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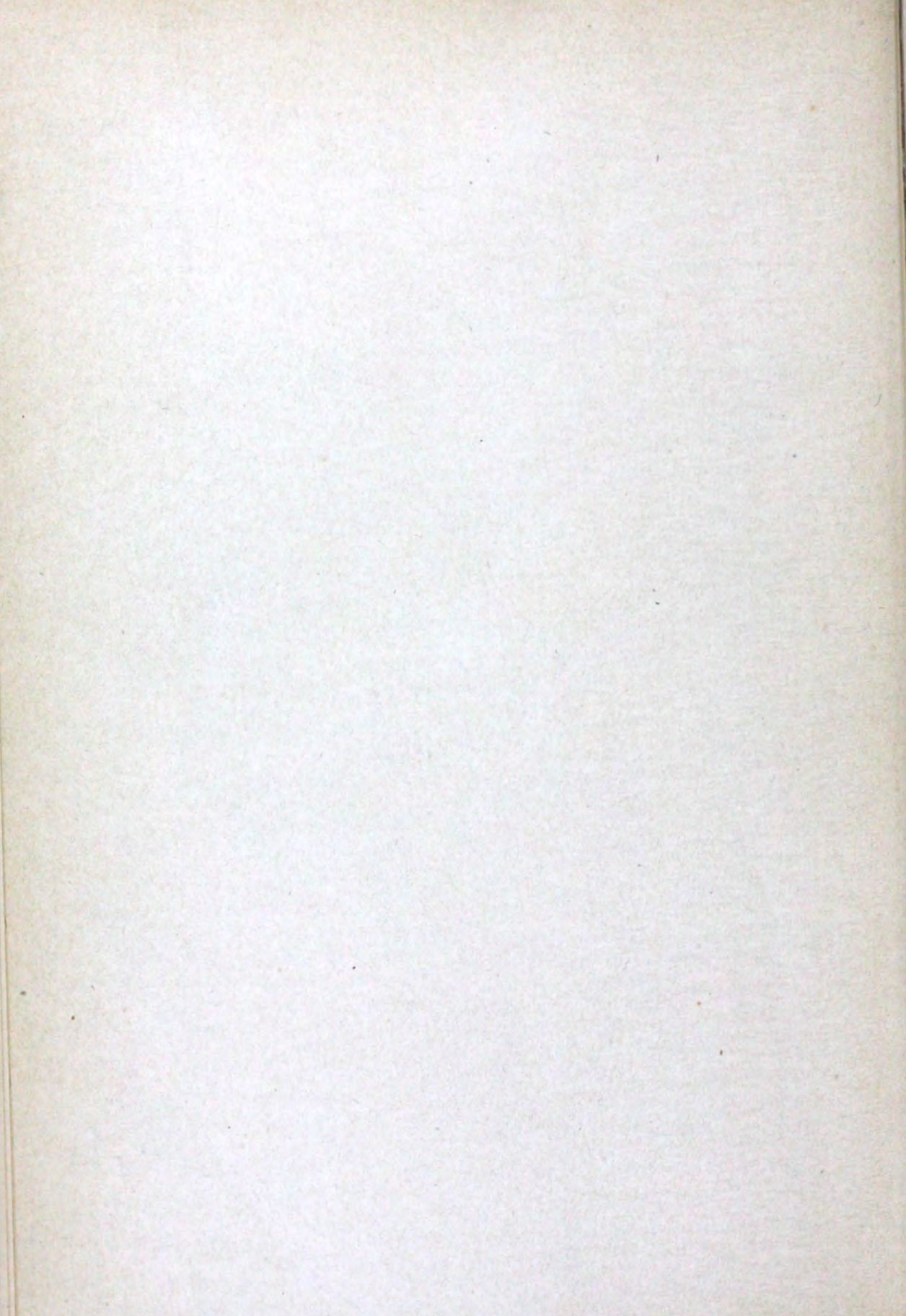
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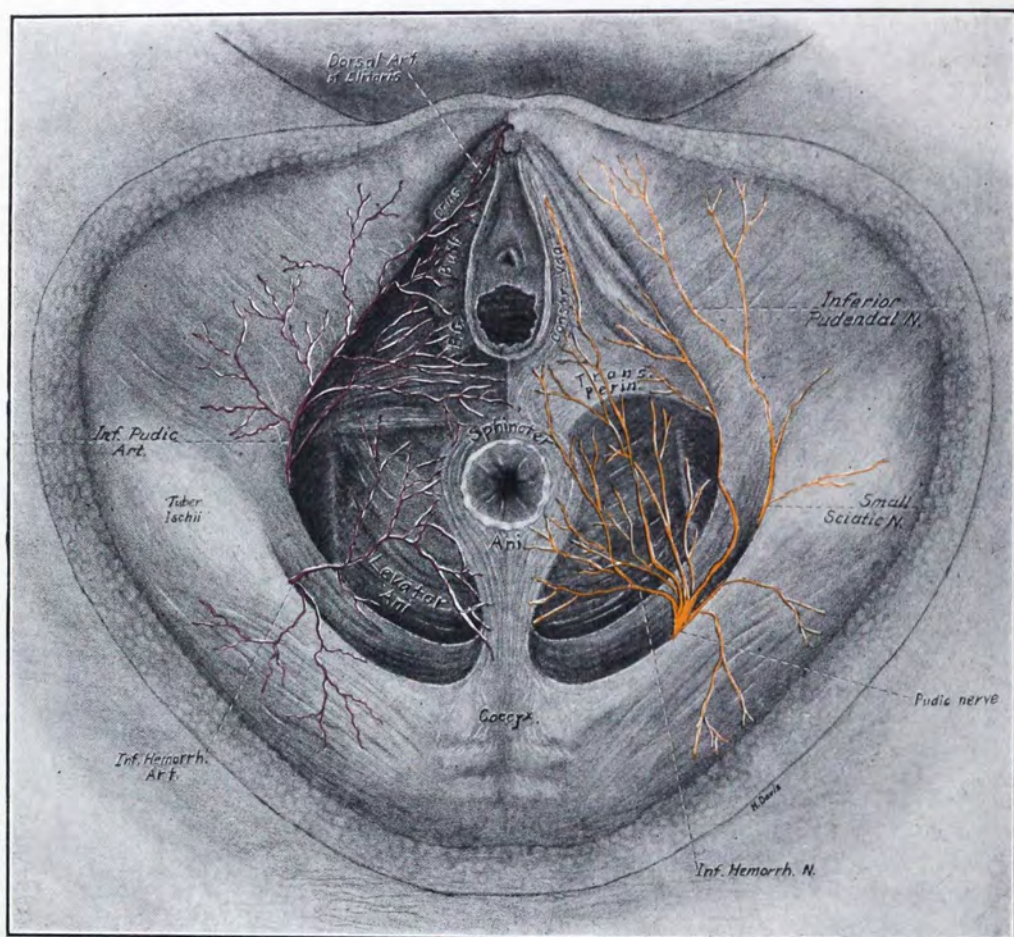


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DISEASES OF THE VULVA





BLOOD AND NERVE SUPPLY OF THE VULVA.—The right side of the picture, with the nerves in yellow, shows the superficial muscles of the pelvic floor intact; in the left side, these muscles have been removed to show the crus of the clitoris, the vestibular bulb and Bartholin's gland. The inferior hemorrhoidal artery, the internal pubic artery and the dorsal artery of the clitoris are indicated in red (redrawn from Kelly).

DISEASES OF THE VULVA

BY

FREDERICK JOSEPH TAUSSIG, A.B., M.D., F.A.C.S.

ASSOCIATE PROFESSOR IN CLINICAL GYNECOLOGY, WASHINGTON UNIVERSITY MEDICAL SCHOOL;
GYNECOLOGIST, BARNARD FREE SKIN AND CANCER, AND ST. LOUIS CITY HOSPITALS;
ASSISTANT GYNECOLOGIST, BARNES HOSPITAL; CONSULTING GYNECOLOGIST,
ST. JOHN'S HOSPITAL; CONSULTING OBSTETRICIAN, ST. LOUIS
MATERNITY HOSPITAL; FELLOW, AMERICAN GYNECOLOG-
ICAL SOCIETY; MEMBER OF AMERICAN ASSO-
CIATION FOR CANCER RESEARCH

GYNECOLOGICAL AND OBSTETRICAL MONOGRAPHS



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PREFACE

SITUATED at the entrance to the genital tract, the vulva differs greatly both in structure and in the diseases which affect it, from the internal organs of generation. While these external parts can be directly examined and easily palpated, some of the most interesting and puzzling problems in diagnosis are concerned with diseases of the vulva. It is probably because gynecologists have as a rule but scanty knowledge of dermatology that mistakes are so often made by them in dealing with vulval conditions. Nowhere does the skin of the body undergo both in form and texture, so many variations in accordance with age, as about the external genitals. This adds to the complexity of the problem.

Because it occupies a borderland between dermatology and gynecology, diseases of the vulva have been insufficiently studied by workers in both specialties, and it is particularly important to have a monograph that takes up in more detail the interesting and frequent abnormal conditions met with in this locality. Special attention is paid by the author to developmental anomalies, to gonorrheal vulvitis in children, to the so-called "precancerous" vulvitis, to the hypertrophic ulcerative conditions about the vulva, and to carcinoma of the vulva and its treatment.

Special thanks are due to Dr. M. F. Engman, Dr. W. H. Chambers and Dr. O. H. Schwarz for valuable suggestions and assistance, and to Mr. H. Davis for his coöperation in the work of illustration.

FREDERICK JOSEPH TAUSSIG

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PART I

ANATOMY, MALFORMATION, TRAUMA

CHAPTER I

EMBRYOLOGY

Definition.—Anatomists and gynecologists have given somewhat varying definitions of the vulva. Some have included only the parts visible on inspection, with the central cleft; others, like Poirier and Charpy, have included the entire external genitals. The name comes from the Latin *valva*, meaning double doors, or door with two leaves. We have accepted in this monograph the broader definition of Poirier and Charpy.

The vulva can, therefore, be considered to include the following structures: labia majora and minora, mons veneris, perineum, clitoris and its folds, Bartholin's glands, vestibulum vaginae, meatus urinarius and hymen. The two latter structures are only partially vulval in origin, but must to some extent be considered in a monograph of this kind because of their close anatomical and pathological relationship with the external genitals. The anus is not properly to be classed as a portion of the vulva, nor will its anatomy and pathology be dealt with in the subsequent pages of this book, except in so far as may be necessary for the proper understanding of normal development and malformations.

Embryology.—In the earliest stages of the development of the breech end of the embryo, the intestinal, urinary and genital tracts coalesce to form what is termed the cloaca. This cloaca is separated from the outside by a thin membrane, the cloacal membrane (Fig. 1), consisting of a few layers of ectodermal and entodermal cells. Such is the condition in the embryo of 10 to 14 mm. body length. At a somewhat later stage, the central cells in the cloacal membrane become absorbed, leaving an opening between the cloaca and the outside. Such, approximately, is the condition found in amphibians, reptiles, and birds; in the higher mammals, however, the intestinal tract is separated from the anterior portion of the cloaca by a downgrowth of connective tissue forming a septum that later becomes the perineum. A further charac-

teristic of some of these higher mammals consists in the downgrowth of the wolffian and müllerian canals to form the genital tract distinct from the urinary tract. Here, again, the separation is formed by the downgrowth of a septum, which only in the later stages of development reaches the surface. The pouch, into which the urinary and genital tracts open previous to their complete separation by this septum, is termed the urogenital sinus (Fig. 2).

Turning now to the more external portions of the genital tract, we find that, at the end of the first month of fetal life in the embryo of

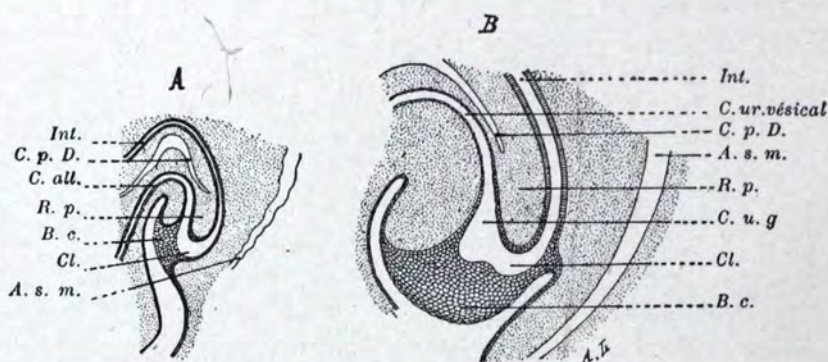


FIG. 1.—SAGITTAL SECTION OF CLOACA (Tourneux). *A*, in an embryo of 8 mm.; *B*, in an embryo of 14 mm.; *Cl.*, Cloaca; *B. c.*, Cloacal membrane; *Int.*, Intestine; *C. u. g.*, Urogenital canal; *R. p.*, Perineal fold.

11 to 13 mm. body length, while the cloaca is still closed, the genital tubercle develops as a mesodermal elevation ventral to the cloacal membrane, and pushes the anterior portion of this membrane before it in its growth. At the end of the second month, this tubercle is a cylindrical structure about 2 mm. in diameter; its upper surface is smooth, but in the center of its lower surface runs a groove that corresponds to the site of the urethra in the male. The epithelial covering of this genital tubercle, while originally single, separates into two layers, the development of which will be considered in greater detail later on.

To either side of the cloacal fossa are found folds of skin that form rounded elevations closing this fossa. Originally these extend the full length of the cloaca, but after the perineal septum has extended to the surface, the folds are limited to the anterior two thirds, extending from either side of the tubercle to a point on a line with the perineum. The genital folds at this early stage of development are single and, from the external appearance of the parts, one cannot definitely state whether the individual is masculine or feminine in type. At the beginning of

the third month, a difference can be noted; the genital tubercle is less prominent in the feminine type and an extra fold has developed on the inner surface of the original genital fold (Fig. 3). This extra fold forms a hood over the genital tubercle known as the prepuce of the clitoris. The extra folds laterally form the labia minora; the labia majora or original folds have, at this time, already grown more prominent.

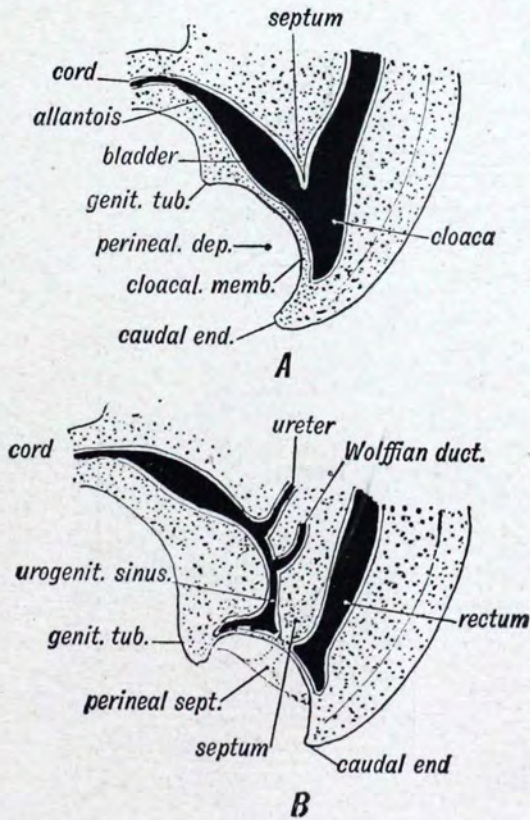


FIG. 2.—DIAGRAMMATIC SKETCH OF SEPARATION OF CLOACA INTO UROGENITAL AND INTESTINAL TRACTS (Keith, *Human Embryology*).

At the beginning of the fourth month, the genital tubercle, now termed the clitoris, is almost entirely covered by its hood or prepuce. Toward the end of the third month, the urogenital sinus becomes greatly shortened by the downgrowth of the urethrovaginal septum, separating the urinary and vaginal tracts. Thus the urethra and vagina are formed and take the place of the urogenital sinus. During this fourth month of fetal life, a marked outgrowth of connective tissue takes place in the perineal region extending upward and encircling the vaginal orifice. This connective tissue outgrowth forms a membrane which is usually

open at the center, but, to a considerable extent, occludes the vaginal orifice; it is termed the hymen and has been the subject of considerable study by embryologists and anatomists. Those who are more deeply interested are referred to the special articles upon this subject. Suffice it to say, the hymen may properly be considered an actively proliferating connective tissue fold, originating in the vagina but extending into the



FIG. 3.—PHOTOGRAPH OF EXTERNAL GENITALS OF AN EMBRYO OF 15 CM. BODY LENGTH. A retractor separates the labia majora, thus exposing the prominent tubercle of the clitoris and the short, narrow labia minora running down from it. At this stage the hymen is only to be identified on microscopic section.

vulva and becoming in its later stages covered by vulval epithelium (Fig. 4). As seen in the accompanying photographs (Figs. 5-7), it forms in the fifth to seventh month of fetal life a whitish prominence resembling the prow of a ship, projecting from the perineum between the labial folds and presenting a great variety of forms.

As early as the third month, there is found, external to the hymenal fold, springing from each side of the labial folds, a minute glandular structure of the definitely mucus-secreting type known as Bartholin's gland; definite mucus formation can be seen as early as the fifth month.

The further development of the external genitals during the last half of fetal life consists primarily in a growth in size; the labia majora,



FIG. 4.—SAGITTAL MICROSCOPIC SECTION OF THE HYMEN AND VULVA OF AN EMBRYO OF 21 CM. BODY LENGTH. This shows how the hymen grows out from the vagina through the vulval orifice.



FIG. 5.—PHOTOGRAPH OF EXTERNAL GENITALS OF EMBRYO OF 28 CM. BODY LENGTH. It shows well developed labia and the beaklike hymen projecting as a white fold between them over the perineum.

particularly, show a rapid increase due to a deposit of fat in this region. A groove is present along the lower aspect of the glans clitoridis cor-

responding to the urethral tract of the male, and at this point the prepuce is separated; it thus forms at the lower edge of the glans a bandlike structure known as the frenulum.

After birth, the external genitals of the female child retain approximately the same proportions; there is, however, an increase in size



FIG. 6.



FIG. 7.

FIG. 6.—EXTERNAL GENITALS OF EMBRYO OF 23 CM. BODY LENGTH. Labia minora are separated to show the hymen.

FIG. 7.—EXTERNAL GENITALS OF EMBRYO OF 24 CM. BODY LENGTH. Labia minora are separated to show a septate hymen. *Cl.*, Clitoris; *L. Mi.*, Labia minora; *H.*, Hymen.

corresponding to the general growth of the body. Only at puberty do we find a marked change in relationship, due partly to the greater development of the labial folds and the growth of hair in this portion of the body. A consideration of the organs at this time and later in life will be taken up in the following chapter.

LITERATURE

- BERRY. Journ. Anat. and Physiol., 1896. 31:18.
BOLK. Ztschr. f. Morphol. u. Anthropol., 1907. 10:250-316.
MEYER. Arch. f. mikr. Anat. u. Entw., 1909. 73:751-792.
POIRIER and CHARPY. Traite d'Anatomie Humaine, 1907. 5(1):579-631.
PRENTISS-AREY. Text-book of Embryology, 1920. 221.
SPULER. Veit's Handb. d. Gynaekologie, 1910. 5:573-651.
TAUSSIG. Am. Journ. Anat., 1908. 8:89-108.
Am. Journ. Obst. and Gynec., 1921. 2:471.
VEIT. Handb. d. Gynaekologie, 1910. 5:637-644.
WOOD-JONES. Lancet, 1914. 1102.

CHAPTER II

ANATOMY

The external genitals of woman undergo the most extensive changes, and the anatomical considerations vary in accordance with whether the individual is (1) in her girlhood before puberty; (2) in the adult stage, but still nulliparous; (3) in the adult stage and has borne children; (4) in the stage after the menopause. Study of the accompanying illustrations show the radical changes that these structures undergo in these four periods of a woman's life.



FIG. 8.—PHOTOGRAPH OF VULVA OF YOUNG GIRL.

In the girlhood period (Fig. 8), one notes a marked prominence of the labial folds and the genital tubercle; a vaginal orifice readily visible on inspection; scanty development of hair upon the surface; and a skin that is smooth and whitish in color, except around the vestibulum where the color is more pinkish. There is practically no secretion upon the surface and the organs lie partly exposed, even on abdominal examination, owing to the absence of fatty deposit and hair over the pubic region.

In the adult nulliparous woman (Fig. 9) is found, on the contrary, a growth of the skin and hair of the genital region and an increase in the size of the thighs that effectively conceals these structures from view.

The growth of hair in the pubic region is extensive, covering the somewhat rounded eminence known as the mons veneris, which develops at this time through an increase in the subcuticular fat. In women, this hairy development is limited to the pubic area, whereas in men it extends upward in a narrow triangular form, following the linea alba almost to the umbilicus. Occasionally this distribution resembling the masculine type is found in women, but should always be regarded as evidence of slightly abnormal bisexual development in the individual.

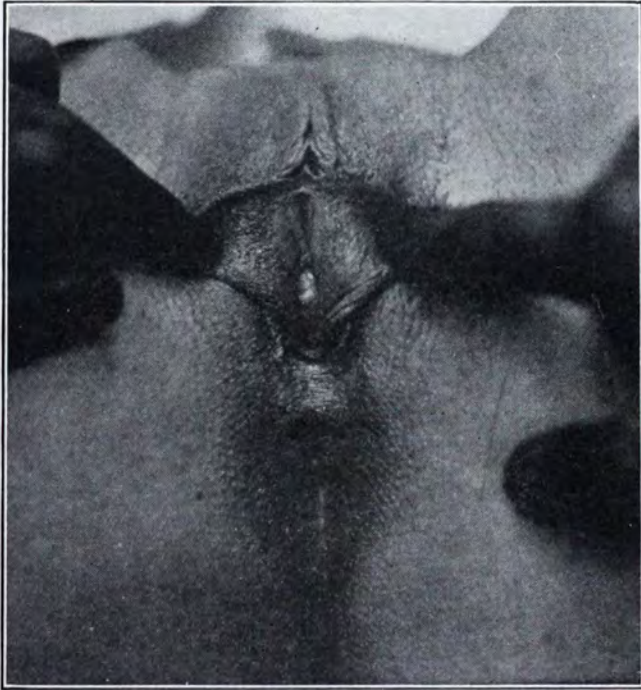


FIG. 9.—PHOTOGRAPH OF VULVA OF ADULT NULLIPARA. This patient was shaved preparatory to operation.

On separating the thighs of the adult nulliparous woman, we find the vulva or, as it is sometimes called, the “interfeminium,” consisting of two folds of skin covered by hair, with a small button-shaped projection at the top, known as the clitoris. Only after these external folds have been separated do we see exposed, in the adult nulliparous type, the inner labial folds—the labia minora, the prepuce, the frenulum of the clitoris, the urethral opening, the vaginal opening, and the hymenal membrane. To either side and halfway between the urethra and the perineum, we see, just external to the hymen, a pink-colored opening—the meatus of Bartholin’s gland. Where the labia minora approach each other over the perineum, a fold is formed that varies somewhat

in extent and is termed the posterior commissure. Between this fold and the hymen is a shallow pocket termed the fossa navicularis. There has been considerable ambiguity in the anatomical description of what is termed the vestibulum vaginae and, in women who have had children, the effacement of these surrounding external folds has indeed made it well-nigh impossible to define the exact limits of this vestibulum. In

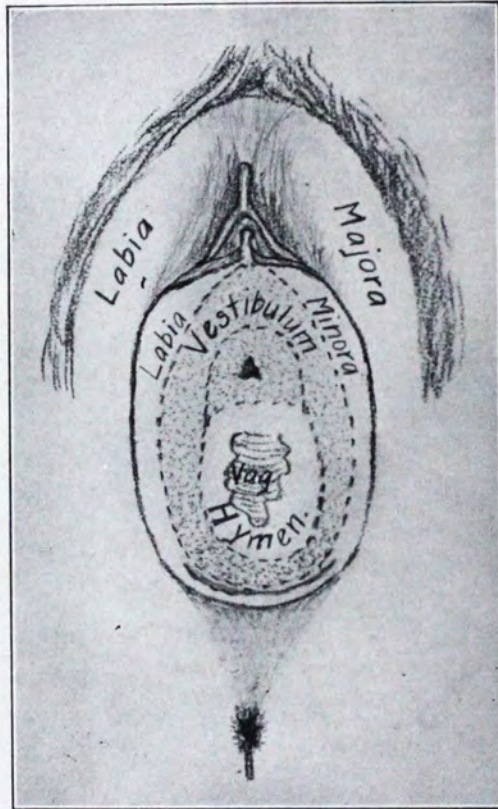


FIG. 10.—OUTLINE SKETCH OF VULVA. The dotted area indicates the limits of the vestibulum vaginae (redrawn from Dickinson).

this stage of the adult nulliparous woman, however, the vestibulum can properly be defined (Fig. 10). It is the area bounded externally by the posterior commissure, the inner surface of the labia minora, and the frenulum of the clitoris; and bounded internally by the edges of the hymenal membrane. This area is characterized by its moist surface and a somewhat pinkish color like a mucous membrane, whereas the more external portions of the vulva surrounding this area are white and definitely epidermal in type.

In the third stage, that of the adult multiparous woman (Fig. 11), we find considerable variety in the appearance of the external genitals, depending largely upon the extent of the external tears that occur at child-birth, and the protrusions resulting from the lack of support of the pelvic structures above the vulval opening. We find in this type that the vulva has again a more open appearance, so that, merely by separating the thighs and inspecting the genitals, the urethra, the labia minora and the edges of the hymen are visible. The labia minora are usually somewhat



FIG. 11.—ADULT MULTIPARA.

shorter and lower than in the nulliparous type. The hymen has been flattened out so that there remain only scattered triangular projections, varying in size and surrounding the vaginal orifice. These hymenal remnants are known as *carunculae myrtiformes*. Owing to the somewhat more exposed condition of the area situated between the labia minora and the hymen, the tissues have lost their delicacy and appear more whitish in color. About the labia and the perineum, there is a slight tendency to wrinkling, not dissimilar to the wrinkling that is ordinarily found in the abdominal skin of multiparous women. Ordinarily we find, on separating the labia, that the vagina presents a somewhat open appearance (Fig. 12) and that a small portion of the anterior

and posterior walls are visible even though they may not be prolapsed beyond the vulval ring.

In the fourth stage, that of the woman beyond the menopause (Fig. 13), there is some variation of form depending upon whether the woman is nulliparous or multiparous. In either instance, however, there is considerable shrinking in the size of the external genitals, corresponding, ap-

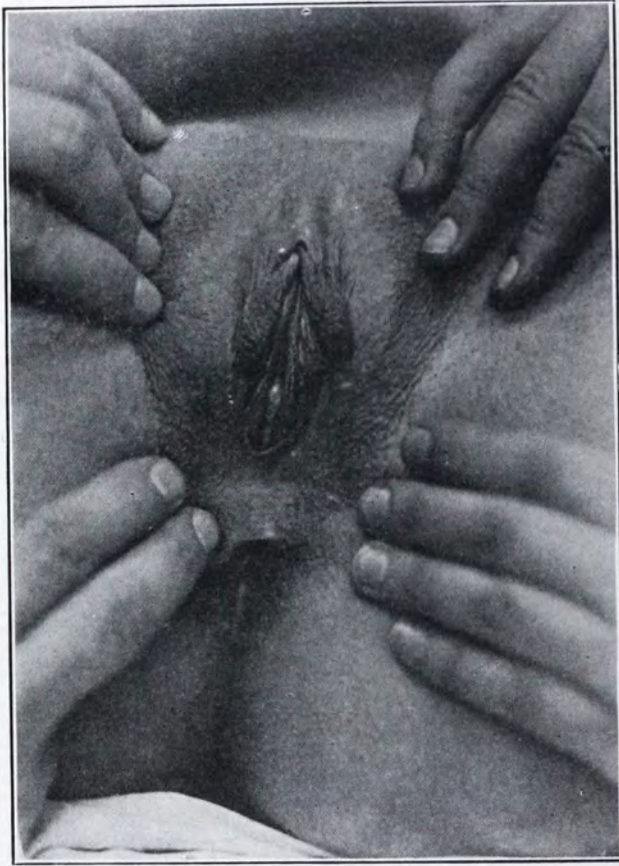


FIG. 12.—PHOTOGRAPH OF VULVA OF ADULT MULTIPARA WITH HYPERTROPHIC LABIA MINORA.

proximately, in extent to the atrophy of the internal genitals. This atrophy of the vulva is fairly rapid in the year or two following the menopause, but continues to some degree throughout the succeeding years, so that in extreme old age (women over seventy years) the labial folds and clitoris are at times so completely obliterated that they resemble the pathological condition known as kraurosis of the vulva. This condition may properly be considered as normal in a considerable percentage of women over seventy years of age. As a rule, the amount of

obliteration of the folds and clitoris in women beyond the menopause increases with the number of children they have borne. Owing to the gradual disappearance of the fatty deposits in the labia majora, the partial loss of hair in this region, and the wrinkling and diminished size of the surrounding areas in the groin and buttocks, there is in the external genitals of older women an openness of appearance not dissimilar to the condition found in children. The most marked difference lies in the texture and color of the skin which, at this stage, shows a

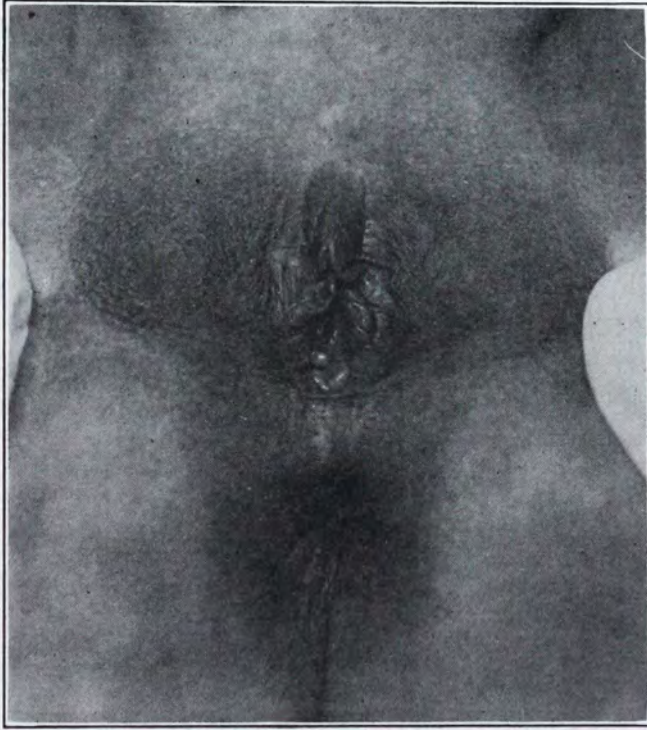


FIG. 13.—PHOTOGRAPH OF VULVA AFTER MENOPAUSE.

markedly wrinkled appearance of the labia majora and a smooth, at times almost velvety, appearance of the labia minora, perineum and the tissues surrounding the urethra. The absence of moisture in the vulval tissues at this time is pronounced and they are oftentimes so brittle in structure that slight traction on the labia or perineum produces a cracking of the skin.

For more detailed consideration, it will be better to take up the various structures composing the vulva individually.

Labia Majora.—The labia majora extend from the lower extremity of the mons veneris down to the perineum. They approach each

other more closely above than below, and consist of folds of skin covered in great part by hair. These labia have an average length of from 8 to 9 cm. and a thickness of $2\frac{1}{2}$ cm. Ordinarily their consistence is firm and elastic but, in the multiparous woman, particularly



FIG. 14.—PHOTOGRAPH OF VULVA OF WOMAN AFTER MENOPAUSE. Note the flabby tone and the thin, glistening mucosa.

the somewhat emaciated type, they are wrinkled and flabby. On the internal aspect of the labia majora, we find a groove separating them from the smaller labia—the labia minora. The upper portion of this inner surface has a somewhat pigmented appearance corresponding to the external surface. The lower portion, approximating the labia

minora, has a smooth, moist surface, slightly pinkish in color resembling the appearance of a mucous membrane. There have been described an anterior and a posterior commissure, but these usually are poorly developed and have no special anatomical significance. The skin covering the labia majora is thick, contains many sebaceous and sweat glands and is covered by hair, except along the lower part of the inner aspect. The extent of this glandular development is very pronounced and accounts for the frequency of sebaceous retention cysts and hair follicle infections found in this region. On the inner aspect of the labia majora, the sebaceous glands empty directly on the skin surface and are less numerous.

Involuntary muscle fibers, or dartos, are much less developed in the labia majora than in the corresponding tissue, the scrotum, of man. They are found in thin bundles, running somewhat irregularly beneath the surface of the skin. A large quantity of fat tissue is found in this region, situated in little lobules separated by elastic and connective tissue fibers. This elastic connective tissue network also forms a fairly well-defined sac with an inner opening pointing toward the inguinal region. It is at this point that the round ligament enters the labium majus from each side, its fibers disintegrating and passing into the fibro-elastic sac, just described. Occasionally a small projection or culdesac of the peritoneum follows the course of the round ligament into the labium majus, and may be filled with fluid or, if communicating with the peritoneal cavity, may contain some of the abdominal or pelvic structures.

The blood supply of the labia majora is derived from the external pudenda and the internal pudenda and also from a small branch coming from the obturator artery. There is free anastomosis between them. The veins of this region have approximately the same source, but they also communicate with the vesicovaginal plexus and the external hemorrhoidal veins. The nerve supply is from the ilio-inguinal, the internal branch of the genitocrural and the genital branch of the lesser sciatic regions (see Frontispiece).

Labia Minora.—The labia minora consist of two cutaneous folds of an average length of 3 cm., an average height of from 10 to 15 mm. and a thickness, at their base, of approximately from 3 to 4 mm. Great variations in size occur in different individuals and, in certain races, such as the Hottentots, they may have a length of 20 cm. Ordinarily they are concealed in the nulliparous woman, but where their size is great they may project outward and be visible. They lie directly approximated to each other; their free border is convex, narrow and usually

somewhat irregular, containing indentations not dissimilar to those found in a cockscomb. Occasionally they are definitely lobulated. I have already described the posterior commissure that connects them and forms the outer margin of the fossa navicularis.

Essentially, the labia minora are reduplications of skin and not mucosa, inclosing in their depth connective tissue fibers with numerous bundles of elastic tissue; there is never any fat. The skin is rich in pig-



FIG. 15.—MICROSCOPIC SECTION OF LABIUM MINUS. Note the large number of sebaceous glands in this region.

ment, and tends to darken in the brunette type during pregnancy; there are practically no sweat glands, but both surfaces are rich in sebaceous glands having many ramifications (Fig. 15). A stratified pavement epithelium with numerous papillae characterizes the skin surface. The prepuce of the clitoris has a smaller structure than the labia minora and is continuous with it. The smegma found beneath the prepuce is the product of the desquamated epithelium and is not limited to the preputial cavity, but may also be found in the ridge between the labia minora and the labia majora. The blood supply is from the labial vessels, as already described, and from the dorsal artery to the clitoris.

Numerous anomalies of development of the labia minora have been described by Jayle. Secondary folds running parallel to the labia and occasionally one running at right angles to them have been observed. These he has termed "paranympheal folds" (Fig. 16). Occasionally,

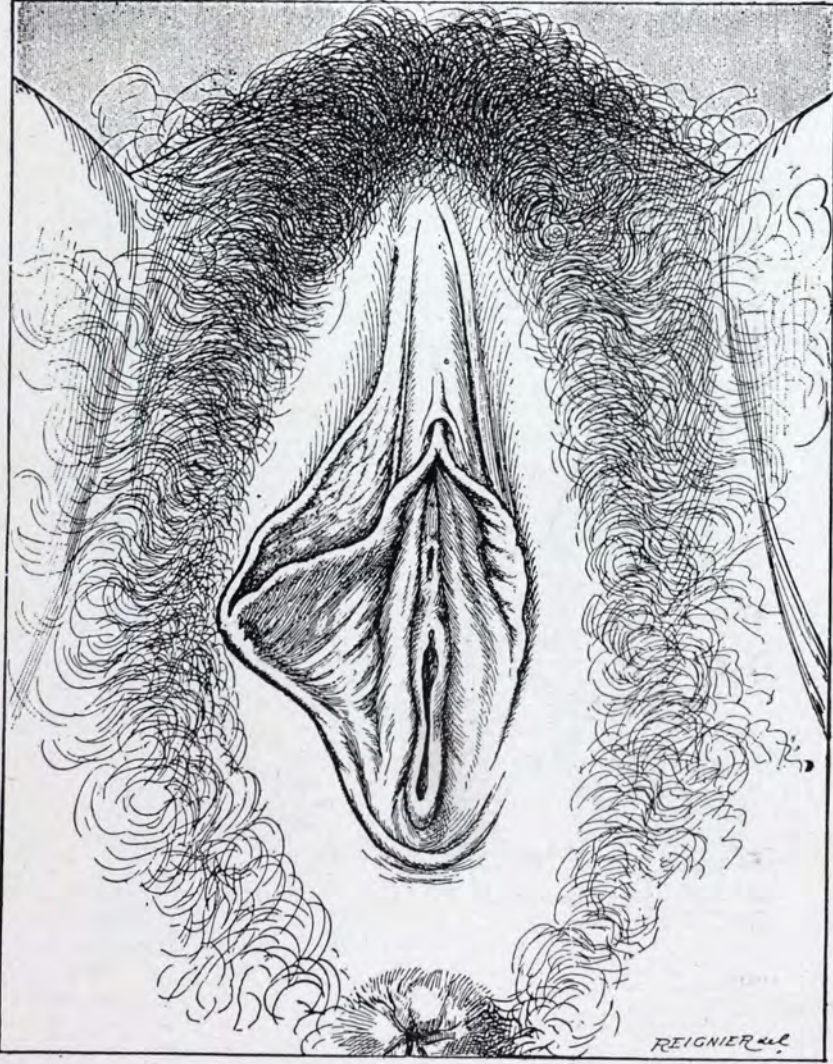


FIG. 16.—PARANYMPHEAL FOLDS IN A NULLIPAROUS WOMAN OF THIRTY YEARS (Jayle). The right labium minus is doubled in its upper half. On the left side there is also a less pronounced extra fold.

similar reduplications are found at the posterior commissure as well (Fig. 17). Jayle believed the prepuce of the clitoris should not, anatomically, be considered a part of the labia minora.

Clitoris.—This structure is composed of two roots, which run along the pubic ramus to unite beneath the symphysis in the body of

the clitoris. The body, in turn, terminates in the upper part of the vestibule as the glans. The roots and the body are covered, the glans alone is exposed.

The *roots* or *crura* of the clitoris are from 3 to 4 cm. in length in the flaccid state, but in erection they are from 4.5 to 5 cm. long. They are approximately cylindrical in shape, but are larger in front than

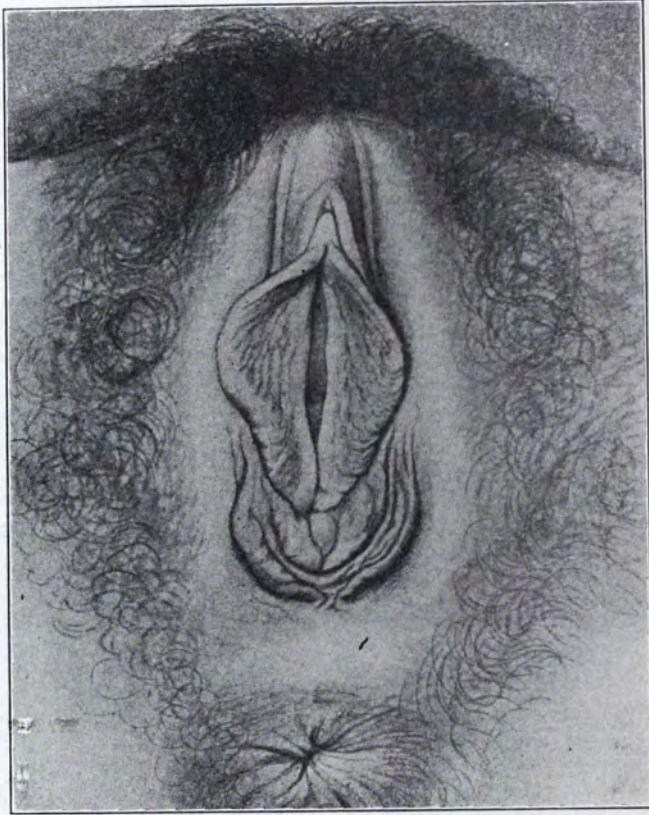


FIG. 17.—COMMISSURAL FOLDS IN A MULTIPAROUS WOMAN OF TWENTY-FIVE YEARS (Jayle). The labia minora are somewhat hypertrophic. In the region of the posterior commissure are seen two well-developed folds resembling accessory labia in extent.

behind. Firmly attached to the middle portion of the pubic ramus, the inner surface is bordered by the ischiocavernosus muscle, while in front of it lies the bulb of the vulva and the bulbocavernosus muscle.

In front of and beneath the symphysis the roots join back to back and are turned so that their dorsal surface lies beneath. The body of the clitoris thus formed goes upward for a short distance, then turns abruptly downward and backward forming a sharp angle, termed the knee of the

clitoris, which differs from the angle formed by the penis inasmuch as it remains the same whether or not the organ is in a state of erection. Its movements are restricted by the frenulum and the suspensory ligament. The suspensory ligament consists of a superficial layer of elastic fibers and a deeper fibrous band which runs from the anterior inferior surface of the symphysis to the fascia of the clitoris.

The body of the clitoris, from 2.5 to 3 cm. long, is surrounded by a connective tissue capsule of fibro-elastic tissue termed the fascia of the clitoris. The glans is conical in shape, covered in part by the prepuce, and ridged beneath where the frenulum is attached. Kobelt states that in animals in which the male possesses a bone in the penis, the female has a cartilage or tiny bone in the clitoris.

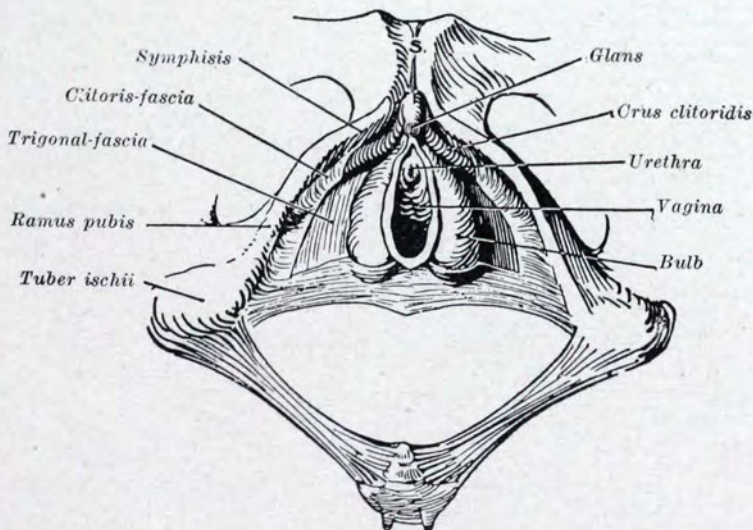


FIG. 18.—CLITORIS AND BULBS. This shows how the two crura join to form the body of the clitoris lying superior to the leech-like bodies of the vestibular bulbs (Corning).

The covering of the glans is not mucosa but merely modified cutaneous tissue. No true glandular structures are found. Unlike the penis, the glans of the clitoris contains no corpus spongiosum and does not possess as much erectile tissue. The vestibular bulbs in woman, corresponding to the corpora spongiosa in man, are independent of the clitoris.

The arteries of the clitoris rise from the internal pudenda. They leave the pelvis beneath the greater sacrosciatic ligament, running parallel to the ischiopubic ramus and sending branches centrally to structures in the midline. The veins correspond to the arteries, except that the large dorsal vein of the clitoris runs beneath the arcual ligament of the

symphysis through a small notch and communicates with the pelvic veins, forming an important part in making the plexus of Santorini.

The nerves originate from the internal pudenda and three large branches run to the clitoris, a greater amount than that which supplies the penis. The glans contains numerous pacchionian bodies and extensive nerve filaments. Hence this structure is hypersensitive.

Vestibular Bulbs.—The bulbs may be compared to two leeches filled with blood. They have a round base beneath and a pointed head above, are 3.5 cm. long and from 1 to 2 cm. in cross section. They lie external to the fascia of the perineum. The capsule of the bulb is much more delicate than is that of the clitoris, so that, when engorged, a bluish color is imparted to the entire vulva.

Bartholin's Glands.—The major vestibular glands were discovered by Bartholin in 1680. Situated one at each side of the vaginal orifice, 1 cm. in front of the hymen, they are the size of a pea and can normally be palpated only in rather thin women. In the adult, their dimensions are from 7 to 20 mm. long, from 4 to 11 mm. broad and from 3 to 7 mm. thick. Firm, elastic in consistence, yellowish-white in color, slightly lobular in shape, they grow rapidly at puberty and shrink after the menopause. The single layer of high cylindrical epithelium lining the racemose glands secretes large quantities of mucus, particularly at periods of sexual excitement. The duct is lined by delicate squamous epithelium similar to that found covering the vestibulum.

LITERATURE

- BERKELEY and BONNEY. *Guide to Gynecology*, 1919. 61.
 DELBANCO. *München. med. Wchnschr.*, 1905. No. 11.
 JAYLE and BENDER. *Rev. de Gynéc. et de chir. abd.*, 1907. 11:407-442.
 MORALLER and HOEHL. *Atlas Norm. Histol. d. Weibl. Geschlechtsorgane*, Leipzig, 1912. 1-10.
 POIRIER and CHARPY. *Traite d'Anatomie Humaine*, 1907. 5:579-631.
 SARETZKI. *Journ. Akuschertza*, 1906. No. 2, 20.
 TESTUT and JACOB. *Anatomy*, 616-628.
 WALDEYER. *Das Becken*, Bonn, 1899. 549.

CHAPTER III

MALFORMATIONS

While malformations of the internal genital organs are met with not infrequently, those of the external genitalia are quite rare and may be grouped almost entirely under two heads: (1) incomplete separation of the cloaca; and (2) pseudohermaphroditism.

Complete absence of either the labia majora or minora is extremely rare. Rudimentary development of the external genitals occasionally

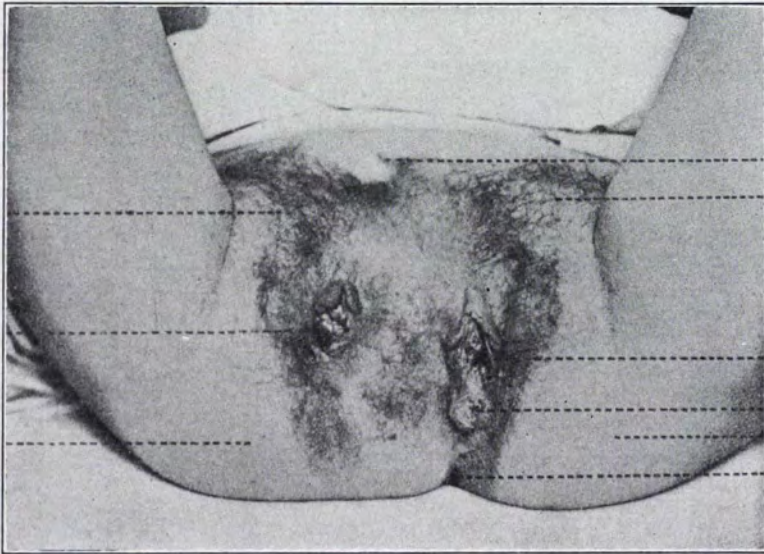


FIG. 19.—DOUBLE VULVA (Gemmell and Paterson). 1. Symphysis pubis; 2. Right mons veneris; 3. Left mons veneris; 4. Right labia; 5. Left labia; 6. Anus; 7. Right tuber ischii; 8. Left tuber ischii; 9. Gluteal fold.

attends a rudimentary condition of the internal organs, but is usually less pronounced. Often we find a normal vulva with rudimentary genitals.

A duplication of the external genitals is extremely rare and usually associated with partial duplications in other portions of the body (uni-ovular twins). Gemmell and Paterson have described an interesting case of double vulva in an adult woman (Fig. 19). This patient had a complete duplication of the internal genital tract as well as the vulva,

and gave birth to a child through each vulva. The lower end of the vertebral column was duplicated and the pelvis was enormously wide.

Cloacal Malformations.—An incomplete septum formation between the urogenital and intestinal tract leads to a variety of congenital anomalies. The bowel may end either (1) at the lower extremity of the vagina (anus vaginalis); or (2) in the vestibulum just back of the hymenal ring (anus vestibularis); or (3) in the center of the perineal body (anus perinealis). In cases of anus vaginalis, the muscular control is incomplete and there is considerable degree of incontinence of the feces as a result. In anus vestibularis, however, there may be complete control, as in a case seen at Barnes Hospital in 1912. This patient, indeed, had constipation so pronounced that cathartics were repeatedly necessary. The rectovaginal septum was approximately 1 cm. thick and, caudal to the anal opening, lay the perineal triangle. Of unusual interest in this case was the fact that there was a complete situs transversus of the large intestine, the appendix and cecum being found on the left side, the sigmoid and rectum on the right. There was, however, no general situs transversus, for the liver, heart and spleen were all found in their proper places. The accompanying sketch (Fig. 20) gives an idea of the anatomical relations in this case.

Ruebsamen was able to find reports of sixty cases of anus vestibularis in literature and describes an operation for this condition, the main feature of which is that, after dissecting free the edges of the fistulous opening and closing it with a purse-string suture, the sutured tissues are drawn down beyond the ring of the sphincter ani muscle and fastened there so that it lies just external to the grasp of this muscular ring.

We find descriptions of double openings of the intestinal tract, one at the normal anal site and the other through either the vagina or the vestibulum. Such double openings are extremely rare, and, in all likelihood, not congenital; their explanation embryologically would be most difficult. The only anomaly that we meet with at all frequently is that of the vestibular anus. Not infrequently it happens, as in the case of the patient described above, that so little discomfort from this condition is felt that it is noticed only when an examination of the patient is made for other reasons. Where pronounced constipation is present, it is usually due to the sacculation of the rectal pouch and the constriction of the anal ring. A moderate degree of dilatation will, at times, be necessary to correct this; only rarely will surgical intervention be justified, and the object should be, in such instances, to make the anal opening correspond as nearly as possible to its normal site.

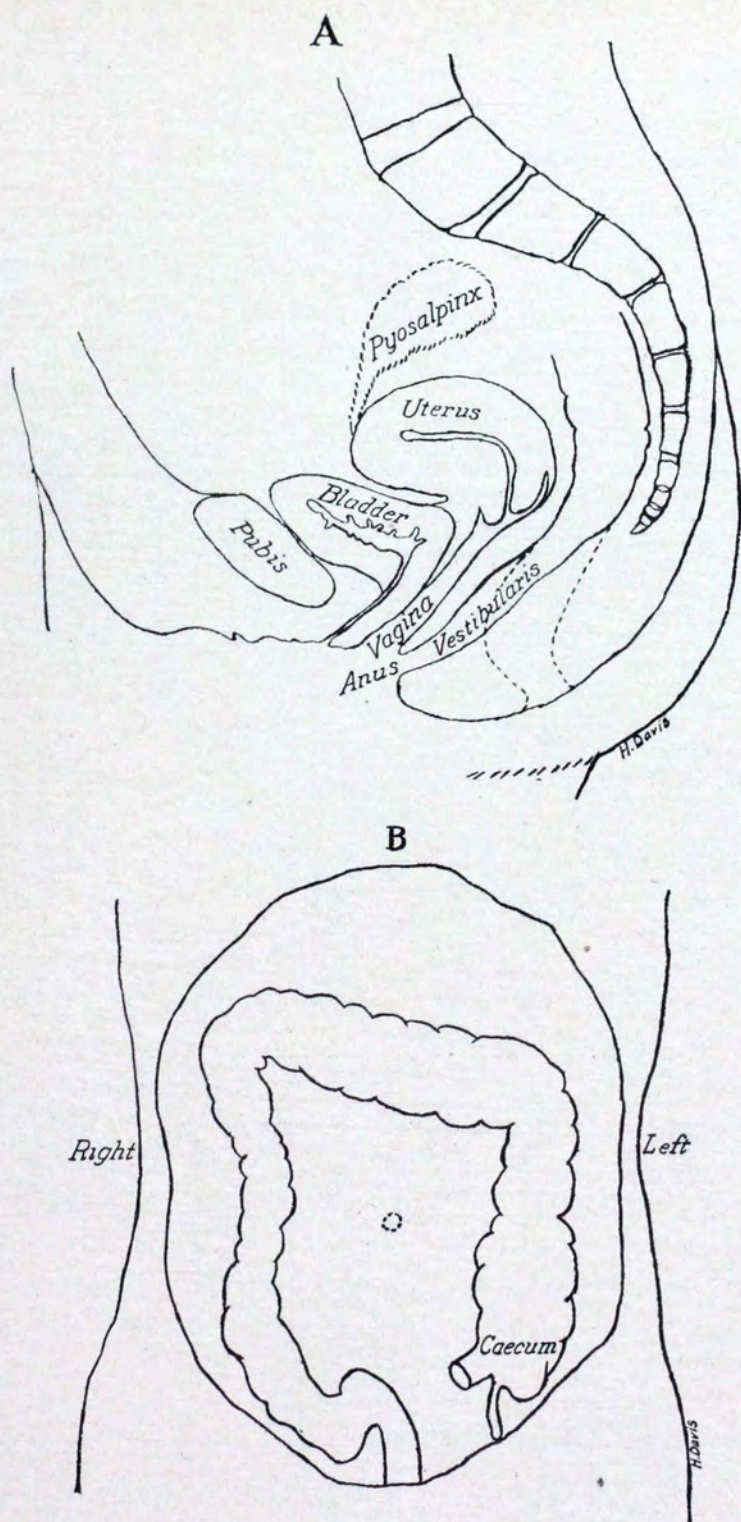


FIG. 20.—VESTIBULAR ANUS. *A*, cross-section of pelvic organs; *B*, transposed intestine. The vulval anomaly was associated in this case with transposition of the large intestine resulting in a left-sided appendix. The symptoms of right-sided pain and swelling suggested appendicitis but were due to a pyosalpinx. Appendix on left side was practically normal. The dotted line in Fig. *A*, shows normal position of anus.

Pseudohermaphroditism.—There are many degrees of bisexual development of the individual. At times this may be evident only in the general physique, lower tone of the voice, absence of the development of the breasts, character of the skin, and general distribution of the hairy growth. The determining factor of sex is the sexual glands, but we find all sorts of combinations in the internal and external genital tract, the secondary sex characteristics and the psyche, in which elements of the opposite sex are combined. Such forms of bisexual development,

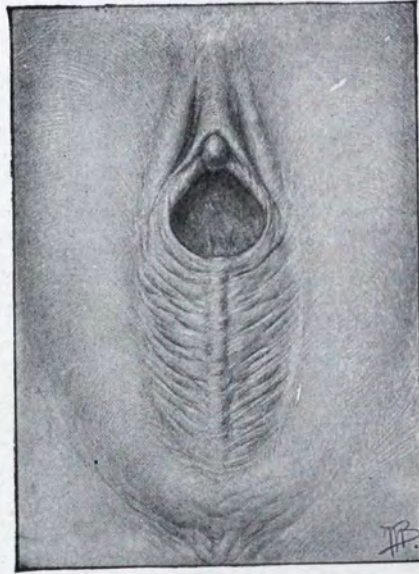


FIG. 21.—AGGLUTINATION OF LABIA MINORA (Kelly).

known as pseudohermaphroditism, are more frequently met with in the male than the female. Since there has arisen in this group, not infrequently, a wrong diagnosis of sex, that condition of development in the male must be briefly considered here, in which the scrotal folds are ununited, the testicles either in the abdomen or the inguinal canal, the urethral opening presenting a condition of hypospadias, and the genital tubercle (penis) corresponding in length more nearly to that found in woman. Such individuals have occasionally been mistaken for women, since the secondary characteristics are very often of the feminine type in these individuals.

The most frequent forms of pseudohermaphroditism in woman are the hypertrophic clitoris and a partial agglutination of the labial folds known as hyposynclysis (Fig. 21). A good example of hypertrophic

clitoris in a negress is shown in Fig. 22. Occasionally there may be associated with this condition a hernia of the ovaries, thus bringing about an appearance of the sex glands in the labial tissues.

Finally, this chapter of congenital anomalies is not complete without brief mention of those failures of fusion that occasionally are found ventral to the vaginal orifice. I refer now to the divided clitoris, associated usually with lack of union of the ventral surface of the urethra.

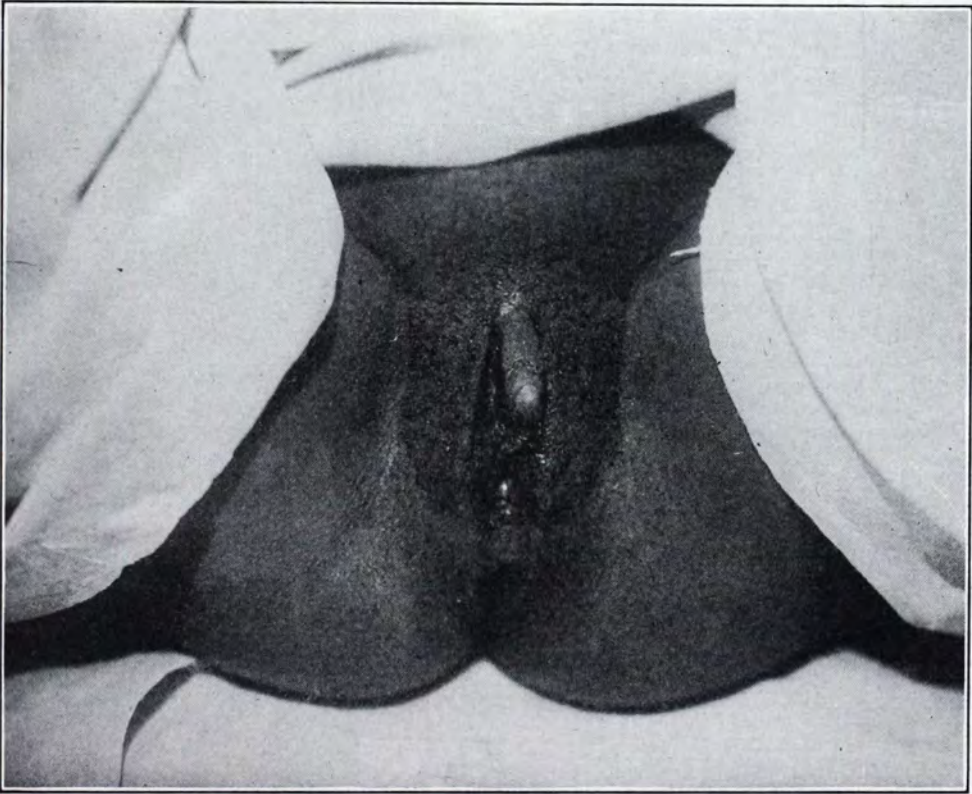


FIG. 22.—HYPERTROPHY OF THE CLITORIS IN AN EIGHTEEN-YEAR-OLD PRIMIPAROUS NEGRESS OF FEMININE TYPE. The long labia minora allowed of considerable change in position on erection. No other genital malformation was present.

We find at times a complete lack of union in the symphyseal region, bringing about complete exstrophy of the bladder. In this instance, the symphyseal bridge is united and there is some degree of disunion reaching upward along the abdominal wall. Cases of lack of union of the anterior wall of the urethra (epispadias) are much less frequent in women than in men. The most frequent of all these malformations is exstrophy of the bladder. Many operations have been devised for the correction of this condition, and the reader is referred to the special literature on this subject. Practically, the only procedure that gives a

satisfactory result is the implantation of that portion of the bladder into which the ureters empty into the sigmoid flexure.

Slight degrees of hypospadias are occasionally found; in these cases, we find the urethra somewhat shorter, with a meatus situated in the lower vaginal segment and somewhat oval in shape, instead of having a star shape as usual. Occasionally, we find associated with such slight degrees of hypospadias faulty development in the müllerian tract and double vagina. Rarely do we find incontinence with this form of hypospadias in the female; operative treatment is not indicated.

LITERATURE

- BELL. *Lancet*, 1911. 1: 1269.
GEMMELL and PATERSON. *Journ. Obst. and Gynaec. British Empire*, 1913. 23: 139.
KELLY. *Operative Gynecology*, 197.
PURDUM. *Am. Journ. Obst.*, 1917. 76: 813.
QUIMBY. *Johns Hopkins Hosp. Bull.*, 1916. 76: 813.
RUEBSAMEN. *Ztschr. f. Geburtsh u. Gynäk.*, 1921. 84.
STUCK. *Am. Journ. Med. Sc.*, 1918. 156: 75.
VEIT. *Handb. d. Gynaekologie*, 1910. 4: ii, 1035.
VEYRASSET. *Internat. Abstr. Surg.*, 1918. 392.
WIENER. *Am. Journ. Obst.*, 1917. 75: 398.

CHAPTER IV

CIRCULATORY DISTURBANCES OF THE VULVA

Edema.—On account of the loose connective tissue situated in the labia majora, it is customary to find marked edema of these structures whenever there is general anasarca or obstruction to the portal circulation. At times the edema of the vulva is so pronounced that it

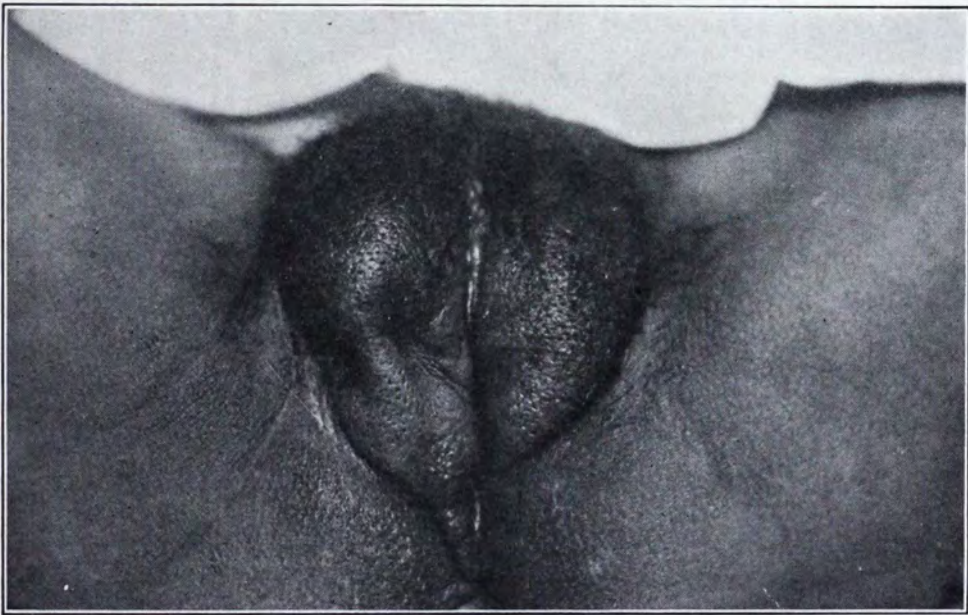


FIG. 23.—EDEMA OF THE VULVA. The edema in this case was due to blocking of the lymphatic return by a pelvic carcinoma. The right labium majus was pinched just before the photograph was taken to demonstrate the pitting on pressure.

causes irritation and difficulty in micturition. Usually both labia are equally involved, but occasionally it is more pronounced on one side. On pressure over such edematous labia, there results deep pitting of the skin (Fig. 23). Edema of the lower part of the abdominal wall is almost always present in these cases.

Some edema is also found associated with acute inflammatory conditions. Where a chancre is located on the labium majus, there is always

marked edema present on that side. Edema is also found, though less marked, associated with abscess of Bartholin's gland.

If the edema is transitory, but little change occurs in the tissues of the vulva. In diseases of the heart and kidney, the vulval edema usually subsides with rest in bed, and results in no permanent changes. In the chapter on chronic hypertrophic vulvitis, I have described a chronic edema that results largely from blocking the lymph and venous return from the vulva. The enlargement resulting from such chronic edema may be considerable, but since the trouble is primarily inflammatory rather than circulatory, I have preferred to discuss it under that head.

Varicose Veins of the Vulva.—In the multiparous woman, it is very common to find dilated veins in the lower half of the body. Wherever we find varicose veins in the leg or in the form of hemorrhoids about the anus, we are apt to see similar venous dilatation in the region of the labia majora. These veins in the nonpregnant individual are rarely troublesome, but during the last months of gestation they may form a large, and at times painful, swelling in the vulval region. So pronounced does this condition become that it may require special treatment. Edema often attends varicose enlargements. The patient complains of burning, itching and a feeling of tension in the vulva. These veins are found more frequently in women who are on their feet a great deal, and with each succeeding pregnancy they grow larger. Occasionally a vein may become thrombosed and the pain resulting therefrom may necessitate rest in bed. The treatment of varicose veins of the vulva is complicated, owing to the difficulty of applying a suitable bandage over the vulval region. I know of no special appliances for this purpose, but I have seen marked relief from the application of a strip of thick rubber dam, 4 or 5 inches wide, fastened to the corset or abdominal binder in the back and brought forward between the thighs, sufficiently tightly over the vulva to compress the dilated veins.

During the puerperium, the veins usually reduce in size and no longer produce symptoms. In some instances, however, they remain dilated and require operative ligation and removal for relief.

The case shown in Fig. 24 is an example of varicose veins of the vulva, occasionally found in the nonpregnant woman on the basis of an old nevus. This woman was twenty-eight years old, unmarried and, according to the statement of an aunt, was born with a birthmark at this site. Since puberty, she had repeatedly had slight bleeding from the region of this swelling. It gradually grew larger, but not until three weeks previous to her entrance to the hospital was there any pain. Ex-

amination showed the entire right labium majus converted into a semi-elastic mass, the size of a hen's egg, covered by varicose veins. The right half of the prepuce and the clitoris was enlarged and had a dark blue color. The left side was normal. The diagnosis of varicose veins on an angiomatous base was made and, through the courtesy of her physician, Dr. Henry Schwarz, she was referred to me for operation. For special reasons only, the labial tumor and not the clitoris was first

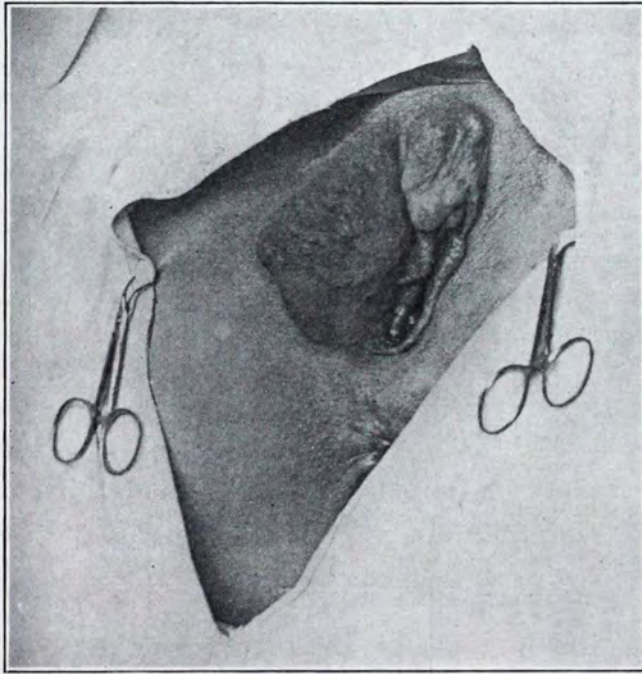


FIG. 24.—VARICOSE VEINS OF THE VULVA IN A NULLIPAROUS WOMAN. Tumor removed. Sections shown in Fig. 25.

removed. Later, however, it became necessary to remove the clitoris as well. Microscopic examination showed a telangiectatic angioma (Fig. 25) in the clitoris, as a result of which the larger varicose veins in the labia had formed.

Hypertrophy of the Labia Minora.—In the usual anatomical descriptions of the labia minora, it is stated that they are small folds lying within the labia majora and ordinarily concealed by the latter when the knees are together. Jayle has shown that this description is not correct. Out of 104 women examined for this particular purpose, 64 showed the labia minora projecting from 0.5 to 4 cm. beyond the vulval cleft. The remaining 40 women were, as a rule, rather stout with unusually large labia majora. Where the labia minora projects more

than 4 cm. from their attachment to the vulva, we may speak of them as hypertrophic. Such an enlargement is usually symmetrical (see Fig. 9), but occasionally we meet with a one-sided elongation of the labial folds. So frequently is a moderate amount of hypertrophy associated with habits of self-abuse that Kelly and Dickinson have felt justified in making the diagnosis of masturbation solely from the changes in the labia. In these

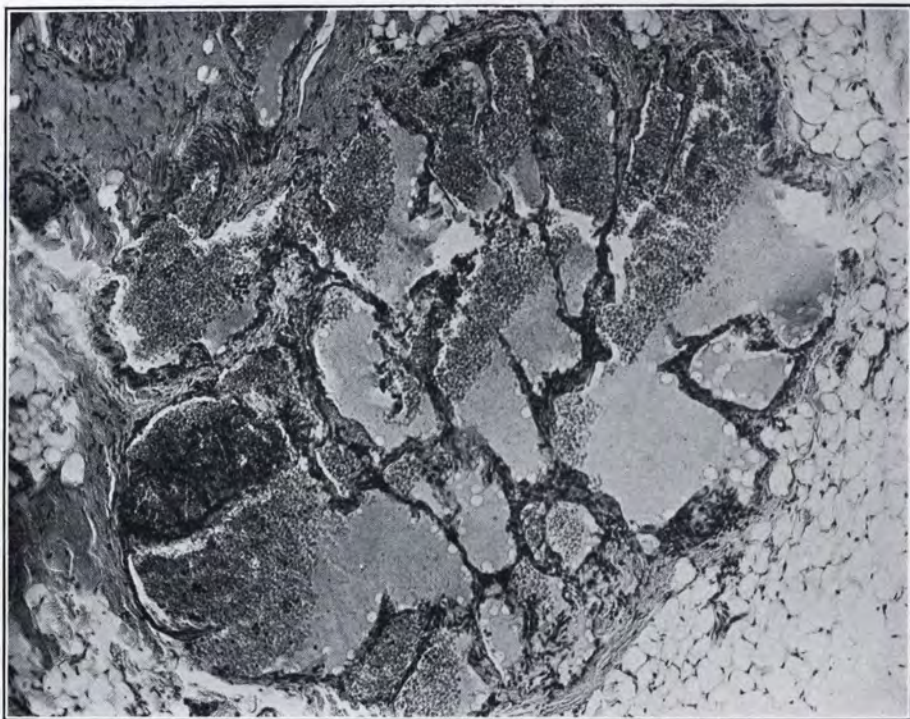


FIG. 25.—VARICOSE VEINS OF THE VULVA. The telangiectatic angioma is shown on the base of which the venous varicosities developed (microphotograph.)

cases there is usually a hypersecretion of the sebaceous glands, making the surfaces of the labia moist and glistening. Chronic hyperemia resulting from repeated sexual excitement is the etiologic factor in hypertrophy more than efforts at traction. In the negress, we find hypertrophic labia minora more frequently than in the white woman. This may be due to greater sexual eroticism in the black, but it is probably due to a greater degree of racial tendency to hypertrophy. In the chapter on chronic hypertrophic vulvitis, this racial tendency will be more fully discussed. Among the Hottentots, the enlargement of the labia minora is often so great as to form a sort of apron hanging between the thighs. Occasionally we see extreme hypertrophy among women of other races.

Opitz describes the operative removal of such a so-called "Hottentot" apron from a fourteen-year-old girl who had persistent vulvitis that resisted all the usual methods of treatment. Where the labial hypertrophy is nodular in type, as in the case pictured in Kelly's *Operative Gynecology* and as in the case described by D. M. Grieg, I think we should classify it as chronic hypertrophic vulvitis rather than as simple hypertrophy due to circulatory disturbance.

LITERATURE

- DICKINSON. Kelly's Medical Gynecology.
GREIG. Edinburgh Med. Journ., 1916. 17: 111.
JAYLE. Rev. de gynéc. et de chir. abd., 1907. 11: 407-442.
KELLY. Medical Gynecology.
OPITZ. München. med. Wchnschr., 1906. No. 19.
SEITZ. Zentralbl. f. Gynäk., 1920. 212.

CHAPTER V

INJURIES OF THE VULVA

Pathologic conditions due to traumatism about the external genital region can best be considered under three heads:

1. Accidental injuries.
2. Injuries due to coitus.
3. Injuries due to childbirth.

Accidental Injuries.—It happens not infrequently, particularly among young girls, that, by falling astride some object, serious injury is done to the external genitals. If the object is a blunt one, it may produce merely a severe contusion with slight breaks in the skin surface. The loose connective tissue about the labia, the presence of numerous large veins in this region, especially in the corpus cavernosum of the clitoris, bring about the formation of a large swelling in cases where injury has occurred at this point. If the fall is astride some pointed object, the injury may be even more serious, and fatal cases have been reported of perforations into the bladder, peritoneal cavity, and intestines. In the adult woman, such injuries of the external genitals are extremely rare, owing to their more protected situation.

Injuries Due to Coitus.—We find, in the records of medical jurisprudence, innumerable cases of severe injury as the result of rape. In such instances, the entire perineal body may be torn, corresponding to a third degree laceration. Such injuries are, of course, more often found in very young individuals and where extreme violence has been employed (Fig. 26), but even in older individuals and without extreme violence, there may occur a rupture of the hymen leading to a severe hemorrhage. Neugebauer found that out of 150 cases of severe injury following coitus, 22 deaths from hemorrhage occurred. As in the case reported by Chase in 1916, the hemorrhage is usually found where the hymen is very thick and fleshy. Guillaume reports a case of almost fatal hemorrhage following a brutal intercourse in which the fourchet was torn. In Rawls' case, a thick hymen in a woman forty-three years old offered so much resistance that there occurred a tear through the perineum into the rectum. In this case there may have been a partial

vestibular anus with a thin perineal septum. At times a rigid hymen leads to dilatation and injury of the urethra at intercourse.

Minor injuries about the hymen are so constantly associated with coitus that we may speak of them as physiologic lacerations; they will vary in location and number in accordance with the shape of the hymenal ring, but are ordinarily found at either side of the posterior commissure.



FIG. 26.—VULVORECTAL FISTULA DUE TO VIOLENCE IN COITUS (Hirst).

Injuries Due to Childbirth.—Here again we may speak of physiologic injuries, such as the obliteration of the hymenal folds by the passage of the child's head, abrasions and minor tears about the vestibulum and perineum. Deeper tears may, however, assume a pathologic importance. These are usually found at the perineum and consist at this site of a somewhat irregular tear through the musculo-fibrous triangle of the perineum, extending laterally often to its attachment with the levator ani muscle and posteriorly to the sphincter ani, or even through the latter. I do not propose to include in this monograph any detailed consideration of lacerations of the pelvic floor, their symptomatology and treatment. The external lacerations of the perineal body are of relatively small significance; it is injury of the deeper structures of the pelvic floor with which we are most concerned. I have had occasion repeatedly to note tears of the perineal body extending to the sphincter that

healed and produced no symptoms whatsoever, owing to the fact that the deeper structures had not been injured. Unless properly united by surgical measures, such perineal tears will heal by granulation and leave a thick and sometimes painful scar in the region of the perineum.

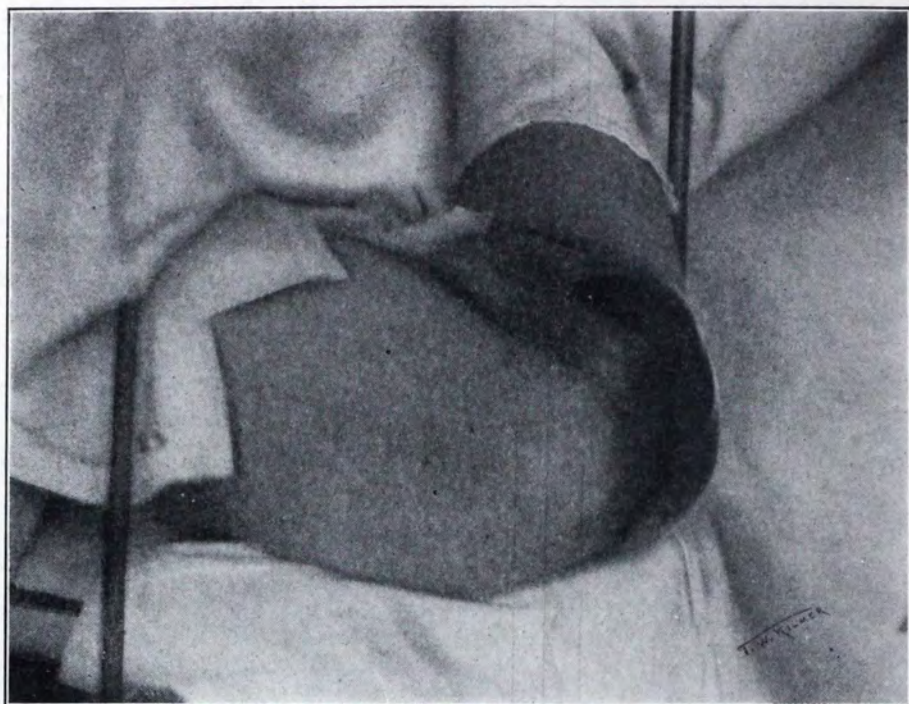
Hematoma of the Vulva.—Mention has already been made of the occurrence of hematoma following severe external injury in the non-pregnant woman. Such a traumatic hematoma may attain the size of a fist, as in the case recently reported by Jacobi. Occasionally there may be only slight ecchymoses due to pinching of the tissues against the pubic arch. If the injury is more posterior, the hematoma may extend into the ischiorectal fossa. More frequent and more serious, however, are those cases of hematoma associated with labor. The term, thrombosis of the vulva, has also been applied to this condition. A predisposing factor in most cases is the presence of large varicose veins. Veit emphasizes cysts of the Bartholin gland as also a predisposing cause of hematoma, and gives a good illustration of his case.

Injuries occurring during childbirth, owing to the increased blood supply of the organs at this time, add to the seriousness of vulval hematoma and not a few of these cases have ended fatally. Owing to the loose structure of the connective tissue surrounding the vulva, vagina and uterus at the time of labor, an injury to some large vein may lead to an extravasation of the blood, extending upward from the vulva alongside the vagina into the broad ligament; in fact, most of these hematomata are properly grouped as vulvovaginal. The break may occur in the vein directly beneath the pubic arch; externally the blood extravasation may extend downward beyond the anal ring and upward to Poupert's ligament. The frequency of this condition would appear to be about one in two or three thousand births. In practically all instances, the veins in the region of the external genitals are markedly dilated before the onset of labor. As a rule, the veins do not rupture until the head has reached the pelvic floor, and at times, owing to the pressure of the head against the soft parts, there is no actual hemorrhage until the child has been expelled, so that the hematoma does not make its appearance until the third stage of labor. Occasionally the veins have been merely bruised and only later become necrotic, with the result that the hemorrhage does not occur until the necrotic slough is cast off. I have, in two instances following operation for Bartholin cysts, noted such hemorrhage with hematoma formation seven or eight days after operation as a result of necrosis of the deeper veins. Not the size of the child merely but the rapidity of labor is a predisposing factor in the

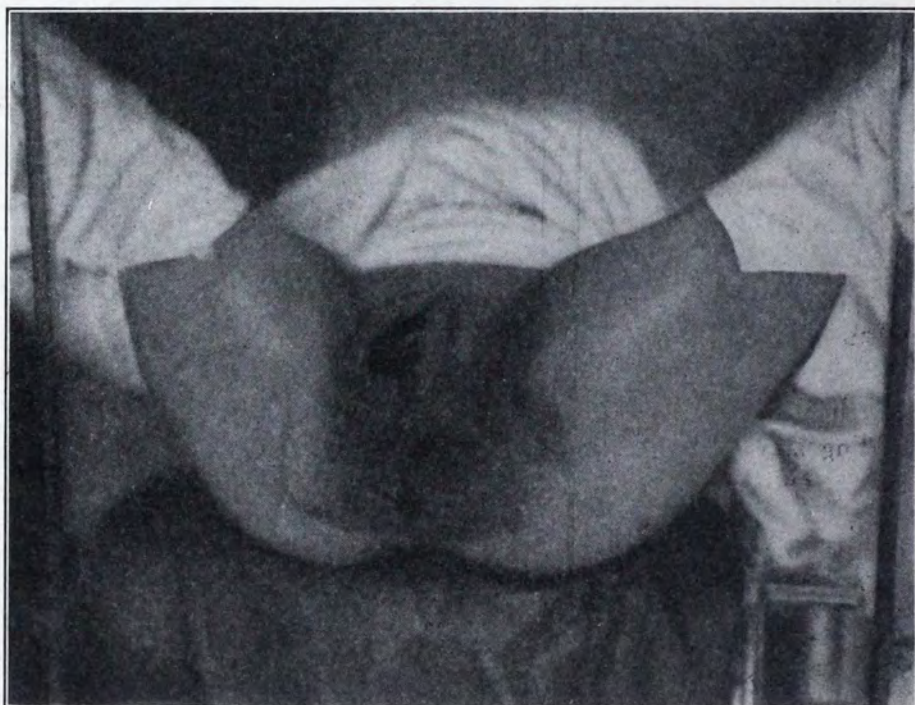
formation of hematoma of the vulva. As a rule, hematoma of the vulva follows rapid spontaneous delivery, but occasionally it is noted after the use of forceps. The condition is more frequent in multipara than in primipara, owing to the greater tendency of the former to varicose veins.

The hematoma produces severe colicky pains at the onset and, if the tumor is a large one, symptoms of anemia quickly show themselves. After injury, the patient has a feeling of increasing tension and pain in the vulval region. Vesical and rectal tenesmus result from pressure of the large blood-clot on the bladder and rectum. With these symptoms, there is noticed a swelling on one side of the vulva, the skin appears dark blue and tense, and the blood may break through at one point, expelling coagula and liquid blood. In such an event, a fatal hemorrhage may result in a short time. At times the external swelling is not so great; but here the anemic condition of the patient justifies the assumption that considerable internal, subperitoneal bleeding has taken place. If the hematoma is small, it may be completely absorbed in time. In the presence of neighboring infection, an abscess may form in the hematoma cavity with serious results. Occasionally it happens that, after such a hematoma has emptied itself externally, a renewed hemorrhage occurs for some reason or other.

The prognosis is usually somewhat doubtful, particularly if the amount of subperitoneal bleeding is unknown. Since the days of asepsis, the mortality has greatly decreased. In 1885, Deneux reported 22 deaths out of 60 cases, a mortality of about 35 per cent, whereas more recent figures give the mortality as ranging from 12 to 20 per cent. In hospital cases, the death rate will probably be found to be much smaller than this. The treatment consists, in part, of preventive measures. In the presence of varicose veins of the vulva, care should be taken that the head does not pass too quickly through the vulval ring. If the hematoma has formed, labor should be hastened as much as can safely be done, since the hematoma may otherwise become so large as to prevent the introduction of the hand. After delivery of the placenta, the bleeding may be controlled by means of a colpeurynter filled with some ice-cold antiseptic fluid or an iodoform gauze tampon; externally, an ice-cap or cold compress may be applied. Ergot may help to control bleeding to some degree, and the giving of narcotics is necessary to relieve pain and insure absolute quiet. If, in spite of this treatment, the hematoma becomes larger, it may be necessary to incise and to catch and ligate the bleeding points. It is preferable not to incise the mass in the first few days, since opening it in this way may lead to an



A



B

FIG. 27.—A, B, HEMATOMA OF THE VULVA (Broun).

uncontrollable hemorrhage. This course is particularly advisable if the patient is not in a hospital. Where the hematoma is opened on the third or fourth day, the blood-clots are removed and the cavity packed with gauze; in addition to this, the vagina should be lightly packed with gauze and a firm compress applied externally.

An interesting and somewhat unusual complication of vulval hematoma before delivery was recently reported by Johannsen. In his case, the patient was found in labor with a temperature of 39° C., pulse 96. The right labia was the site of a bluish-red tumor, the size of a child's head, involving the perineum to the anus; this growth was obstructing the progress of labor and had been gradually increasing in extent during the course of labor. The tumor was incised, the child delivered, and the bed of the hematoma sutured; no packing was necessary in this case.

In the case recently reported by Broun (Fig. 27), 600 grams of blood-clot were removed at operation. The hematoma of the vulva occurred one hour after delivery. The seat of the torn vessel was in the left lateral wall of the vagina near the introitus. Bleeding was readily controlled with a few sutures.

LITERATURE

- BROUN. Med. Rec., New York, 1921. 99:119.
CHASE. Am. Journ. Obst., 1916. 74: 514.
DENEUX. Siebold's Journ., 1885. 17:665.
GUILLAUME. Bull. Soc. anat. de Paris, 1920. 642.
JACOBI. Zentralbl. f. Gynäk., 1920. 630.
JOHANNSEN. Zentralbl. f. Gynäk., 1920. 856.
MENGE-OPITZ. Gynaekologie, 1920.
NEUGEBAUER. Monatsschr. f. Geburtsh. u. Gynaek., 1899. 9:221.
RAWLS. Am. Journ. Obst., 1916. 74:300.
VEIT. Handb. d. Gynaekologie, 1910. 4:ii, 751.

PART II
INFLAMMATIONS

CHAPTER VI

ACUTE VULVITIS (NONGONORRHEAL)

When we consider the fact that the vulva is not merely subject to infection from the various germs that are present on the skin of the body, but is constantly contaminated by discharge from three important tracts—the urinary, the genital, and the intestinal—it is a wonder that infection of the vulva does not occur more frequently than is actually the case. In fact we can explain it only on a basis of relative immunity from infection on the part of the vulval skin. Small abrasions, unless inoculated with some specific organism, usually heal promptly, and severe general infections rarely take their origin from this portion of the body.

Of the bacteria that are normally found upon the vulva, the most common are streptococci and staphylococci of various kinds, and colon bacilli. The bacteria present around the vestibulum resemble more closely the vaginal flora, including a great variety of saprophytes. Some of these may, under favorable conditions, multiply and produce, as will be shown later, typical inflammatory lesions.

The normal secretions of the vulva are varied in character. Numerous sebaceous and sweat glands are found upon both labia and serve to keep the vulva constantly moist. A somewhat odoriferous secretion comes from certain groups of special glands (Tyson's) situated about the clitoris. From Bartholin's gland comes a clear mucous secretion which, during sexual excitement, is particularly abundant. Smegma, which is found in crevices about the prepuce of the clitoris, is not a true secretion but consists merely of accumulations of desquamated epithelium undergoing fatty degeneration. In fat women with profuse perspiration and in women who indulge freely in sexual intercourse or masturbation, the excessive secretions may be the main factor in producing a vulvitis.

Acute Diffuse Vulvitis or Intertrigo.—One of the most frequent forms of acute vulval inflammation is that known as intertrigo, in which there is usually a diffuse redness of the entire vulval skin, often involving the labiofemoral and inguinal creases. It is found primarily in young babies and in fat women and is due to the maceration of the skin by

excessive moisture. Whether this moisture results from profuse secretions of the sweat glands, from dribbling of urine as in vesicovaginal fistulas, from profuse irritating vaginal discharge and prolonged menstrual bleeding, or from frequent liquid bowel movements, makes relatively little difference so far as the clinical picture is concerned. There is rarely any break in the skin, merely a diffuse reddening with occasional small areas where the upper layers have been desquamated. The deeper tissues of the vulva are not involved. The chief symptom of this form of acute vulvitis is a feeling of burning and soreness in the genital region, with at times a slight itching sensation. This discomfort may be so pronounced as to make the patient extremely nervous and prevent her from sleeping. The passage of urine over the raw surface produces a burning sensation which is often alleviated only by an irrigation of boric acid solution. Rough cloths or diapers greatly increase the discomfort, and only by keeping the parts dry and uncovered, as far as possible, will the condition subside.

Lack of cleanliness also produces this form of simple acute vulvitis. Occasionally we find retention of sebaceous material and smegma around the clitoris as the main cause, particularly if this material is lodged beneath the prepuce. Malcolm reports two cases of vulvitis due to this cause. The vulvitis produced by the retained secretions of Tyson's glands beneath the prepuce of the clitoris will, in some instances, lead to masturbation. In such cases, the adhesions around the clitoris should be separated and in some instances a circumcision may be necessary. This procedure is very simple in girls, consisting merely of freeing the clitoris from adhesions, snipping off the top of the preputial folds and coapting the edges with two or three catgut stitches. There is no danger of hemorrhage.

Follicular Vulvitis.—Closely related to intertrigo, and at times associated with it, is a generalized infection of the hair-follicles. It is frequently present in advanced cancer of the cervix or vagina, especially where a vesicovaginal or rectovaginal fistula is present. Also during pregnancy, with excessive vaginal secretions, especially in the absence of cleanliness, do we meet with such follicular infections. Small red papules, later turning into pustules, are scattered over the surface of the labia majora. Over the mons veneris, the number of these infected follicles and the amount of their secretion may be so great as to form thick crusts in which the hairs lie matted together. The *Staphylococcus albus* is usually found to be the infecting agent.

The symptoms of follicular vulvitis are similar to those of intertrigo,

but are usually more severe and persistent. The discharge causes the clothing to stick to the denuded skin and when, on walking, it pulls loose, the discomfort becomes almost unbearable. If the pelvic hairs are at all matted together, they should be cut short so as to render possible the proper washing away of discharge and the application of suitable medicaments. Where only a few follicles are infected, tincture of iodine may be applied directly to each and allowed to dry. Polak recommends, in more severe cases, washing the vulva with synol soap and applying compresses of 50 per cent alcohol and boric acid. Ordinarily, patients will find this rather heroic treatment, owing to the sensitiveness of the eroded vulval skin to alcohol and ether. I prefer to use either a simple boric pack or a poultice of aluminum acetate solution (teaspoonful to 1 pint of water). Rest in bed is essential to speedy recovery. Ointments usually do more harm than good by sealing the ducts of the follicles.

Furunculosis of the Vulva.—Furuncles or “boils” are found rather frequently, situated usually in the loose tissues of the labia majora or about the mons veneris. As a rule, boils in other regions have preceded or will follow them, since the infection is essentially systemic in origin. Starting as a hair-follicle infection or acne pustule in the deeper tissues of the dermis, it may, on account of the good blood supply of the labia and the loose connective tissue beneath the skin, assume considerable proportions. At times such a boil may be the size of an acorn before it breaks through and extrudes its central necrotic mass or core. At the height of the inflammation, such a boil may be extremely painful and incapacitate the patient for walking. Ordinarily it is best to apply merely palliative measures until the furuncle has ripened enough to form a definite capsule with fluid contents. Then an incision can be made to let out the contents, but in so doing care should be taken not to cut beyond the limits of the capsule as the infectious material thereby gains access to surrounding lymphatics and is apt to form other boils in other parts of the body. The squeezing out of the core is particularly dangerous as bacteria are usually squeezed in as well as squeezed out. Furunculosis may be an indication of some systemic disease like diabetes. It is influenced by diet. Where there are recurrent boils in various parts of the body, as is often the case, it is advisable to give staphylococcus vaccine, starting with the hypodermic injection of 50,000,000 bacteria and running up gradually to five or ten times that amount. Usually from ten to fifteen injections at intervals of from two to five days are sufficient to produce resistance to this infection.

Erysipelas of the Vulva.—Fortunately erysipelas in this region has become a rare disease. It occurs primarily under two conditions: (1) following an infected perineal wound at childbirth; (2) following operative measures on an infected cancer of the vulva. I recall years ago seeing erysipelas of the vulva in association with an epidemic of scarlet fever and puerperal sepsis in a maternity hospital. Localized gangrene and death resulted in this case. Cancers, owing to their frequent contamination with virulent streptococci, are apt to be complicated by erysipelas. In 1920, I removed a femoral lymph gland metastasis following carcinoma of the vulva. One gland was infected and necrotic and was adherent to the femoral vessels, hence it could only be partially removed. Ten days after operation, a typical erysipelas developed in the femoral wound. The patient was seriously ill but finally recovered. One year after this attack, no evidence of carcinoma could be detected in the region of the wound, although the operation was certainly incomplete. Apparently the erysipelas had a favorable effect in controlling the cancer.

The onset of erysipelas is marked by a hard chill and temperature rising to from 103° to 104° F. There is burning, itching and swelling in the region of the vulva. Little can be done in the way of treatment beyond sustaining the patient's resistance. Fresh air, a nourishing diet, rest and such mild stimulation as the case may require are better than local measures.

Gangrenous Vulvitis or Noma.—When found in adults, gangrenous vulvitis usually follows some virulent wound infection. A perineal tear, associated with much bruising at the time of delivery and infected with septic microorganisms, usually streptococci, may break down and form a large sloughing wound that takes a long time to heal where the patient survives the primary infection. Somewhat less frequently, we meet with such a gangrene of the vulva following operative measures; particularly, extensive plastic procedures on the perineum or labia. Older patients in debilitated condition are more liable to have such necrotic changes accompanying wound infection. In little girls, we occasionally see a circumscribed gangrene of the vulva, called noma, accompanying severe systemic infections, such as measles, scarlatina, diphtheria or typhoid. Seitz reports a symmetrical gangrene of the vulva in a twelve-year-old child following furunculosis. In the photograph of diphtheria of the vulva in the following chapter, such localized areas of gangrene can be seen. Berkeley and Bonney found gangrenous vulvitis, especially in debilitated children, and as a sequela to venereal

infection of a phagedenic ulcerative type. They recommend vigorous treatment, owing to the danger of death from toxic absorption; frequent application of peroxid of hydrogen either as an irrigation or as a gauze pack, while, in severe cases, scraping away gangrenous tissue under anesthetic and either carbolic or nitric acid applied to the base. I have found a pack of gauze, soaked in equal parts of glycerin and peroxid, placed over the gangrenous wound particularly effective in hastening the loosening and casting off of the necrotic membrane. I cannot see the value of strong cauterants in these cases.

Where gangrene occurs in young children, it is usually one-sided, starting with redness and infiltration in one of the labia, with a foul-smelling discharge. Later a blister forms that breaks down, forming a grayish-green ulcer. Prostration is extreme. Excision of the affected areas, if discovered in the early stages, is advised by some. Forced feeding and stimulation are necessary, owing to the profound intoxication. The wound after excision should be kept clean by frequent irrigation with boric acid solution.

Apthous or Mycotic Vulvitis.—Fungus infections producing vulvitis will be taken up in the chapter on skin diseases of the vulva.

Thrombophlebitis of the Vulva.—While text-books and literature make no specific mention of thrombophlebitis of the vulva, I do not believe this condition as rare as this absence in the record would seem to indicate. Indeed, I have had occasion in the past three years to see two typical instances of such a localized phlebitis. In view of this rarity, a brief history of these two cases may be of interest. One woman, fifty years of age, had had chronic valvular disease of the heart for years, with intermittent attacks of endocarditis. When I first saw her, she was in the midst of one of these attacks, running a temperature of from 101 to 102° F. and suffering from pain in the left labial region. Her physician had noticed a hard swelling on examination, and, suspecting a malignant condition, asked me to see her. I found at the lower margin of the left labium majus, about on a line with the posterior commissure, a bluish, exquisitely painful, elongated, hard swelling, 2.5 by 1 by 1 cm. in size. The swelling was not adherent to the skin and was approximately 1.5 cm. below the surface, of equally hard consistence, and with only slight surrounding edema. In view of these findings, together with numerous varicose veins in this region, my diagnosis was a thrombophlebitis. Beyond absolute rest in bed and hot applications to relieve the pain, nothing was done by way of treatment. In the course of three or four weeks the swelling subsided, and, when I had occasion to examine

the patient eight months later, I could detect only a nodule the size of a bean, painless and without fixation, at the site of the former swelling.

In the other patient, whose history I wish to relate, the diagnosis of a thrombophlebitic condition could not be made with certainty, owing to the extent of the lesion at the time of its removal. This patient, a woman of forty-six years, had given birth to two children, and had

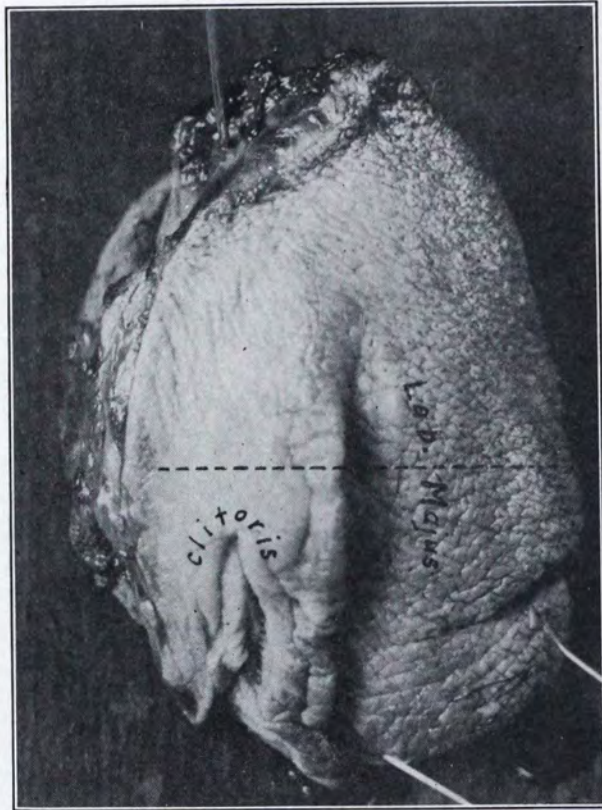


FIG. 28.—ABSCESS OF THE CLITORIS. Specimen removed at operation including the right labium majus (wrinkled portion) and the clitoris with its prepuce and a small part of the labia minora from each side (smooth portion). Dotted line shows where transverse cut was made to show abscess wall (Fig. 29).

never had any symptoms of an infection of Bartholin's gland. Eight years previous to the present attack, an abscess situated in the upper left labial region had been lanced, after a short period of inflammation, with the escape of some purulent material. During the succeeding years, from time to time, the patient had observed a slight vaginal discharge of a somewhat offensive character, but, since this had been attended by no discomfort, she had not mentioned it to her physician.

Throughout these years, she had had chronic arthritic pains, with occasional slight elevations of temperature; a tentative diagnosis of focal infection had been made. A search for the primary focus had been directed everywhere except the genital region.

The present attack began with a chill and rise of temperature to 103° F. on August 4, 1922, attended by rather vague discomfort in the



FIG. 29.—SPECIMEN OF ABSCESS OF THE CLITORIS CUT TRANSVERSELY TO SHOW THE THICK CAPSULE SURROUNDING THE ABSCESS. About one to two ounces of a rather thick pus escaped at operation. The point of origin was the left crus of the clitoris.

abdomen and general malaise. Five days later, a pain was felt in the region of the former vulval abscess, and I was called in consultation. At this time the temperature ranged between 102° and 104° F. Examination of the abdomen showed slight tenderness in the region of the appendix, without, however, any definite palpable swelling. On inspection of the external genitals, a whitish scar about three quarters of an inch long could be seen at the inner margin of the left labium majus, on a level with the clitoris and running parallel with the left ramus. Palpation beneath the scar showed an exquisitely painful thickening the size of an acorn, situated approximately in the left corpus spongiosum of the clitoris. My first thought was of a simple thrombophlebitic process in

one of the numerous veins in this region. Its location excluded the possibility of an infection of Bartholin's gland. Vaginal examination revealed no evidence of infection, a uterus of approximately normal size, in good position, and no tenderness or swelling in the tubo-ovarian region. In spite of absolute rest and hot applications, the pain, swelling and temperature increased, so that three days later the entire left labium was edematous and the mass itself was approximately the size of a small



FIG. 30.—SECTION OF WALL OF ABSCESS OF CLITORIS. Pyogenic membrane lining the entire cavity without any trace of epithelial elements.

lemon. A few drops of pus escaped from a pin-point opening near the site of the former scar. The main abscess sac, however, was still deeply situated and, in view of the history of prolonged infection, it was deemed best to remove the entire mass, instead of merely incising the abscess. The accompanying photographs (Figs. 28, 29) show clearly the site of this abscess, which I think should be termed an "abscess of the clitoris." Histologic study of the sections showed that the capsule of the abscess, approximately 2 cm. thick, consisted of fibrous connective tissue, without evidence of any epithelial structures (Fig. 30). From its location, it must have originated within the left ramus of the clitoris.

It was probably secondary to an old thrombophlebitic process in this region. The only alternative is that it was an infection of some cyst or sebaceous gland. In the latter event, however, we should expect a smaller, more superficial, abscess.

Focal Infection of Vulval Origin.—This case of abscess of the clitoris is of special interest in view of the previous history of focal infection without any definite primary focus. X-ray of the teeth of this patient had shown one or two slightly suspicious areas, but the patient's dentist declared her teeth to be sound and advised against extraction. Too short a time has elapsed since the operation¹ to determine the effect of the removal of this deeply situated abscess upon the arthritic symptoms, but, to judge from a similar case in which the abscess lay in Bartholin's glands, I should expect complete relief. In this case, reported in 1919, the arthritis was much more severe and had been treated for two years by the usual hydrotherapeutic measures, without relief. The primary focus of infection was found only when an exacerbation of the old chronic bartholinitis directed attention to the vulva. At operation, the entire gland and surrounding tissues on the left side were found converted into an old abscess sac, with numerous sinuses leading from it. Within one week after the removal of the primary focus, the joint symptoms and swelling disappeared, and during the past five years I have repeatedly seen the patient and know that she has had no recurrence of the old trouble. In both of these cases cited above, only the onset of acute symptoms directed the attention of the physician to the possibility of infection in this part of the body. Such experiences make it advisable never to neglect a minute examination of the vulva as a possible primary focus of infection in chronic arthritis.

Acute Ulcerative Vulvitis Associated with the Bacillus Vaginalis.—The field of new diseases of the vulva has by no means been exhausted. Particularly some of the ulcerative conditions found in this region need further bacteriological and pathological study. An example of this is the so-called "Ulcus Acutum Vulvae" of Lipschuetz. Reports concerning this peculiar disease come almost wholly from Austrian and German sources, but the careful descriptions and bacteriological studies of these writers justify its consideration in this monograph.

Lipschuetz found in women, particularly in virgins with intact hymen, lesions that resemble a venereal ulcer. Occasionally, two or three ulcers only were present but usually the number was greater; they were

¹ In May, 1923, nine months after operation, all symptoms of arthritis had disappeared.

scattered about the vestibulum, the labia and the perineum and varied from 2 mm. to 2 cm. in size. They were not, in Lipschuetz's cases, associated either with gonorrhea or lues, nor did they have any resemblance to tuberculous ulcers. The disease usually starts with a burning sensation in the vulva, increasing in severity and usually associated with a slight rise in temperature. Every contact with the clothing or the passage of urine over the inflamed vulva gives rise to severe pain. Within one or two days the ulcers are well defined. They have a sharply demarcated, slightly undermined edge, and the base is covered by a whitish-gray or yellowish-gray membrane, adherent and thick, somewhat resembling a diphtheritic membrane. Occasionally the ulcers may coalesce. The surrounding vulval tissue is reddened and may be slightly edematous. Thus far no suppuration of tributary lymph glands has been observed, though in severe cases there is definite glandular enlargement.

The height of the ulcerative process is reached within four days. If left untreated the process may persist for a long time, the old ulcers cleaning and healing over, while a crop of new ulcers appears in their place. Auto-inoculation on other portions of the body have been unsuccessful. Under simple antiseptic measures the ulcers will usually clean up within two or three days, the membrane dissolves, sometimes overnight, and the base of the ulcer remains red and shallow with practically no infiltration. It rapidly heals over, leaving a small, white, pliable scar that later can no longer be distinguished. Occasionally, the patient is first seen when the ulcers have begun to clean off with only a little necrotic membrane left adherent. This may render the diagnosis difficult. There is a marked tendency to a recurrence of this ulcerative condition even where antiseptic measures have been persistently employed. Out of the 14 cases, Lipschuetz found these ulcers 7 times in virgins. Out of Scherber's 22 cases, all were virgins. He found the disease prevalent in young girls, from fourteen to twenty years of age, and not, as Lipschuetz did, in older women. Other writers have reported only single cases. Lenartowicz saw the ulcers on both labia and posterior commissure in a girl sixteen years of age. Volk found the ulcers in a married woman who had a pronounced endocervicitis.

The disease is characterized by its sudden onset, the location and multiplicity of the ulcers, the thick diphtheritic membrane covering the base, the short duration of the disease, the tendency to recurrence, and, above all, by the constant finding of a long rod-shaped bacillus, with parallel groupings, occasionally in pairs, in short chains and staining

positively according to Gram (Fig. 31). This Gram-positive bacillus has with great probability been correctly identified as the specific cause of this form of ulcerative vulvitis and, by bacteriological culture, has been shown by Scherber to be identical with the so-called Doederlein bacillus that is so commonly found present in the normal vagina. According to Scherber, this saprophyte will, under certain favorable conditions, multiply and become pathogenic in its action. The careful studies of Lipschuetz and Scherber have to my mind excluded the possibility of diphtheria, chancroid, lues and other common diseases as the

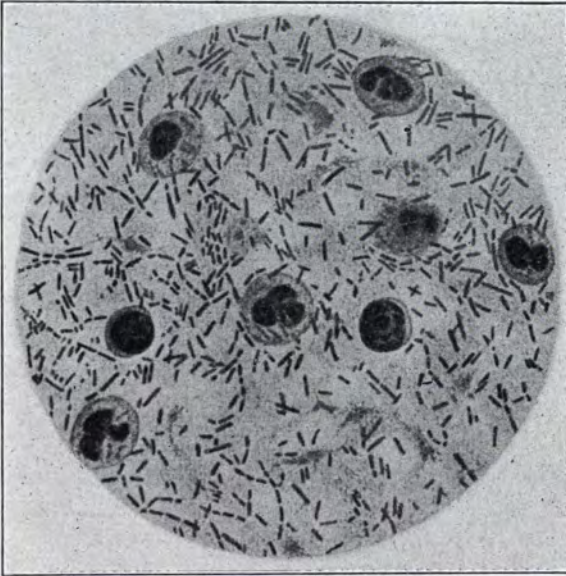


FIG. 31.—SMEAR FROM "ACUTE ULCER OF THE VULVA," SHOWING TYPICAL BACILLUS VAGINALIS OF DÖDERLEIN (Scherber).

etiologic factor in their ulcers. Scherber was not only able to get pure cultures of this organism, but, in 1921, found that he could inoculate rabbits with it, produce an ulcer and, from this, later on grow new cultures similar to the first. Scherber found this bacillus present in large numbers in the vaginas of these patients even after the ulcer had healed.

In American literature, I find a case recorded that I believe is probably to be classed under this head. In 1918, Schiller described an "Unusual Ulcerative Process of the Vulva" in a married woman, twenty-three years old, that had the clinical aspects described above: sudden onset, burning about the vulva, slight fever, with the appearance of three ulcers, one the size of a quarter on the inner left labium, one the

size of a penny back of it, and a third small one on the vestibulum vaginae. These ulcers were superficial, with sharp edges and covered with a gray moist membrane. Schiller thought first of chancroid, but



FIG. 32.—ACUTE ULCER OF VULVA. (Ulcer on Left Labium Majus and to the Right of the Urethra is Shown.) Both were covered by a necrotic membrane in which many rod-like bacilli in chains were found. Similar ulcers had appeared in crops for the previous two years.

found microscopically a "*long Gram-positive bacillus grouped parallel.*" Cultures for diphtheria were negative. No others were made. Apparently Schiller was unfamiliar with previous literature on this subject, as he makes no mention of the work of Lipschuetz and Scherber.

While I was engaged in writing upon this subject, there came to my clinic at the Barnard Free Skin and Cancer Hospital a woman of thirty-five years, who gave a history of syphilis twelve years previously, that had been actively treated and given rise to no further symptoms. In the last two years, however, she had had recurrent attacks of small ulcers that disappeared either spontaneously or after the use of mild

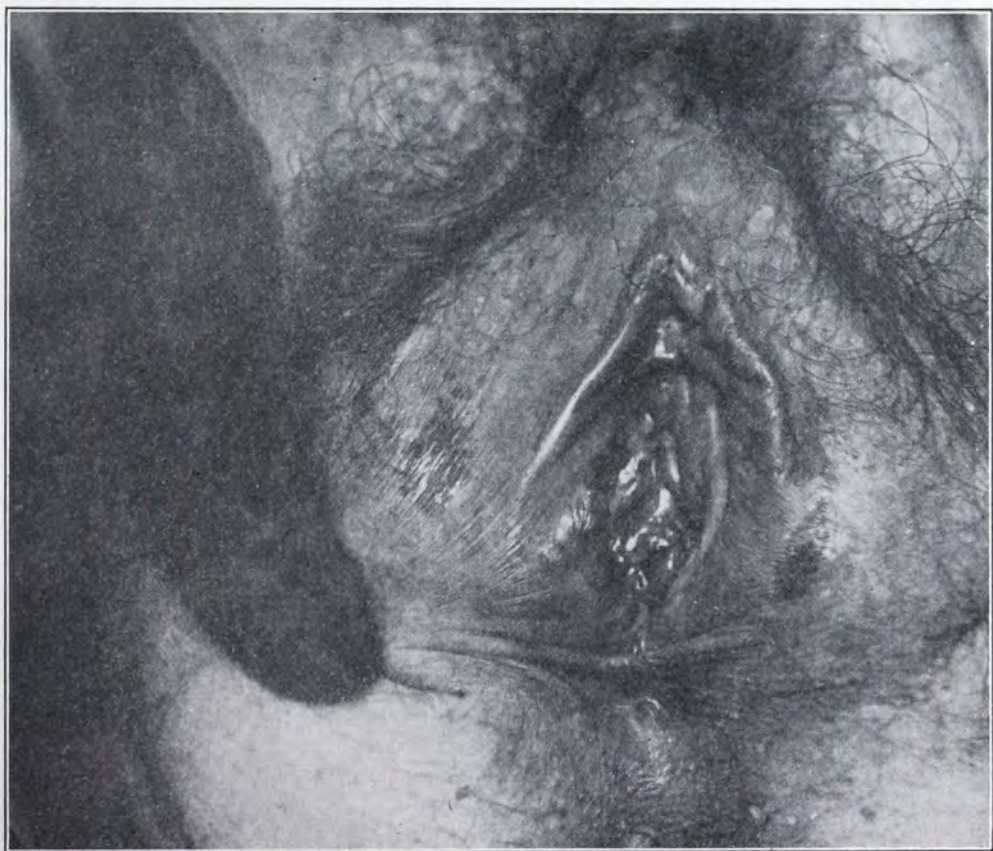


FIG. 33.—SAME CASE AS FIG. 32, EIGHT DAYS LATER. This shows rapid healing of ulcer under simple boric acid washes, without internal or dietetic treatment. This case was later found to have a transitory glycosuria, which may have been an etiologic factor in the disease.

antiseptic washes. These ulcers had been diagnosed as syphilitic in spite of three negative Wassermann tests and six injections of salvarsan. Still they recurred. When she first came to the clinic, September 15, 1922, an ulcer with thick necrotic membrane upon it was seen near the meatus and diagnosed as probably luetic. Five days later she returned and a second ulcer on the inner surface of the left labium, as seen in Figs. 32 and 33, had developed. She stated that it had appeared in

the last two days. This ulcer was shallow but covered with a thick necrotic membrane. Smears were made from this membrane and stained according to Gram. The microörganism that predominated in the field was a long bacillus corresponding in morphology to the Doederlein bacillus. Two days later, without doing anything but use a boric acid wash, both ulcers had cast off their membrane and presented a clean red base. Microscopically the same bacillus was again found in large numbers. Unfortunately, only broth cultures were made and these showed only the usual cocci. In view of the history of recurrent attacks, the sudden onset, the superficial ulcer, the diphtheritic, necrotic membrane covering it, the rapid dissolution of the ulcer and the predominant presence of long Gram-positive bacilli, resembling the organism of Doederlein, in the membrane, I think this may reasonably be classified as a case of this specific ulcerative vulvitis.

Both Lipschuetz and Scherber have found that aluminum acetate packs or weak bichlorid douches, continued for a period of time (one or two months) after the ulcers have healed, will prevent recurrence in the majority of instances.

LITERATURE

- BERKELEY and BONNEY. Guide to Gynecology, 1919. 387.
 EDEN and LOCKYER. Handbook of Gynecology, 1917. 2:1-51.
 MALCOLM. Brit. Med. Journ., 1918. 2:55.
 POLAK. Pelvic Inflammations in Women, 1922. 1-9.
 TAUSSIG. Journ. Mo. State Med. Assoc., 1918. 15:205.

VULVITIS DUE TO DOEDERLEIN BACILLUS

- LENARTOWICZ. Wien. klin. Wchnschr., 1917. No. 9, 266.
 LIPSCHUETZ. Arch. f. Dermat u. Syph., 1912. 114:365.
 Wien. klin. Wchnschr., 1918. 17:461.
 SACHS. Wien. klin. Wchnschr., 1905. No. 23, 602.
 SCHERBER. Wien. klin. Wchnschr., 1913. No. 26; 1918, 31:179.
 Arch. f. Dermat. u. Syph., 1919. 127:359-391.
 Wien. klin. Wchnschr., 1921. 34:1005.
 SCHILLER. Am. Journ. Obst., 1918. 77:378.
 VOLK. Wien. klin. Wchnschr., 1914. 236.

CHAPTER VII

ACUTE VULVITIS ASSOCIATED WITH SYSTEMIC DISEASES

Not infrequently we find infections of the vulva associated with generalized infections of the body. In this chapter I shall not include tuberculosis or syphilis, but shall reserve them for separate consideration. Among the other infectious diseases producing acute vulvar inflammation may be mentioned diphtheria, smallpox, vaccinia, scarlet fever, measles, typhoid fever, and dysentery. Diabetes mellitus also leads indirectly to acute vulvitis and has been included in the present chapter.

Diphtheria of the Vulva.—In the past twenty years, a considerable number of cases of diphtheritic infection of the vulva have been reported. In almost every instance the vulval infection was secondary to an infectious process in the nose or throat. While diphtheritic vulvitis occurs most commonly in children, it has also been found in adult women during the puerperium. In the presence of a diphtheritic throat infection at the time of confinement, special care must be observed to prevent an infection of the perineal wound with diphtheria bacilli. Bumm first directed attention to diphtheria as a cause of puerperal ulcers. Kromayer reports a case of diphtheria of the vulva in a twenty-two-year-old girl, with an ulcer 4 by 2 cm. in extent, near the clitoris, that was first diagnosed as chancroid. This ulcer was cauterized but did not heal. Ten weeks later the base of the ulcer was still covered with a thick, white, adherent membrane, and its border was irregular, reddened and hard. Microscopic examination showed typical diphtheria bacilli in the membrane. Three thousand units of serum were given with prompt improvement and in three weeks the ulcer was entirely healed. In most of the recent reports of diphtheria of the vulva, the age incidence was between five and ten years. Egyedi reports a case of a diphtheria of the vulva in a seven-year-old girl in which typical Löffler bacilli were found. After giving antitoxin, the membranes disappeared, but the ulcer persisted. Further examination showed the presence of *Spirochaeta pallida* in the ulcer. The ulcer healed after antiluetic treatment. In an eight-year-old child, with typical typhoid fever, Fingova and Delbanco discovered an

ulcer of the vulva four days after the temperature had returned to normal. A nasal infection was noticed at the same time. The following day the patient had a rise of temperature and smears from both the vagina and the nose showed diphtheria bacilli. Three thousand units of serum were given with prompt relief. In eight days the vulva was healed. Lendeertz describes a diphtheritic vulvitis in a five-year-old child, start-



FIG. 34.—DIPHThERIA OF THE VULVA

ing with petechial hemorrhage around the urethra. A prophylactic dose of 600 units of serum was given, mainly because two sisters had just had diphtheria. Two weeks later the patient was brought to the hospital with three ulcers; one over the coccyx, one above the clitoris, and one in the posterior vaginal wall. All three were covered with a dirty brown membrane, and smears and cultures showed diphtheria. Seven thousand units of antitoxin were given and in ten days the ulcers were healed, but numerous postdiphtheria paralyses (palate, oculomotor tracts, extremities) occurred. The patient finally recovered.

The accompanying photographs of a case of vulval diphtheria are from a twelve-year-old patient seen by Dr. W. H. Mook (Figs. 34 and 35). This picture is sufficient evidence of the extent and severity of a diphtheritic infection of the vulva. It will be noted that a gangrenous ulcer is also situated low down over the coccyx as in Lendeertz's case.

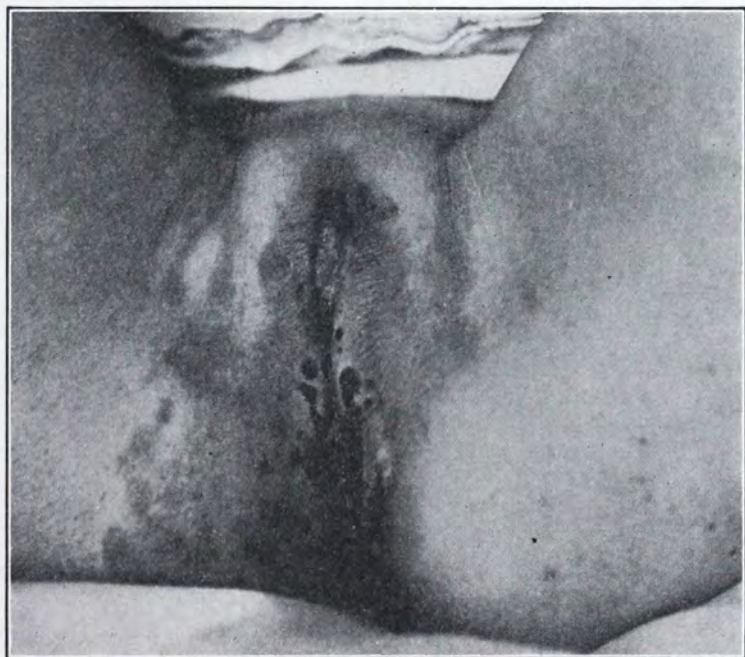


FIG. 35.—CLOSER VIEW OF CASE SHOWN IN FIG. 34. This shows black necrotic membrane covering ulcers around the clitoris, the labia, the perineum and the anal fold.

Small-pox and Vaccinia of the Vulva.—Geipel reports the appearance of small-pox pustules on the vulva, either synchronous with or later than the general eruption. His material was based on the epidemic of 1919 in Germany. At times the vulva seems predisposed to the formation of pustules. Cowpox or vaccinia has also occasionally been found to produce vulval lesions. Sloan, in 1903, found the vulva markedly swollen and very tender in a woman who had been vaccinated five days previously. The mucous membrane of the labia minora was dotted with small pustules and the surrounding mucous membrane was reddened. The infection subsided in a few days coincident with the healing of the vaccination sore on the arm. Sloan thinks the vulval infections due to accidental auto-inoculation. That such an infection of the vulva can occur without any abrasion is maintained by Loewenbach and Brandweiner.

Diabetic Vulvitis.—In the majority of cases of diabetes in women, the first symptom that induces them to consult a physician is a pronounced burning and itching about the external genitals. For this reason gynecologists are often the first to be consulted for this ailment. The clinical picture of this form of vulvitis is typical and, once seen,



FIG. 36.—DIABETIC VULVITIS. This shows the raw glistening surface of the vestibule and labia minora and an eczematous trigonitis in the genitocrural folds to either side.

should always lead to a careful examination of the urine for the presence of sugar. The skin has the appearance of a moist eczema, is diffusely reddened and has a raw appearance as though seared with a cauter. The area involved varies in accordance with the duration of the disease and the amount of irritation produced by the glycosuria. It is most pronounced in characteristic cases over the vestibulum and labia minora.

The accompanying photograph (Fig. 36) shows a case in which not only the vulval region but the inguinal folds as well were the seat of this diabetic dermatitis. The patient was an unusually stout woman and the diabetes had existed for approximately one year without effective treatment. For this reason the skin of the entire vulva had assumed a dusky red appearance and was somewhat thickened. Microscopic ex-

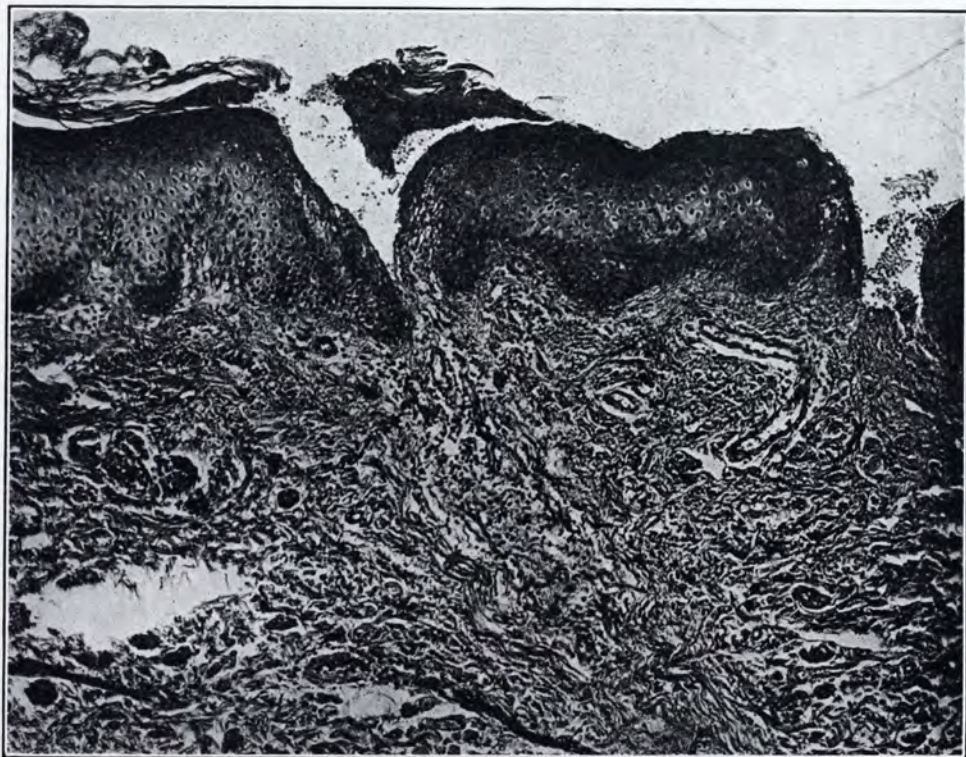


FIG. 37.—SECTION MADE FROM BIOPSY OF LABIUM MINUS. This is the same case as Fig. 36, and shows histologic changes in diabetic vulvitis. The epithelium looks as if it had been corroded; at the points where the breaks have occurred, an infection of the dermis with round-cell infiltration will be observed.

amination of a piece of this skin taken for biopsy showed numerous cracks in the epithelial layer with round cell infiltration in the subjacent tissues (Fig. 37).

The chief subjective symptom of diabetic vulvitis is a burning sensation with intense pruritus that becomes more pronounced following urination. There is marked frequency of urination, increased thirst and hunger and, usually, a decided loss in weight. Owing to the intense pruritus, the patient gets but little rest at night. The discharge from the eroded vulval surfaces is serous and somewhat milky. The neighboring skin is often the seat of an eczematous eruption.

The origin of the vulvitis is probably to be explained as follows: The sugar-bearing urine, passing over the vestibular and labial epithelium, causes it to swell and become eroded. The presence of sugar is favorable to the growth of microorganisms, especially fungi, and an infection of the subdermal tissues is thus produced. The pruritus, with its resultant scratching, increases this inflammatory process so that before long the entire skin in the neighborhood of the urethra is involved. There may be some cases in which the lesions are not so pronounced, but in every case of pruritus of the vulva it is well to bear in mind the possibility of diabetes and to test the urine for sugar.

The treatment of diabetic vulvitis consists primarily in general measures and I would refer the reader to the special textbooks on this subject. It is astonishing with what rapidity the vulvitis disappears, coincident with the exclusion of sugar from the urine. If the pruritus and burning is not very intense, all that will be required is rest in bed, irrigation of the vulva following urination, with an application of a mild boric acid solution and zinc oxid ointment. If itching is pronounced, the addition of 5 per cent anesthesin or novocain to the zinc oxid ointment gives relief. Excoriations should be touched up with a 4 per cent silver nitrate solution. Since diabetes is marked by frequent relapses and it is not always possible to eliminate the sugar from the urine, it may become necessary to use stronger measures for the relief of the vulval symptoms.

Other Infections.—Of the other infectious and constitutional diseases which in rare instances may produce a vulvitis, mention should be made in the first instance of typhoid fever. Lartigau found from ten to twelve small, superficial, round ulcers from 3 to 10 mm. in diameter, on the mucous and cutaneous surface of the vulva, in a case of typhoid fever. He was able in this instance to grow in culture typical typhoid bacilli from the secretions of these ulcers. Similar small ulcers have been observed following dysentery and cholera. These resemble the intestinal ulcers occurring in the disease and must be regarded as contact inoculations from the fecal contents. In scarlet fever and measles, the associated vulvitis is usually more diffuse. Albecker found typical pneumococci in a case of vulvitis in an eight-year-old girl, and several other pneumococcus infections of the vulva are recorded.

LITERATURE

- ALBECKER. Gyógyászat, 1906. Cited by Veit.
BUMM. Ztschr. f. Geburtsh. u. Gynäk., 1896. 33: 126.
EGYEDI. Deutsch. med. Wchnschr., 1916. No. 44.
FINGOVA and DELBANCO. Dermat. Wchnschr., 1916. 63: 905.
GEIPEL. Zentralbl. f. Gynäk., 1920. 274.
KROMAYER. Dermat. Wchnschr., 1920. 71: 770.
LARTIGAU. Boston Med. and Surg. Journ., 1899. 141: 240.
LENDEERTZ. Med. Klin., 1920. 151.
LOWENBACH and BRANDWEINER. Monatschr. f. prakt. Dermat., 1904.
36: 18.
SLOAN. Brit. Med. Journ., February 21, 1903.
VEIT. Handb. d. Gynaekologie, 1910. 4: 554.

CHAPTER VIII

GONORRHEAL VULVITIS

The gonococcus attacks primarily delicate squamous and cylindrical epithelium. Where there has been any appreciable amount of keratinization, it fails to get a foothold. For this reason the vulva of adult women, except for the area immediately surrounding the vestibule, is not readily infected by the gonococcus and, for the same reason, the vulva of girls from infancy to puberty is especially susceptible to this disease. Let us first consider gonorrheal infection in women beyond puberty.

After the usual incubation period following exposure to this infectious agent, we find redness and a discharge that rapidly becomes purulent, pouring from the urethra and from the ducts of Bartholin's glands; there is some edema surrounding these structures, and a diffuse redness over the entire vestibulum; occasionally there is a slight admixture of blood with the discharge, especially that coming from the urethra. It is rather unusual for this infection to be limited to the external genital tract in the adult; where this is the case, the symptoms produced are usually those of external irritation and frequent, burning urination. In the chronic infections, these symptoms may be very transitory and the whole process may clear up in two weeks' time, except for the pockets of Skene's ducts and the deeper portions of Bartholin's glands. It is often extremely difficult to determine whether such an individual has been entirely rid of her infection or not. Repeated negative examinations over a period of several weeks are necessary to establish a reasonable certainty of cure. Feis has recently described a technic for probing Bartholin's duct in chronic gonorrheal infections and thereby obtaining secretion for microscopic examination; in 11 out of 25 cases, where milking the gland brought away no secretion, he could, by adopting this technic, still find gonococci. In its chronic stage, gonorrheal infection produces practically no symptoms except for occasional slight burning on urination. Veit estimates that fully three fourths of all cases of vulvitis are due to gonorrhea. The diagnosis must always be based upon the microscopic findings of gonococcus in the secretion, although, in the chronic stages,

the fact that Bartholin's glands or Skene's duct is the seat of the disease is evidenced by the redness at the entrance of these structures and by the fact that usually a minute droplet of purulent fluid can be expressed from them. In looking for the gonococcus, it is best to wash away lightly any secretion about the external genitals, taking care in so doing not to press against the urethra or Bartholin's glands; if the finger is then introduced a few centimeters into the vagina and pressed upward against the urethra, one will find, in the presence of infection, that some pus is expressed through the meatus. A small platinum loop or toothpick wrapped with a small bit of cotton can be used to pick up this secretion and make smears upon a slide or cover glass. Occasionally the amount of secretion will be so slight as barely to be visible with the naked eye, yet under the microscope it may be found to contain leukocytes in plenty and perhaps a small number of typical gonococci. A similar technic applies to the examination of the secretion from Bartholin's glands. In the acute stages, of course, the cocci will be found in large numbers with a typical arrangement within the pus cells and superficial epithelium, but later on they become more difficult to find and only extracellular forms may be visible. A single negative finding is no evidence of the absence of infection, particularly in obtaining urethral smears. If the patient has recently voided, there may be an absence of typical bacteria; in such cases, it may be well to expose the openings of Skene's ducts and to obtain a minute droplet of secretion directly from them for microscopic examination.

Treatment.—The treatment of gonorrheal vulvitis in the adult, particularly if there is a reasonable doubt as to the infection of the higher portions of the genital tract, should consist primarily of rest, mild antiseptic external washings (boric acid), urinary antiseptics, and, in the presence of extreme chafing, applications of some slightly anesthetic salve, such as a 1 to 2 per cent carbolic vaselin. All external examinations, and, above all, any treatment of the upper genital tract, should be strenuously avoided. It seems reasonably certain that a not inconsiderable number of gonorrheal infections are thus limited to the region of the vestibulum, and only because of internal examination, vaginal douches, or sexual relations are the bacteria transplanted to the cervix and upper vagina. The difficulty in treatment, of course, results largely from the refusal of the patient to observe the necessary rest and abstinence. Experience advises against the use of stronger antiseptics in this first stage of the disease, and there is a considerable question as to the advisability of any active treatment during the first week after the onset; at this time it is better to use the nonirritating silver salts, such as

argyrol or silvol, in from a 5 to 10 per cent solution. In making applications of these solutions, the tissues should be handled with extreme gentleness so as not to force any of the infectious pus into the deeper portions of the neighboring tissues.

In the later stages of the disease, one should employ silver nitrate solutions, increasing in strength from .5 per cent up to 4 per cent. Where there is any tendency for the retention of the secretion in pockets, one should see to it that better drainage is obtained, and that the antiseptics reach the deeper affected tissues. The opening of Skene's duct can be exposed by means of hairpin retractors or an Outerbridge wire pessary, and, after exposure, should be freely incised along their urethral border by introducing small, probe-pointed scissors through the opening of the duct and cutting the intervening septum. Many a latent infection can be eradicated by removing this focus. Chronic infections of Bartholin's gland may be cured, according to Feis, by daily injections of .5 per cent silver nitrate solution for a period of four weeks. Owing, however, to the racemose structure of these glands, it may be impossible to eliminate this source of infection by any means other than complete excision of the glands themselves.

VULVOVAGINITIS IN CHILDREN

The alarming frequency of gonorrheal infection of the vulva in little girls has only in recent years been given the attention it should receive. Seippel estimates the number of cases appearing in Chicago annually at 500. Pollock figures the yearly infections in Baltimore at from 800 to 1,000 girls. In an investigation conducted by Dr. P. C. Jeans and myself over a period of five months at the St. Louis Children's Hospital, over 5 per cent of girls coming to the dispensary were found infected with gonorrheal vaginitis. Only one third of those infected had sought the clinic for this condition. In the remainder, it was discovered as the result of a routine examination of each patient entering the clinic. In the opinion of 149 physicians replying to the questionnaire of the American Pediatric Society's Committee on vaginitis, less than 2 per cent had observed any decrease in the number of cases seen during recent years, while from 13 to 28 per cent had noted an increase both in private and hospital practice. I think it reasonable to assume that most of this apparent increase is due to more careful physical examination. In many instances the infection is so mild that the overworked mother in the

tenement districts pays no attention to it, and the child herself merely experiences a slight chafing and burning at times. Fortunately it is only the exceptional case in which the genital tract above the cervix is infected. In orphan asylums and children's hospitals, a vigilant quarantine must be maintained against any girls with active infection, for the slightest break in technic may cause an epidemic affecting a large percentage of the inmates of the institution.

Gittings and Mitchell published, in 1917, an excellent review of the literature on gonorrheal vaginitis. The majority of investigators emphasize the rarity of any direct sexual contact as an agent of infection. Indirect contact with adult members of the household having the infection and the use of public lavatories have generally been accepted as the two most common means of infection. In my own investigation of 66 cases, carried out with the assistance of the Social Service Department of Washington University, the lavatory seat seemed to be the chief agent for transmitting infection. From the frequency with which these infections first made their appearance shortly after the school age, it seems reasonable to assume that the school lavatory was in good part to blame for the transmission of the disease to other children.

While gonorrheal vulvitis of the newborn does not compare in frequency with gonorrheal infection of the conjunctival sac at this time, and, of course, has none of the serious consequences of the latter, it is not by any means a rare condition; and it might well be adopted as a rule, in every case in which the parturient mother has an acute gonorrheal infection, to use the prophylactic drop of 1 or 2 per cent silver nitrate about the vulva as well as into the conjunctival sac. This is especially advisable in view of possible transmission of infectious material from the vulva to the conjunctiva by the careless handling, of either the nurse or mother, in the first weeks of the infant's life.

The Course of the Disease.—The onset of the disease is characterized by marked redness, not merely of the vestibulum but also of the labia minora, prepuce of the clitoris, and the inner surface of the labia majora; a profuse purulent discharge pours from these structures, and there may be even some superficial erosion due to the loss of the upper layer of epithelium. In neglected cases, where the parts have not been kept clean, there is often considerable intertrigo. In practically all instances, the outer third of the vagina is infected at the same time, and very often the deeper portions as well as the cervix are involved in the disease, the spread taking place up the genital tract by continuity, even in the absence of any internal manipulations. It is for this reason that

we speak of the disease as a vulvovaginitis and, while it may be true that the vulval tissues are more resistant to the disease and the infection more readily eliminated from this portion, it cannot be gainsaid that there is a true infection of these structures in the early stages, although in some of the later stages the redness and irritation may be largely due to the chafing produced by the irritating vaginal discharge. Smears taken from the vulva at the acute stage will show innumerable intracellular gonococci with large quantities of pus. As the acute condition subsides, the number of gonococci diminishes, but the pus persists. When the disease enters the chronic stage, smears show an increasing proportion of epithelial cells to pus cells, and finally the pus cells disappear altogether. Only where such an absence of pus cells as well as gonococci has been noted over a period of from six weeks to two months can we feel reasonably certain that the disease has been eradicated. Unfortunately, even where treatment has been carried out conscientiously, there are occasional exacerbations of infection from one cause or another; I have seen such recurrences of the acute, or rather subacute, condition following constipation, riding bicycles and other measures producing external irritation. As the disease abates in its virulence, the redness and discharge diminish and we may find only a few yellowish crusts clinging to the skin around the upper margin of the labia majora, and a slight wrinkled appearance of the inner surface of the labia as evidence of the disease.

Diagnosis.—While the diagnosis of gonorrheal vulvovaginitis is usually simple and based on the microscopic findings, we may have cases of a somewhat similar external inflammation due to other conditions. Occasionally infectious diseases of childhood, particularly exanthemata, may produce an infection in this region. Infections of the urinary tract are at times responsible for vulvitis, and cases have been recorded of pinworms passing from the rectum into the vagina and producing irritation and discharge similar to the condition produced by a chronic gonorrhea. In all instances, however, where such irritation and discharge are present in little girls, careful and repeated microscopic examinations should be made.

Prognosis.—There is still much difference of opinion as to the seriousness of this condition. Only rarely have any deeper or distant infections been noted. Proctitis is not infrequent, but is usually limited to tissues around the anus. Arthritis has been recorded, and, in a few instances, an occasional infection will spread to the tubes, producing in a very few instances a typical pyosalpingitis. Rachford states that the complications are far less frequent in children than in adults. Only

proctitis has been observed in a considerable percentage of these cases. Mucha reports the autopsy findings in a child having gonorrheal vulvovaginitis, but dying of other causes. In his patient, the infection was absolutely limited to the vaginal wall and the vaginal portion of the cervix, and did not enter the uterine cavity or even infect the cervical canal. According to Nagel and Veit, gonorrheal vulvovaginitis frequently produces atresias of the genital tract back of the hymen through the occlusions of the vaginal folds, and is considered by them to be the chief cause of such occlusions, leading, at puberty, to the retention of menstrual blood and formation of hematocolpos, hematometra and hematosalpinx. So far as I have been able to read the evidence, there is little to support this theory, particularly as compared with the undoubted occurrence of congenital obliterations in this region of the body through the outgrowth of the connective tissue forming the hymen and the folds directly back of it. The chronicity of gonorrheal infection in children justifies the assumption that a considerable number of cases persist up to and beyond the onset of puberty and then may readily be a factor in those chronic infections of the cervix and tubes in virgins that have heretofore been usually attributed to bacteria gaining their entrance through the intestinal tract. There is still lacking any careful study of these possible late results of gonorrheal infection in children. To what extent they may be a factor in the occurrence of sterility in such individuals should also be made the subject of further inquiry, and may well influence us in estimating the prognosis of this disease.

Treatment.—The difficulty of treatment lies partly in the chronicity of the infection and is due in part to the difficulty of obtaining the coöperation of the parents in carrying out any form of treatment over the necessary period of time. It must be acknowledged that we have at present no rapid way of limiting the course of the disease. The use of gonorrheal vaccines (hypodermatically) has given somewhat questionable results. They deserve a trial, however, where simpler measures had to give results. In the questionnaire of the American Pediatric Society 20 out of 31 expressed themselves favorable to its use. Success in treatment would seem to depend not so much upon what particular antiseptic is employed, as upon the persistence with which these measures are carried out for a given period of time. In dispensary treatment, I found it impossible for practical reasons to have the little children come regularly for treatment, and therefore adopted the expedient of training a certain number of visiting nurses in the technic of vaginal applications. If the mothers were sufficiently intelligent, they were taught how to give the

vaginal treatment and told to bring the child at intervals of once every week or two to the clinic for examination and a study of vulvovaginal smears. When such persistent supervision of the case was carried out with the social service follow-up system to prevent temporary neglect, a considerable percentage of the cases could be permanently cured in from three to six months. In no case was a cure considered permanent until negative smears for six weeks at intervals of two weeks were obtained.

The antiseptics employed in my series consisted of frequent external washing of the parts in boric acid solution from two to five times a day, depending upon the amount of discharge, followed, in the acute stage, by the instillation of a silver solution into the vagina and about the vulva. Since practically in every instance the infection had entered the vagina and since the multiple folds of the vaginal walls in little children made it impossible to eradicate the infection from this region except by active treatment, vaginal instillations were employed in practically all cases, starting with 10 per cent argyrol solution, then shifting to .5 per cent silver nitrate solution, and finally increasing to 2 per cent or even 4 per cent silver nitrate solution, depending upon the age of the girl and the chronicity of the disease. At the same time, small doses of urotropin were given by mouth so that the tissues would be bathed by a urine containing formaldehyd. In the acute stage the maximum of rest consistent with the well-being of the individual was observed.

Extreme precautions to prevent the infection of other girls must be observed by the separate washing of infected linen, by special care in the bathroom arrangements and by keeping the child away from school in the acute stage and denying her the use of the school lavatory until she has been entirely rid of the infection. It is important also to pay attention to the general health of these girls, since anemia and bad hygiene lowers resistance to the infection and makes it more difficult to effect a cure. Several cases in my experience were finally cured only when the girls were sent to the country for several months.

LITERATURE

- FEIS. München. med. Wchnschr., 1920. 67:755.
FIFE, GITTINGS and CARPENTER. Tr. Am. Pediat. Soc., 1915. 27:331.
GITTINGS and MITCHELL. Am. Journ. Dis. Children, 1917. 12:438.
MUCHA. Wien. med. Wchnschr., 1916. No. 28.
NAGEL. Ztschr. f. Geburtsh. u. Gynäk., 1896. 34.

- POLLOCK. Johns Hopkins Hosp. Bull., 1909. 20: 142.
RACHFORD. Am. Journ. Med. Sc., 1917. 153: 207.
ROOKE. Brit. Med. Journ., 1920. 1: 671.
SEIPPEL. Am. Journ. Dis. Children, 1913. 5: 266. Cited by Spaulding.
TAUSSIG. Am. Journ. Med. Sc., 1914. 148: 480.
VEIT. Handb. d. Gynaekologie, 1910. 4: 568-578.
YLPPÖ. Therap. Monatschr., 1916. No. 12.

CHAPTER IX

ULCERATIVE VENEREAL INFECTIONS

Syphilis.—While the subject of syphilis is too broad to be considered here in detail, it is well to bear in mind some of the more striking lesions found upon the vulva in various stages of this disease.

Primary Sore.—When we take into consideration the frequency of syphilitic infection in women, it is surprising that the initial lesion or change so often escapes observation. Contrary to chancroidal sores, the chancre is usually a painless lesion, and only where there is marked inflammatory reaction around it does the patient take note of its existence. Gellhorn and Ehrenfest state that the primary sore heals more rapidly in women than in men. Only when it is located at the mucocutaneous junction, over the labia majora or at the posterior commissure, does the chancre assume its typical indurated appearance and produce definite soreness and irritation. We have as yet no accurate figures as to the frequency with which the primary sore is found in various locations of the vulva. Upon the labium majus, the primary sore produces a shallow ulcer with hard parchmentlike border and marked edema of the surrounding tissues. The labium majus, in these cases, is often twice its normal size and the disk-shaped ulcer is usually from 2 to 3 cm. in diameter. The inguinal lymph glands on the side where the chancre is located show the typical hard induration of syphilis long before general adenopathy is present. Excision of the primary sore has been recommended by Neisser, but is rarely practiced, probably because of the fact that the sore is rarely recognized at a sufficiently early stage. *Spirochaeta pallida* can be found in the serum of initial lesions in large numbers. Multiple primary chancres are not at all infrequent in women (Fig. 38). They are due to simultaneous inoculation of several abrasions. Occasionally we find symmetrical sores on each labium due to contact inoculation. Not infrequently there is a combined infection with chancroidal sores that temporarily obscures the diagnosis. Marked induration of such a sore should always strongly suggest the possibility of syphilis. A Wassermann test will usually establish the diagnosis, if the blood is not taken at too early a stage.

Secondary Lesions of Syphilis.—Secondary lesions are of two kinds: (1) condylomata lata, appearing upon the moist cutaneous surfaces of the vulva and perineo-anal regions (Fig. 39); and (2) mucous patches appearing upon the vestibular epithelium surrounding the vaginal orifice. The condylomata are somewhat elevated plateaulike lesions, usually multiple, from 0.5 to 2 cm. in diameter, sometimes coalescing, but more often definitely circumscribed. They may undergo superficial ulceration, but more often they have an intact epithelial covering. Mucous patches,

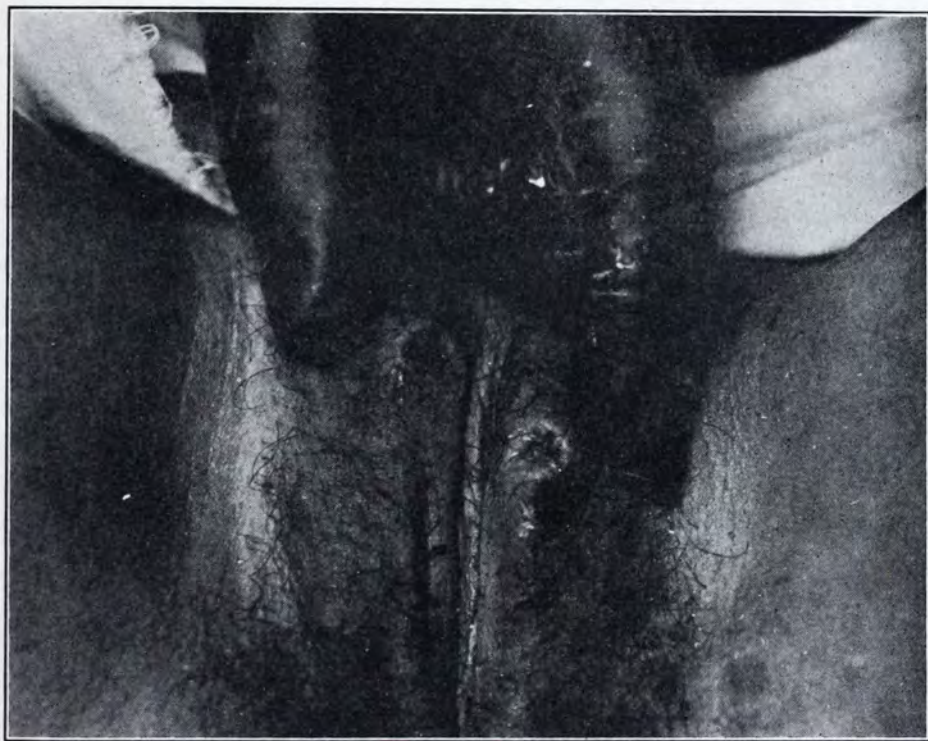


FIG. 38.—MULTIPLE CHANCRES OF THE VULVA.

on the other hand, are somewhat smaller in size, have the appearance of a shallow ulcer, with grayish red base. They also are usually multiple and resemble closely mucous patches found in the mouth. The appearance of these secondary lesions is usually synchronous with the fever, general adenopathy and general skin eruption characteristic of this stage. The most frequent site of condylomata lata is on the inner surface of the labia majora and around the anal margin. There is usually no difficulty in distinguishing between these lesions and the acuminate warts that are commonly associated with gonorrhea. Where both kinds of warts are present, the diagnosis may be obscured and

require a Wassermann test for final decision (Fig. 40). Secondary lesions are most infectious. The secretions from mucous patches and condylomata contain innumerable *Spirochaeta pallida*, and special care is required in nursing such women to prevent carrying the infection to others by instruments, clothes, bedding, etc. (Fig. 41).

Tertiary lesions of syphilis about the vulva are seen very frequently and, owing to their characteristic form and location, are readily recog-



FIG. 39.—CONDYLOMA LATA. The somewhat symmetrical arrangement of the lesions are due to contact implantations from one side to the opposite.

nized. These gummatous deposits start as an ulcerating nodule, most often at the meatus urinarius or in the vestibulum, between the clitoris and the labia minora. This ulcer has a hard base and extends deeply into the subjacent tissues. It does not bleed ordinarily, though a straw-colored, slightly purulent, blood-tinged discharge exudes from its surface. The base of the ulcer is covered by nodular granulations that are not friable, as in cancer, but have an almost hard consistence. Slowly the ulcer extends along the surface and at times infiltrates deeply, especially near the urethra. There may be healing with scar-tissue formation in one part of the ulcer and an extension of the process on the oppo-

site side. Characteristic of the destructive ulcerations of tertiary lues of the vulva is the symmetric splitting open of the urethral canal, leaving one lip beneath the pubis and the other hanging down with the anterior



FIG. 40.—COMBINED CONDYLOMA LATA AND ACUMINATA (Barnard Free Skin and Cancer Hospital).

vaginal wall, thus presenting the appearance of a bilateral tear of the cervix with ectropion. Where such a destruction of the urethra occurs, there is always more or less incontinence of urine. Gummatous ulcers around the labia minora may eat large holes through them, and the

resultant scar-tissue formation leads to marked distortion of the surrounding structures.

Not infrequently a gumma is found in the region of the posterior commissure, and in such instances there may be gummatous infiltration of the rectovaginal septum leading eventually to a rectovaginal or rectovaginoperineal fistula. We also find gummatous deposits about the anus with the formation of irregular polypoid outgrowths of tissue. These



FIG. 41.—CONDYLOMA LATA. Note the marked inflammatory reaction and the epithelial proliferation at the edge of the ulcer (microphotograph, from Gyn. Lab., Washington University).

tertiary lesions are always more frequently found and more extensive in the negress. In fact, the negress is as much predisposed to tertiary ulcerations of the vulva as she is to the formation of fibroids of the uterus. I shall not consider at this point what Stein has termed syphiloma of the vulva, since it has seemed more logical to consider this as postsyphilitic hypertrophy and to group it with the other chronic hypertrophic processes found about the vulva.

Chancroid.—Chancroidal infections have been shown to be due to the streptobacillus of Ducrey. These bacteria (long rodlike bacilli forming chains) are found in large numbers in the base of the super-

ficial ulcers they produce. From the ulcers they travel along the lymph channels to tributary lymph glands in the groin and there set up an acute lymphangitis. The course of this infection is usually acute and self-limited. Occasionally, however, we find the infection persisting for several months. The lesions about the vulva consist of multiple punched-out ulcers varying in size from that of a split pea to lesions covering one half the surface of the genital region. The ulcers have somewhat undermined edges, are often serpiginous and, where they involve the more delicate structures such as the labia minora, may produce perforations and other irregular conformations as the result of the destruction of tissue. The base of the ulcer is usually gray in the early stages, but later, as the disease progresses, it assumes a more reddish tint and finally heals by granulation. The use of cauterants will, of course, greatly expedite the course of the disease and will diminish the likelihood of implantation ulcers in other portions of the same region. This tendency to auto-inoculation is characteristic of chancroidal infections. At times, we have a combination of chancroidal infection with syphilis that presents considerable diagnostic difficulties, and it is wise always to have a Wassermann test made in every case of chancroidal sore about the vulva. In differential diagnosis, it is often more difficult to separate chancroidal ulcers from secondary lesions of syphilis (mucous patches), than from primary lesions (chancre) of this region. The chancroidal ulcers are most frequently found about the vestibular ring, especially the fossa navicularis, whereas the primary lesions of syphilis are more common about the internal surface of the labium majus.

The *treatment of chancroids* that has generally been adopted in the past is the cauterization of the fresh sore with carbolic acid, lunar caustic or the actual cautery, followed by the use of antiseptic powders during the stage of wound healing. Recently Jacob has strongly indorsed the treatment of Jersild. This consists of the application of the high frequency spark in combination with a 25 per cent copper sulphate solution to the infected ulcer. Robbins and Seabury, who have also had good results with this method of cauterization, recommend the following technic: A small pledget of cotton moistened with 10 to 20 per cent cocain is applied to each lesion. After five minutes a 25 per cent copper sulphate solution in distilled water is applied and the short high frequency spark from a rather fine-pointed vacuum electrode is applied directly to the sore for from one to three minutes, depending on the size of the ulcer. The sparking is extended to 1 mm. beyond the edge and is especially directed beneath the undermined edges of the ulcer.

The application is to be repeated after two or three days if the ulcer does not have a healthy appearance. Weak silver nitrate solutions are used to hasten dermatization. Apparently this form of treatment is followed by a smaller percentage of recurrences than others that have been employed.

Granuloma Inguinale.—Occasionally we find, in temperate zones and especially in the negro race, a form of chronic ulceration about the genitals that is definitely venereal in origin, even though it is not nearly so infectious as that produced by chancroids. In the tropics, this disease is variously known as granuloma inguinale, granuloma of the pu-

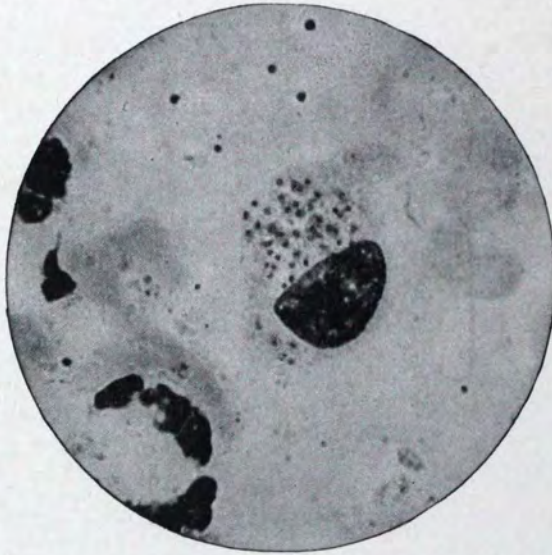


FIG. 42.—SMEAR FROM CASE OF GRANULOMA INGUINALE SHOWING DONOVAN'S BACILLUS (Randall, Small and Belk, *Surg. Gyn. and Obst.*)

dendum, and *ulcus tropicum*, and is quite common. In Brazil, Guiana, Uruguay, the West Indies, India, South China and Western Africa, we find reports of chronic ulcerations of this kind. While the disease is found in men as well as women, it is less common among the former and the lesions are usually less extensive. In Porto Rico, Goodman found a considerable number of cases, especially among the prostitutes. Within the past year, Randall, Small and Belk gave a full description of 16 women with this disease in Philadelphia. Reed and Wolf have seen this disease in New Orleans. In fact there seems to be no doubt that the disease is more racial than climatic in its distribution. In only a negligibly small number is the disease found in other than the negro or negroid race.

Etiology.—It is reasonably certain that the encapsulated bacillus, discovered by Donovan in smears from these ulcers, is the specific cause of the disease. Cultures have been grown of this microorganism and somewhat similar ulcerations produced by inoculation upon rabbits. Donovan called this bacillus the “calimatobacterium granulomatis.” A spirochete was found in some of these ulcers by Wise, but his work has not been confirmed. Recently Randall demonstrated Donovan’s bacillus (Fig. 42) in 12 out of 16 cases, and in 3 of these cases was able to

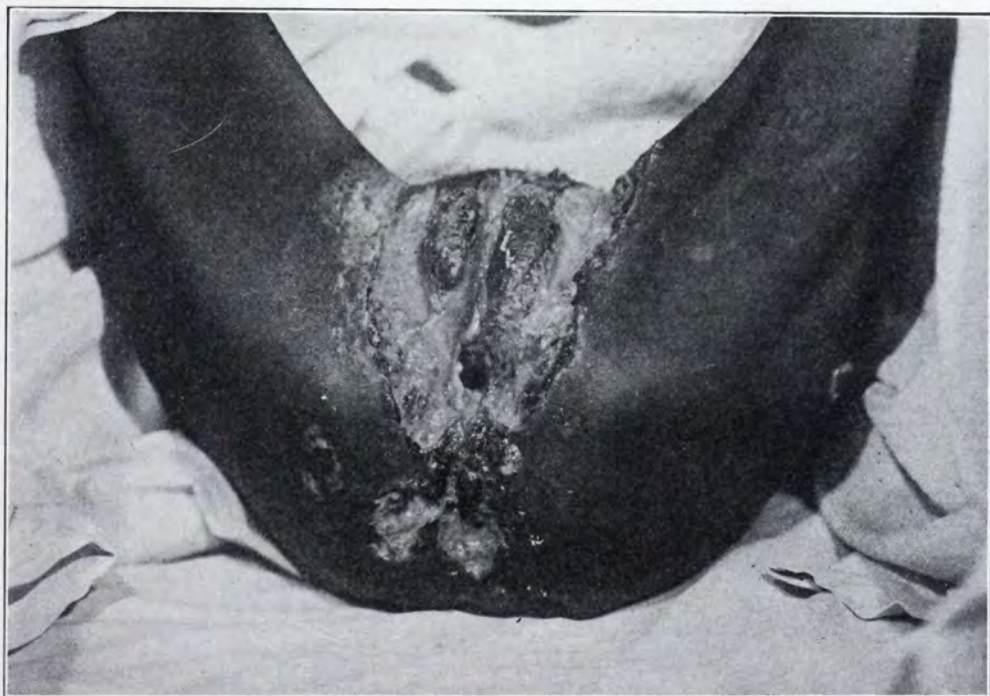


FIG. 43.—GRANULOMA INGUINALE. Extensive superficial ulcerations extending upward into groins is shown (case of Dr. Edgar F. Schmitz).

isolate it in cultures. Some additional evidence is still needed, however, before we can consider this etiology as positively established.

Pathology.—The lesions in women are located about the inguinal, the genital and the crural folds. They consist of extensive, slowly progressing ulcers with sclerosed edges; irregular in outline, not bleeding readily; covered in part by a grayish exudate, having a nodular firm base, and at times undermining and perforating neighboring structures. Some enlargement of the labia majora may be present, but not the extreme degree that we find in chronic hypertrophic vulvitis as described in a later chapter. Goodman emphasizes the raised border, the bright

granulations, and the protruding papules present in lesions about the vulva and anus.

Histologically, we find in the ulcer a superficial cellular area surmounted on a base of dense, hyaline connective tissue. Many lymphocytes and a few polymorphonuclears are present. At the margin of the ulcer, the epithelium is partly destroyed and beneath it, and for some distance beyond the ulcer, extends the round-cell infiltration. Finger-like projections of the epithelium occur at the edge of the ulcer, resem-

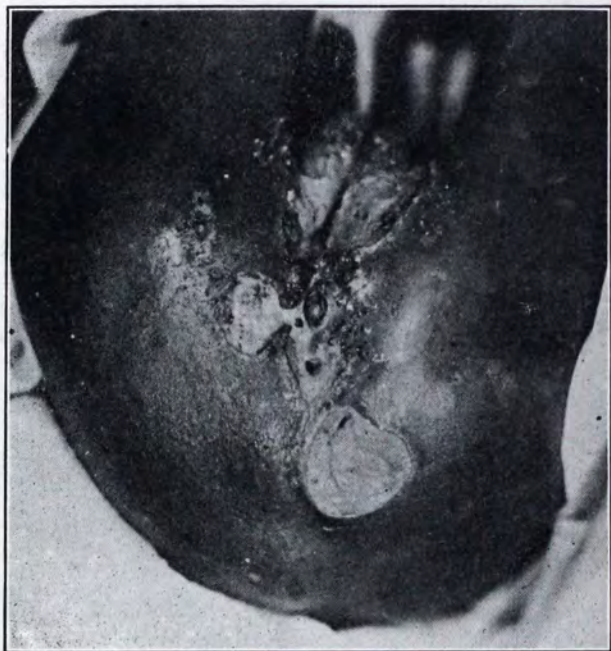


FIG. 44.—GRANULOMA INGUINALE. Lesions around anus and over sacrum. The latter is probably in part a decubitus ulcer.

bling beginning cancer—a condition also found in tertiary syphilis of the vulva.

Symptoms and Course.—The granulomata are usually not sensitive, differing markedly from chancroids in this respect. There is really no special discomfort except chafing and moderate burning after urination. In the case observed by Dr. E. F. Schmitz (Figs. 43, 44), the disease had existed for several years with gradual extension of the ulcers. Occasionally there is temporary improvement with partial healing.

Treatment.—Weinbrenner recommends potassium iodid internally and exposure of the ulcers to direct sunlight. Rystic finds improvement following cauterization and antiseptic dusting powders. Excision of

the ulcerated area is not effective. Results in recent years with the use of intravenous injections of tartar emetic have been so uniformly successful that one is justified in strongly recommending this treatment. The technic employed by Randall, Small and Belk is as follows: An initial dose of 0.04 gm. is given and this is quickly advanced to a maximum dosage of 0.1 gm. The drug is prepared by dissolving 0.1 gm. in 10 c.c. of sterile normal salt solution and preserving it in sealed sterile ampules. Injections should always be intravenous and given every other day until healing has markedly progressed. Vianna recommends giving an injection once a week for twelve doses after the ulcer has healed. Occasionally cases obstinately resist treatment by this method or tend to recur at intervals, but, compared to all other measures, the treatment with tartar emetic should be the method of choice.

LITERATURE

CHANCROID

- JACOB. Arch. f. Dermat. u. Syph., 1920. 1:435.
 JERSILD. Ugesk. f. Læger, 1916. 78:850.
 ROBBINS and SEABURY. Journ. Am. Med. Assoc., 1917. 69:1217.

SYPHILIS

- GELLHORN and EHRENFEST. Tr. Am. Gynec. Soc., 1916. 41:129.
 NEISSER. Beitr. z. Path. u. Ther. d. Syph., Berlin, 1911.

GRANULOMA INGUINALE

- ARAGAO and VIANNA. Mem. do Inst. Oswaldo Cruz, 1912. 4:211.
 CUMMINGS. Brit. Med. Journ., November 20, 1920. 775.
 DONOVAN. Indian Med. Gazette, 1905. 40:414.
 GOODMAN. Arch. f. Dermat., u. Syph., 1919. 1:151; 1920, 2:332.
 GRINDON. Journ. Cutan. Dis. incl. Syph., 1913. 31:236.
 HOFFMAN. München. med. Wehnschr., 1920. 67:159.
 PARDO. Journ. Cutan. Dis. incl. Syph., 1918. 36:206.
 RANDALL, SMALL and BELK. Surg. Gynec. and Obst., 1922. 34:717-727.
 REED and WOLF. New Orleans Med. and Surg. Journ., 1921. 74:25.
 RYSTIC. Liječ. vijesnik u. Zagrelu., 1921. 43:222.
 SYMMERS and FROST. Journ. Am. Med. Assoc., 1920. 74:1304.
 WEINBRENNER. Zentralbl. f. Gynäk., 1920. 814.

CHAPTER X

TUBERCULOSIS OF THE VULVA

In one of the monographs of this series (Norris' *Gynecological and Obstetrical Tuberculosis*), there is to be found the best review on the subject of tuberculosis of the vulva that has thus far been published. Since Norris has gone into great detail, giving abstracts of all cases reported in literature up to 1920, I shall refer those specially interested in this subject to his monograph.

For my purposes it will suffice to give briefly a summary of his observations and conclusions with a few criticisms that suggest themselves to me. The first authentic case of tuberculosis of the vulva was reported by von Winckel in 1881. The most recent one I have found is by Gravagna in February, 1922. During these forty years approximately sixty cases have been recorded in literature. This is ample evidence of the rarity of the lesion, and, if we analyze more closely the reports of these sixty cases, doubt will arise in our mind regarding the diagnosis in at least a third of them. The mere presence of giant cells, in the absence of typical tubercles, is not proof of tuberculosis, since these cells may be found in other chronic inflammatory conditions. Neither should the presence of tubercle bacilli in the secretions of the ulcer be regarded as proof, since these bacilli may have been merely deposited upon the surface of the ulcer by infectious discharges coming from intestinal, genital or urinary lesions. We may regard either typical tubercle formation or the presence of bacilli in tissue as positive evidence. It is not uncommon to find vulval irritation associated with tuberculous discharges from above, and this may readily result in a small break in the skin, through which the tubercle bacilli may gain entrance and so lead to the formation of a true tuberculous ulcer of the vulva. In a considerable number of the well-authenticated cases, such a secondary infection from above has probably taken place. There is considerable doubt whether primary tuberculosis of the vulva ever occurs. None of the cases reported in literature have positively established this fact, though in some few instances the other tuberculous lesions have been

remote and a direct primary infection from without would seem more plausible.

In general, an ulcerative and hypertrophic form are recognized; the ulcerative form is by far the more frequent. In Norris' compilation, 44 out of 54 cases were of this type and only 10 were of the hypertrophic form. J. B. Murphy thinks that cases of so-called lupus or esthiomene should be included as tuberculous, but recent studies have shown that this is not justified. Only in a few exceptional cases have positive evidences of tuberculosis been found in this hypertrophic ulcerative condition. Characteristic of tuberculosis of the vulva are large simple ulcers, often multiple or coalescing with one another, usually having a firm base covered with yellowish-gray tubercles and undermined edges. Where the ulcer is deeply destructive, as in Reed's description of urethral lesions, I question the diagnosis of tuberculosis unless confirmed by microscopic evidence. Such destructive ulceration about the urethra is almost always due to tertiary syphilis.

The location of these tuberculous ulcers is most frequent about the vestibular mucosa (Fig. 45), including therein the labia minora, the urethra and the fourchet. By extension, they may involve structures around them, but the more delicate epithelium of this region seems to offer less resistance to such infection than does the hair-covered area of the vulva.

The disease is slow in its onset and may involve a considerable area when first seen. Local discomfort and burning on urination are the first symptoms. Discharge and pruritus are the rule, though the discharge is more often due to an associated lesion higher up in the genital tract. Pain is an uncertain symptom, at times being quite pronounced, especially after urine has come in contact with the ulcer. Where the urethra is involved, frequency of urination is a symptom.

The disease can occur at any age from thirteen months to eighty-eight years and is fully as frequent among single as among married women. This latter point speaks against the infection coming from without through intercourse with a tuberculous husband. While the course of the disease is unfavorable if left untreated, tuberculosis of the vulva will rarely, if ever, be the primary cause of death.

A group of cases running a subacute course is found in children and in women after parturition. At times the local lesion is a manifestation of a general miliary tuberculosis. In this group the treatment must be largely constitutional, with the application of nonsurgical measures to the local sore. In the type, however, where a slowly progressing

ulceration has developed, surgical excision is usually advisable and gives temporary, and at times permanent, relief. Radiotherapy has been used successfully and may gradually supersede the knife. Where, however, there is any reasonable possibility of malignancy, a cautery excision of the



FIG. 45.—TUBERCULOSIS OF THE VULVA (Kelly and Noble).

ulcer is the safe procedure, followed by microscopic examination of the tissue removed and, in the presence of cancer, of course, associated with the subsequent removal of the tributary lymph glands. In view of the possibility of a lung involvement in these cases, the question of anesthesia must be carefully considered. In all events, hygiene and climatic meas-

ures to combat tuberculosis must be used to follow up any local measures that have been employed. Bulkley's review of the results of treatment in these cases, while it is the only tabulation thus far made, justifies no definite conclusions. It would probably be wiser not to accept his conclusions but to follow the newer methods of treating tuberculous ulcers elsewhere, especially radiotherapy, when one of these rare cases comes under observation.

LITERATURE

- BULKLEY. *Am. Journ. Med. Sc.*, 1915. 149:535.
DANIEL. *Monatschr. f. Geburtsh. u. Gynaek.*, 1913. 37:65.
GRAVAGNA. *Policlin.*, 1922. 29:222.
GREENBERG. *Johns Hopkins Hosp. Rep.*, 1921. 21:149.
LAGANE. *Bull. de la Soc. de Paris*, 1910. 85:665.
MURPHY. *Am. Journ. Obst.*, 1903. 48:737.
NORRIS. *Gynecological and Obstetrical Tuberculosis*, 1921. 108-139.
REED. *Diseases of Woman*, New York, 1913. 388.
WINCKEL, v. *Pathologie d. Weiblichen Sexual-Organen*, Leipzig, 1881.

CHAPTER XI

CHRONIC ATROPHIC VULVITIS

In the chapter on anatomy, I discussed briefly the changes that take place in the external genitals after the menopause and emphasized the great variation in the amount of atrophy present in different individuals. In the examination of 100 old women at the City Infirmary, whose average age was sixty-seven years, I found 13 who presented a condition of extreme atrophy with practically complete obliteration of labia minora and clitoris. None of these women had any pruritus or other local symptoms and in none was there any leukoplakia. In a few of these 13 women, however, the skin was extremely brittle, so that it cracked when put upon slight tension. The results of these examinations are given in the accompanying table:

	Labia Minora	Num- ber of Cases	Aver- age Age	Percent- age of Nulli- parae	Percent- age of Extreme General Skin Atrophy	Percent- age of Vaginal Dis- charge
Slight atrophy	5 -15 mm. high	21	66	42	46	14
Moderate atrophy . . .	3 -5 mm. high	33	67	41	51	12
Marked atrophy	1 -2 mm. high	33	71	19	46	18
Extreme atrophy	Obliterated	13	68	11	52	23

The only other similar study was made by Thibierge in Paris. He found extreme obliteration in 12 out of 94 women examined systematically for this condition. He "is tempted to believe" that this extreme form of obliteration of folds does not vary greatly from the so-called "kraurosis vulvae." For a correct appreciation of the pathology of the atrophic diseases to be considered in this chapter, it is important to bear in mind that mere obliteration of labial folds with narrowing of the vaginal outlet may, in some women, be a normal condition.

It is often difficult to draw a sharp line between normal and ab-

normal, between a rather pronounced physiologic involution and definite pathologic disease. Of the pathologic atrophic processes about the vulva, the following will be considered:

1. Pigment atrophy—*Vitiligo*.
2. Atrophy sclerosis—*Simple kraurosis*.
3. Chronic atrophic vulvitis—*Leukoplakic Vulvitis*.

1. **Vitiligo.**—Vitiligo is a peculiar atrophy of the skin in which circumscribed areas varying in size, usually somewhat symmetrically situated, show an absence of pigment with deeper pigmentation in the

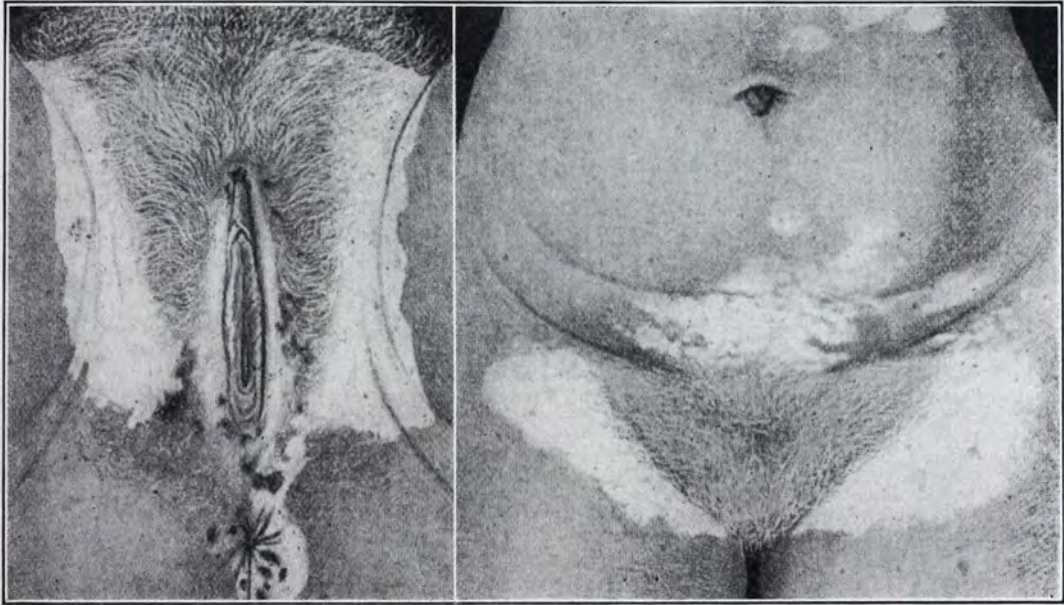


FIG. 46.—VITILIGO OF THE EXTERNAL GENITALS AND ABDOMEN (Jayle). Note the deposit of pigment in blotches surrounding the area of vitiligo and the tendency to symmetrical involvement.

skin surrounding these areas. We are here concerned merely with the form of vitiligo that is localized about the genital and lower abdominal region. It is a somewhat rare condition about the vulva.

The exact cause of vitiligo is still unknown, but two important etiologic factors, at least in vitiligo of the vulva, are: (1) disturbance of the nervous system, such as is produced by severe illness, pain or mental strain; and (2) insufficiency of ovarian secretion. Vitiligo is occasionally found present in several members of the same family. Jayle has recently made a careful study of this subject and justly emphasizes the importance of considering, not merely the local condition, but the patient's general constitution. He differentiates the genital from the

abdominal type. He does not believe syphilis to be a factor in the disease, except in so far as it affects the entire endocrine system. In practically none of the cases he reports did the vitiligo appear in a healthy woman. Of these, 3 had cancer, 5 had tuberculous parents, 4 had been subjected to pelvic operations, and so on down the list.

Beyond the change in pigmentation, there are hardly any noteworthy lesions in vitiligo. Around the whitish patches, often involving the entire

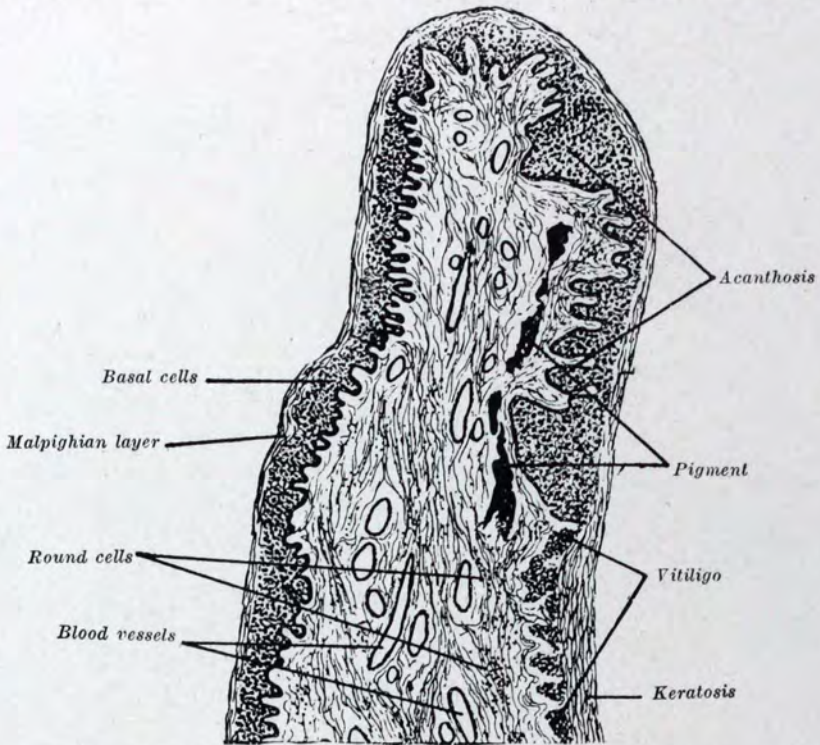


FIG. 47.—SECTION THROUGH AREA OF VITILIGO OF LABIUM MINUS (Jayle). The atrophy is most pronounced in the malpighian layer where the cells are gathered in somewhat irregular heaps without any definite basement membrane.

vulva, we find a zone of excessive pigmentation which is pronounced in the brunette type. Occasionally this excess of pigment is deposited in spots that are practically black in color (Fig. 46—Jayle).

Under the microscope, the area of white skin shows marked atrophic changes. The malpighian bodies show complete absence of pigment and are so reduced in size as to form small heaps of cells, rather than an equally thick layer with definite basement layer as seen in the surrounding normal skin (Fig. 47). There is a moderate amount of hyperkeratosis, with some lymphocytic infiltration in the underlying connective

tissue. In the dermis surrounding the vitiligo, there are found large deposits of black pigment. In a few rare instances, vitiligo has been associated with pruritus and leukoplakia, as in the case reported by Jadassohn in which a symmetrical vitiligo, involving both labia and anus, was observed in a twenty-two-year-old girl who had complained of pruritus for approximately two years. Jadassohn believed that the absence of

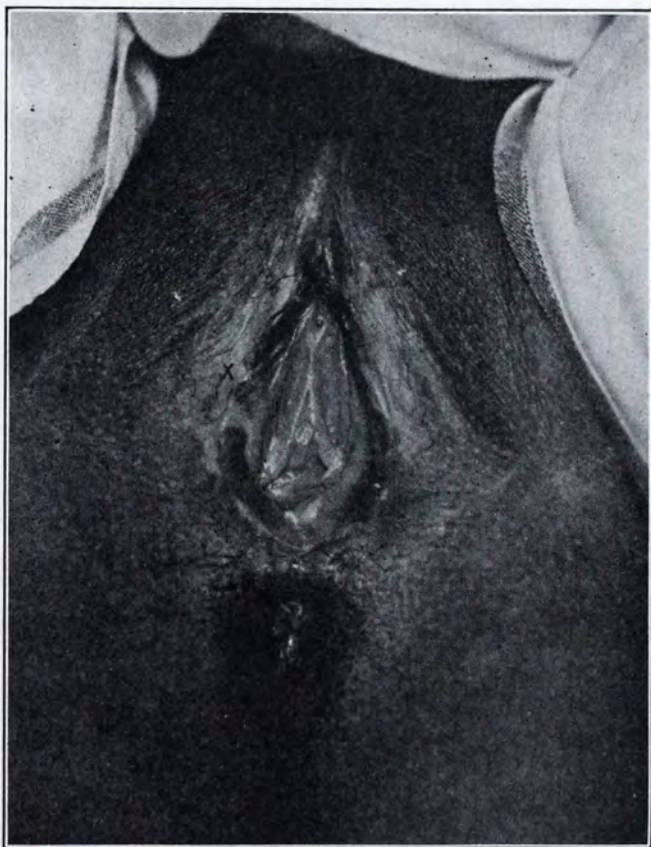


FIG. 48.—LOCALIZED GENITAL VITILIGO IN A NEGRESS WITH PATCHES OF LEUKOPLAKIC VULVITIS. Note the heavy pigment deposit in parts of the labia minora. To the right of the X is a small round patch of leukoplakia recognized by its harder parchment-like consistency and whiter color.

pigmentation preceded the pruritus and leukoplakic vulvitis. In Fig. 48 will be seen the photograph of a somewhat similar case occurring in a negress thirty-two years of age. It is noteworthy that these atrophic lesions, including carcinoma, are extremely rare in the negro, whereas the hypertrophic forms of vulvitis with ulceration are almost entirely limited to the black race. In this negress, the area of vitiligo is rather limited; but, by comparing the histologic picture as shown in Fig. 49

with the illustrations in Jayle's article, it will be seen that the whitish areas are not due to scar tissue or to leukoplakia, but to simple loss of pigment or vitiligo. This confirmed the diagnosis made on gross inspection, for the skin in this region was soft and pliable, whereas, over the true areas of keratosis found in other parts of the vulva, there was



FIG. 49.—SECTION TAKEN FROM RIGHT LABIUM MINUS OF CASE SHOWN IN FIG. 48. Atrophy of malpighian layer and frayed-out appearance at base is shown. Moderate keratosis, sclerotic dermis.

a thickened plaque with parchmentlike glistening appearance. Surrounding the areas of vitiligo were patches of deep pigment deposit.

Jayle's conclusions concerning vitiligo are that, while abdominal vitiligo occasionally gives rise to symptoms, the vulval form never troubles the patients. The vulval form is practically always attended by some lesion in the ovaries. Younger persons with vitiligo have men-

strual disorders and are either sterile or have only a few children. In the way of treatment, only a little can be effected. X-ray and radium have been suggested, but since the cause of the pigment atrophy lies probably in a disturbance of the endocrine system, more is to be hoped by development of organotherapy along some new lines. The preparations at present available are usually inert.

2. **Simple Kraurosis.**—It was an unfortunate circumstance that the first cases of leukoplakic vulvitis seen by Breisky, in 1885, were attended by marked sclerosis and narrowing of the vaginal outlet. This led him to consider the constriction as an essential feature of the disease and so induced him to apply to it the name "kraurosis" (to shrivel up). Much confusion has resulted therefrom, so that German, French and English reports each give a different interpretation as to what kraurosis means. Kraurosis, like pruritus, is only a symptom and not a disease. It refers to the narrowing of the vaginal outlet by a sclerotic process in the vulval ring. This narrowing is frequently produced by leukoplakic vulvitis, which is a disease characterized by a definite clinical course and definite pathologic changes, as will be shown later in this chapter. Other conditions, however, may also produce a sclerosis of the vulval ring and I am entirely in accord with Berkeley and Bonney in preferring to group this nonleukoplakic or simple atrophy sclerosis as true kraurosis. In its clinical course, its histopathology, and its absence of any tendency to malignant change, it differs sharply from leukoplakic vulvitis. I feel, therefore, that, in future, writers should not use these terms interchangeably but should reserve the term kraurosis for this simple nonleukoplakic sclerosis.

Simple kraurosis of the vulva, therefore, is a chronic atrophic condition limited to the labia minora, the vestibule, the urethra and the clitoris. The labia majora, perineum and peri-anal regions are not involved. In the early stages, the skin may be red and glistening with isolated patches of dark red or dull purple. This is the condition Jayle has termed "kraurosis rouge" or "kraurosis inflammatoire" (Fig. 50). In the second or final stage of this disease, the skin becomes pale yellow, with smooth glistening surface, obliterated labial folds, atrophic mons veneris, and scanty broken-off pubic hairs. The skin feels thin, though the deeper tissues may feel thick and hard.

An excellent description of the changes in kraurosis are given by Thibierge. Beneath the mons veneris, the hairs show considerable thinning. The remaining hairs are brittle and broken off. The labia majora are usually flaccid, occasionally flat and atrophic. The labia minora are

greatly reduced in height and length, measuring from 2 to 3 cm. in length, and from 2 to 3 mm. in height; they are stiff like a slightly

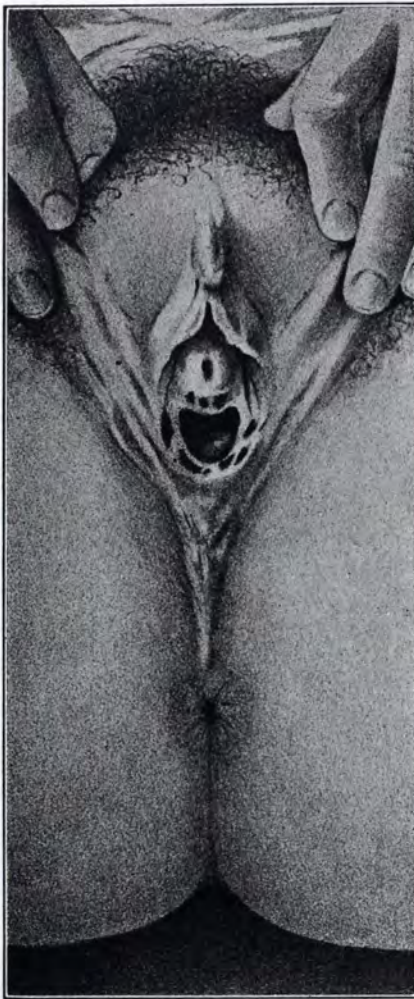


FIG. 50.—SIMPLE KRAUROSIS OF THE VULVA (Jayle). The condition is characterized by stenosis of the vulval ring without obliteration of labia minora and clitoris. On the vestibulum are several red atrophic patches similar in pathology to the red spots found in senile vaginitis.

curved piece of cardboard. Above they are continuous with the prepuce of the clitoris, which has approximately the same appearance. Between the clitoris and the urethra, the vestibule forms a smooth surface, with occasionally a few fibrous bands running from the meatus. The fourchet is often deformed by scars from old tears during childbirth.

The vaginal orifice is narrowed and barely admits the index finger. Any attempt to introduce a second finger is very painful. The carunculae, remnants of the hymen, form hard, round, often pedicled knots. The entire vaginal ring is stiff and inelastic.

The symptoms of kraurosis are essentially produced by the mechanical constriction. Intercourse is either impossible or very difficult and painful. Occasionally, we find some pruritus, but this is usually promptly relieved by simple local measures. It is apparently independent of the kraurotic process. In the first stages of the disease, according to Berkeley and Bonney, the parts are extremely sensitive and there is considerable dysuria; in the second stage, the soreness may have disappeared, but the dyspareunia is more pronounced. Microscopically,

we find in the epidermis simple atrophic changes, differing greatly from the picture in leukoplakic vulvitis (Fig. 51). In the connective tissue beneath, there is usually some infiltration with lymphocytes and plasma

cells. There is also some leukocytic infiltration beneath the epithelium. Most striking is the almost normal condition of the elastic tissue in complete contrast to the marked changes in leukoplakia; the dermis shows a marked increase of sclerotic fibrous connective tissue.

According to Jayle, there are several types of kraurosis. He differentiates a senile form and a postoperative form. I see no justification for such subdivisions. Apparently deficiency or an absence of ovarian secretions is the most important etiologic factor, but, in addition thereto, we may have some inflammatory process. Jayle considers syphilis unquestionably the cause of some cases of kraurosis. Castration resulting from operation in younger women is occasionally followed by

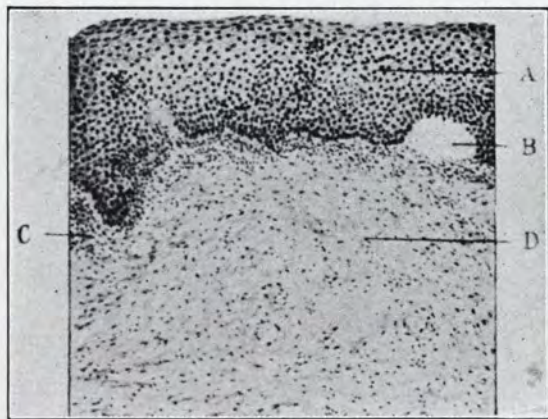


FIG. 51.—SECTION TAKEN THROUGH ONE OF THE RED PATCHES OF KRAUROSIS OF THE VULVA (Jayle). *A*, Vestibular epithelium practically normal except for slight atrophy. *B*, Blood-vessel breaking up basement membrane. *C*, Subepithelial leukocytic infiltration. *D*, Sclerotic dermis.

this form of atrophy sclerosis. I agree with Berkeley and Bonney that nonleukoplakic or simple kraurosis is not associated with carcinoma of the vulva.

The treatment of kraurosis is essentially surgical, requiring a sagittal incision through the vulval ring with the removal of a portion of the sclerotic tissue, followed by a transverse suture of the incision. This procedure, similar to the operation for vaginismus, leaves the vaginal canal open. In some instances, the process is so advanced that plastic surgery will give no relief.

3. Leukoplakic Vulvitis.—Hardly any disease in gynecology presents so many interesting features for study as leukoplakic vulvitis. While considerable progress has been made in our knowledge of the histology of this condition and its relation to cancer, we are still far

from a satisfactory answer as to the why and wherefore. Let us start with a definition of leukoplakic vulvitis as a chronic atrophic inflammatory condition, affecting either the entire vulva or a small area thereof, characterized by the formation of whitish plaques of thickened epider-

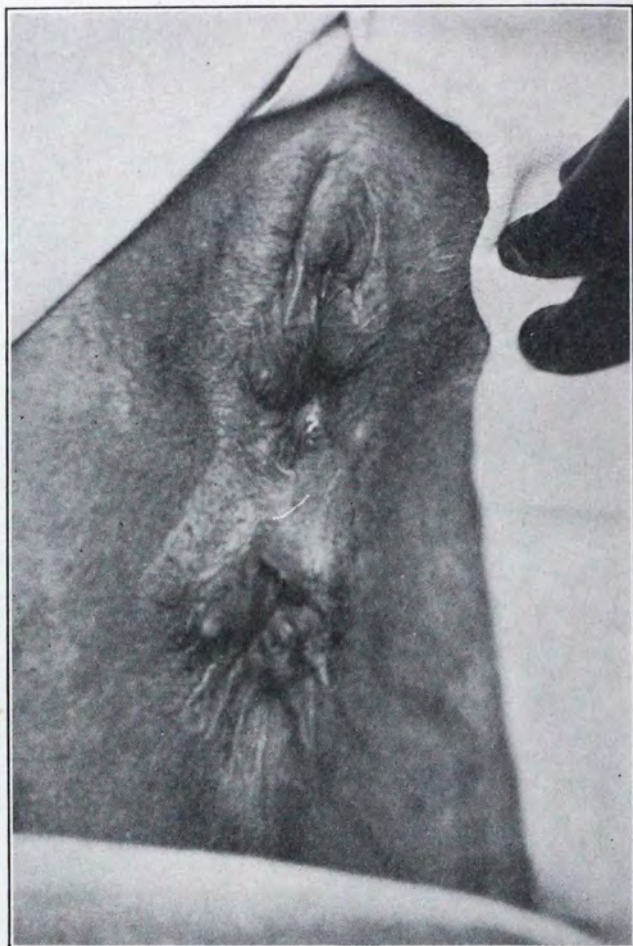


FIG. 52.—LEUKOPLAKIC VULVITIS, GENERALIZED TYPE, EARLY CASE. As yet there is no obliteration of labia minora; in fact, the labia through lacking tone, are a trifle longer than normal, but eventually this type tends to form a constricted sclerotic ring, such as is seen in Fig. 53.

mis, with sclerosis of the subjacent connective tissue and absence of elastic fibers, producing a parchmentlike consistence of the affected skin.

In approximately two thirds of the cases, the area involved includes, in symmetrical form, the entire vulva from the mons veneris above to the tip of the coccyx below, including the entire prepuce, the labia minora,

the inner surface of the labia majora, the perineal skin and the skin surrounding the anus for a distance of approximately from 2 to 3 cm. The area involved resembles in shape the figure 8, with the vaginal opening in the larger circle above and the rectal opening in the smaller circle below (Fig. 52). In the remaining third of the cases, the leukoplakia is found as a localized patch, varying in size from 2 to 6 cm. in diameter. Occasionally this patch will be symmetrical, as in one of my cases in which an area over the perineum, the size and shape of a small butterfly, was involved. The shape of the lesion varies greatly with the individual case, but the margins are usually sharply defined and the skin as a whole has a totally different consistence from that of the surrounding normal skin. This localized form of leukoplakic vulvitis never produces a constriction of the vulval ring, nor does there seem to be more than a slight tendency to an extension of the process as the disease continues. I have seen several cases of leukoplakic vulvitis localized to a small area of the vulval skin, although the process had existed for nine or ten years; and, on the other hand, I have seen the form of generalized leukoplakic vulvitis, affecting the entire area as described above, arise within a period of two or three months. Only this generalized or diffuse form of leukoplakic vulvitis ever develops into the extreme stage of sclerosis of the vulval ring that we term "leukoplakic kraurosis" (Fig. 53).

I feel, therefore, that some distinction should be made between these two types of the disease, although the symptoms, the pathology, the tendency to cancer, and the treatment of the two types is essentially the same.

We may distinguish four stages of the disease, according to Berkeley and Bonney. In the first stage, the affected skin is red, swollen and excoriated, and its surface is dry. In the second stage, the skin shows thickening with some flattening of folds, so that the labia minora appear merely as ridges with patches of skin having a whitish semi-opaque color. In the third stage, the skin has assumed a cracked parchmentlike appearance, with small points of ulceration and with a diffuse white or bluish-white color. In the fourth or final stage, the vulval surface is smooth, shiny, and white, with obliteration of all labial and preputial folds and complete quiescence of the disease.

I cannot find anywhere else in literature or in my own observations any confirmation of Berkeley and Bonney's conclusions as to this fourth or healed stage of the disease, while I am in general accord with the description of the first three stages given by these authors. Apparently one of the frequent temporary retrogressions, which we have all ob-

served in leukoplakic vulvitis, led them to the conclusion of this fourth healed stage. Possibly, if these cases had been observed longer, a recurrence of the old trouble would have been found.

Although there are in general these stages in the development of leukoplakic vulvitis, the picture is often confused by the fact that there

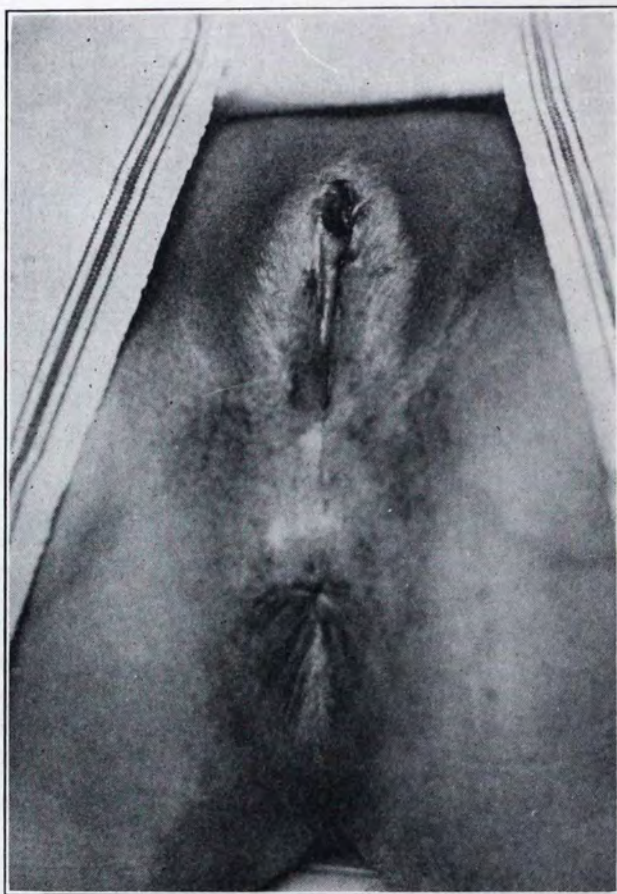


FIG. 53.—LEUKOPLAKIC VULVITIS, WITH SCLEROSIS, SO-CALLED LEUKOPLAKIC KRAUROSIS, OR KRAUROSIS OF BREISKY. In this case an area of carcinoma had developed in the region of the clitoris (see also Fig. 84).

may be, in the same individual, areas in various stages of development, from that of early inflammatory change to that of complete sclerosis.

Histopathology.—The microscopic changes are, if anything, even more characteristic than those observed in the gross. In the first stage (Fig. 54), we find little involvement of the epithelium. It shows some degree of atrophy and low papillae. On the other hand, the corium

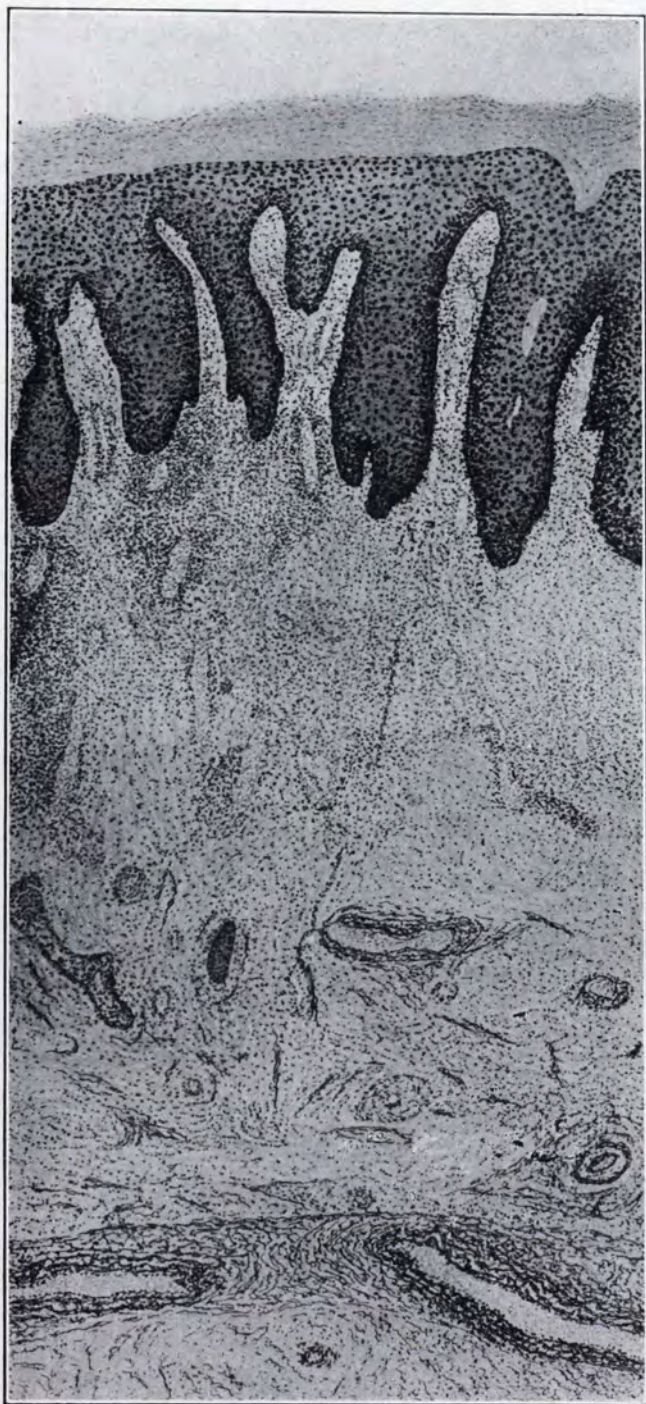


FIG. 54.—LEUKOPLAKIC VULVITIS (first stage). Section showing marked hyperkeratosis, acanthosis of the malpighian or mucous layer and inflammatory changes in the dermis. Elastic tissue is entirely absent surrounding the vessels at the bottom of the picture (drawn from microscopic section of tissue from case illustrated in Fig. 52, stained by Weigert's method).

directly beneath the epithelium shows active infiltration with lymphocytes and a few polynuclear leukocytes. There is also noted an absence of elastic tissue fibers in the layer directly beneath the epidermis. In my observations, the change in the elastic tissue has occurred at the very onset of the disease, so that I have been led to consider it an essential feature of the disease and possibly a prime factor in the pruritus and friability of the skin. In the second stage of development (Fig. 55), the epithelium shows the hypertrophic changes usually attendant on the pruritus, acanthosis or papillary prolongation of the malpighian layer, increase in thickness and pigmentation of the eleidin layer and

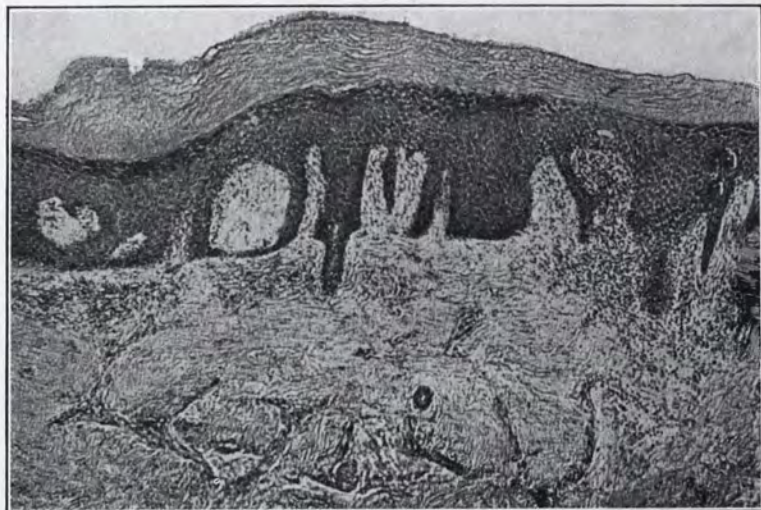


FIG. 55.—LEUKOPLAKIC VULVITIS (second stage). Section showing pronounced keratosis, greater irregularities of mucous layer with occasional break in the basal layer, beginning hyalinization of dermis, with pronounced round cell infiltration.

a moderate amount of hyperkeratosis (increased keratin layer). In the corium, there is less round-cell infiltration, no leukocytes, but an increased deposit of plasma cells. The round cells are usually grouped around the lymph and blood-vessels. The connective tissue shows beginning collagenic deposit, its fibers are swollen and the nuclei are absent, while the area in which elastic fibers are absent has extended to a considerable distance beneath the epithelium. In the third stage, the picture in the epithelium has materially changed (Fig. 56). The keratin layer is now heaped up and occupies about one half the thickness of the epidermis. Beneath it, the eleidin cells are still numerous and deeply pigmented, while the rete malpighii consists of a greatly reduced layer of cells, at times only from four to six layers deep, of equal size and

shape, but with complete absence of a basement membrane so that the surface toward the corium has a frayed-out appearance. In the corium, the collagenic changes already mentioned are so pronounced that large patches directly beneath the epithelium have a glairy unnucleated appearance like mucus. Here and there, between these glairy masses of decolorized and swollen connective tissue, we find nests of lymph and plasma cells. Occasionally, we find the formation



FIG. 56.—LEUKOPLAKIC VULVITIS (third stage). Section showing hyperkeratosis, thinning of mucous layer with frayed-out basal cells and pronounced hyalinization of the upper layer of dermis.

of a new lymph-node. Berkeley and Bonney emphasized this formation of lymph-nodes as being similar to that found at the borders of a carcinoma, to which this disease is so closely related. A total absence of elastic fibers is noted for a distance approximately from three to four times the thickness of the epidermis. Beneath this layer, the elastic fibers are heaped up in irregular bundles; broken and swollen, as if they had been swept out of the upper layer (Fig. 57). Owing to the extreme brittleness of the skin in this stage, we find cracks and ulcers at numerous points over these diseased areas.

Symptoms.—In fully 90 per cent of the cases of leukoplakic vulvitis, there is pronounced itching. Usually there is, at the onset, a slight burning or chafing, but very soon pruritus is noted, becoming so pronounced as to interfere materially with the sleep of the individual. The itching, however, is usually not as severe as in pruritus vulvae and this can, I believe, be explained by the fact that leukoplakic vulvitis usually makes its appearance in women over fifty to fifty-five years of age, at



FIG. 57.—LEUKOPLAKIC VULVITIS. Section showing a stage intermediate between second and third with thickened eleidin layer and moderate collagenic deposit.

which time the vulval skin is less sensitive to pain and irritation. It is this more or less anesthetic condition of the skin in old women that accounts for the fact that many of them will note pruritus for several years before consulting a physician and that, occasionally, there is merely a feeling of diffuse chafing without any true itching sensation.

Other less marked symptoms of leukoplakic vulvitis are burning on urination, and irritation or pain on defecation. The urinary symptoms are produced by the passage of urine over the excoriated vulval sur-

faces. The leukoplakic areas surrounding the anus produce pruritus ani and annoying symptoms on defecation. As to general symptoms, there is a relatively high incidence of rheumatic-joint pains in these women that may have some etiologic importance. In two instances, the removal of the diseased vulva was followed by disappearance of the joint symptoms. It suggests the possibility of focal infection as a factor in the production of leukoplakic vulvitis.

Prognosis.—While simple kraurosis, as defined in this chapter, is a benign condition and really requires treatment only in married women, because of its interference with sexual relations, we have in leukoplakic vulvitis a far more serious condition, one that demands more than palliative treatment. In a later chapter, I shall take up in detail the etiologic relation between leukoplakic vulvitis and carcinoma of the vulva. Suffice it to say here that, while the disease is usually slow in its development and progress, it has the potentialities of a malignant condition and certainly it is easier to prevent such a cancer by a simple vulvectomy at this time than to cure it by radical excision after the cancer has developed.

Treatment.—Surgical excision of the entire vulva, including the perineal and peri-anal skin, if these are involved, is positively indicated except where some impairment of heart, kidney or lungs makes such an operation too serious. If such contra-indications exist, we may employ radium or X-ray. Neither gives sufficiently reliable results to be preferred to surgery. Radium, when used about the vulva, often produces painful excoriations. As a palliative, the various anesthetic ointments can be employed. Some use has been made of corpus luteum extract hypodermatically in leukoplakic vulvitis, with symptomatic relief, but without change in the skin lesions.

LITERATURE

- BALZER ET LANDESMANN. Bull. Soc. franç. de dermat. et syph., 1913. 406.
BERARD ET DUVET. Ann. de gynéc. et d'obst., 1919. 22:449.
BERKELEY and BONNEY. Tr. Roy. Soc. Med., 1909. 3:29.
BREISKY. Ztschr. f. Heilk., 1885. 29.
BROCQ. Ann de dermat. et syph., 1915, 5e Ser. 5:579.
JADASSOHN. Cor.-Bl. f schweiz. Aerzte, 1919. 49:453.
JAYLE. Rev. de gynéc. et de chir. abd., 1906. 10:633.

- JAYLE. Rev. franc. de gynec. et d'obstet., 1921. 16:193.
PERRIN. Ann de dermat. et syph., 1901, 4e Ser. 2:21.
PERRUCHET. Gynécologie, 1904. No. 2.
PICHEVIN ET PETIT. Semaine gynéc., 1897. No. 7, 49.
TAUSSIG. Arch. of Dermat. and Syph., 1920. 1:621-635.
Surg. Clin. North America, St. Louis, 1922. 1559-1570.
THIBIERGE. Ann. de dermat. et syph., 1908, 4e Ser. 9:1-17.

CHAPTER XII

CHRONIC HYPERTROPHIC VULVITIS

In other chapters I have considered some of the chronic ulcerative conditions about the vulva. Of these, syphilis is the most common. Gummatous ulcerations frequently destroy large areas about the urethra and the rectovaginal septum. This leaves the surrounding tissues hard, somewhat thickened, irregular in contour and often forming fistulous passages. In similar wise, tuberculosis gives rise to typical ulcers with indurated edge and slight enlargement of the tissues about them. Perhaps the most extensive ulcerations are due to "granuloma inguinale." In this disease the ulcers may involve, not merely the entire vulva, but extend downward over the anus and upward along the inguinal folds. Here, too, there is much distortion of anatomical relations, some fibrosis of neighboring structures and the formation of numerous sinuses. All three of these diseases may, in certain individuals, if the infection is of long standing, produce considerable hypertrophy of the vulva. Syphilis, especially, has rightly been held responsible as the underlying factor in a majority of the pronounced cases of chronic hypertrophic inflammation of the vulva.

Only those who have tried to work their way through the labyrinth of terms and the heterogeneous description of lesions found in foreign and American literature can appreciate the difficulties that attend the writer in trying to put some order and clearness into this chapter of vulval pathology. Let me cite a few of the terms that have been employed: *esthiomene*, *elephantiasis*, *psuedo-elephantiasis*, *lupus* of the vulva, *ulcus rodens vulvae*, *lymphstasis* of the vulva, *syphiloma* of the vulva, *granuloma* of the pudendum, *ulcus vulvae chronicum*, etc.; and in the description of the lesions we also find marked variations, from ulcerating outgrowths to smooth nodular tumors, pendulous papillary masses or some combination of these three conditions. In the past, writers have felt this absence of any sharp demarcation between these various chronic hypertrophic ulcerative lesions. Veit in his "Handbuch," in 1910, dealt in separate chapters with *ulcus rodens vulvae* and

elephantiasis; yet in the opening paragraph of his chapter he states, "Gladly would I give the evidence that these diseases are directly related but as yet I cannot do so." In the years that have elapsed since 1910, the numerous reports upon this subject justify to my mind the con-



FIG. 58.—CHRONIC HYPERTROPHIC VULVITIS, DUE TO *FILARIA SANGUINIS*, "ELEPHANTIASIS ARABUM" (Scheube). Huge mass involving right labia and inguinal tissues in a Japanese woman.

clusion that this evidence is at hand, that these various conditions have essentially the same or similar etiologic factors, and in general run a similar clinical course. Even the so-called *elephantiasis arabum* (Fig. 58) found more especially in oriental countries, due to an infection with *Filaria Sanguinis*, can hardly be considered a distinct disease. In these cases, there is blocking of the lymph channels leading to the vulva,

with resulting chronic edema. Most observers agree, however, that the massive hypertrophy of the labia found in these oriental women is a *postfilarial* condition and is practically always associated with prostitution and lack of cleanliness. In most of these cases, a careful search of the blood no longer reveals any filaria.

What, then, are the essential factors that make a clinical entity of this disease? As I see it, they are four in number:

1. Blocking of lymphatic return.
2. Prostitution or excessive sexual intercourse.
3. Lack of cleanliness or profuse irritating discharge.
4. Racial predisposition to skin hypertrophies.

Here and there a case may be found where one or two of these predisposing conditions are absent, but in a considerable majority all will be present to some degree.

1. Blocking of Lymphatic Return.—The lymph return may be blocked in various ways. In the inguinal region, it may be blocked as already mentioned, by filarial infection. A chancroidal bubo may produce an obliteration of the lymph stream on the one side. Syphilitic adenitis, if pronounced, will also interfere with the return flow of lymph. A surgical resection of inguinal lymphatics produces a similar result. Each of these conditions have been found associated with chronic hypertrophy of the vulva. In other cases, the blocking of the lymphatics results from the sclerotic scar tissue produced by the chronic ulcerations in this region; particularly those around the urethra, extending laterally to the pubic arch, tend to block the lymph return from the clitoris and labia minora. It is the rule to find scar tissue in this region, where there is a hypertrophy of the above-mentioned structures.

2. Prostitution or Excessive Sexual Intercourse.—This has been mentioned by practically all writers as an important factor in this disease. Its influence is twofold. On the one hand, the frequent sexual relations tends to continued active hyperemia of the genital organs with resulting increased tissue growth. On the other hand, coitus in women whose external genitals are the seat of ulcerations, and whose tissues have a poor nutrition, leads to constant abrasion and irritation of these structures with resulting wound infection. This continued chronic traumatism of the vulva is a factor that must not be underestimated. The ulcerations of tertiary syphilis are usually located about the vestibulum and, hence, are readily traumatized at intercourse.

3. Lack of Cleanliness or Profuse Irritating Discharges.—As has been stated, the disease is almost wholly confined to the lower strata of

society. I do not know of any single instance in which this form of hypertrophy was observed in a woman of cleanly habits and good morals. The chronic irritation of the skin with resulting hypertrophy produced by lack of ordinary cleanliness may also result from a profuse leukorrheal discharge, usually gonorrheal. Thus the case reported by Aboularage, in which the tumor reached halfway to the knees, was attributed by



FIG. 59.—SYPHILITIC ULCERATION WITH BEGINNING HYPERTROPHY (Wassermann positive).

him, in large measure, to a persistent gonorrheal discharge from the vagina. The tertiary ulcerations of syphilis, with their destruction of the urethra and rectovaginal septum, lead frequently to urinary and fecal incontinence. The irritation produced by the continued contamination with urine and feces is, in some instances, a factor in the chronic hypertrophy.

4. **A Racial Predisposition to Skin Hypertrophies.**—This is found primarily in the colored races. The cases reported in American litera-

ture are almost exclusively limited to the negro race. In my series of 13 cases recently reported, all were negresses. It has been generally commented upon that these hypertrophies are more common in the tropics. This increased tendency to vulval hypertrophy in the negro



FIG. 60.—SAME CASE AS FIG. 59, 18 MONTHS LATER. Marked hypertrophic nodular changes with extensive ulceration is shown (Wassermann negative).

race corresponds to the greater frequency of keloids and fibroids in this race. A review of European literature, however, will convince the reader that other races are not wholly immune. Further studies are necessary to determine the extent of this racial predisposition.

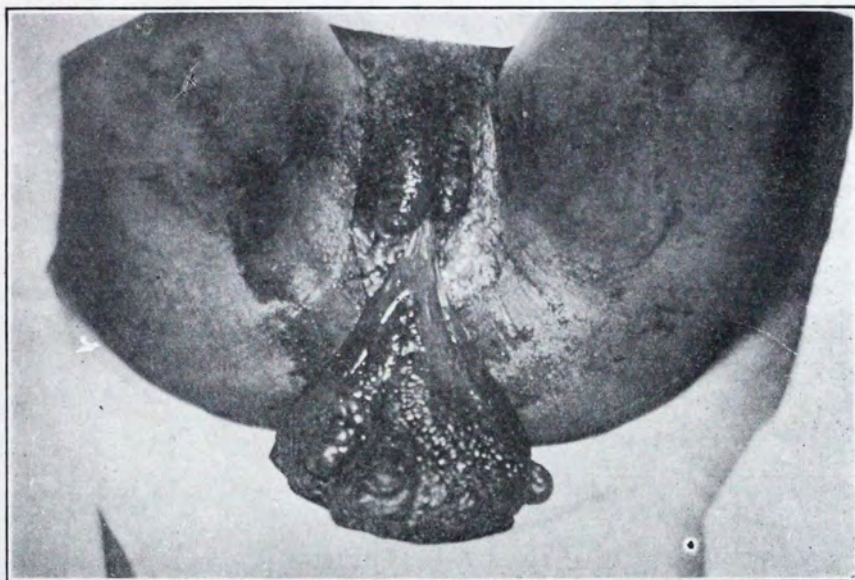
Many attempts have been made to find some specific microörganism in the tissues and secretions of these vulval hypertrophies, but no definite

evidence is at hand of any special bacterial agent as a factor in its production. Syphilis, to be sure, is present in a high percentage of these women or, to be more accurate, *has been* present. The evidences of a preceding syphilis are manifold, but the Wassermann test will usually be negative by the time the hypertrophy has developed, and antisyphilitic treatment will produce relatively small improvement in the size of the swelling or in the ulceration. Figs. 59 and 60 show two photographs

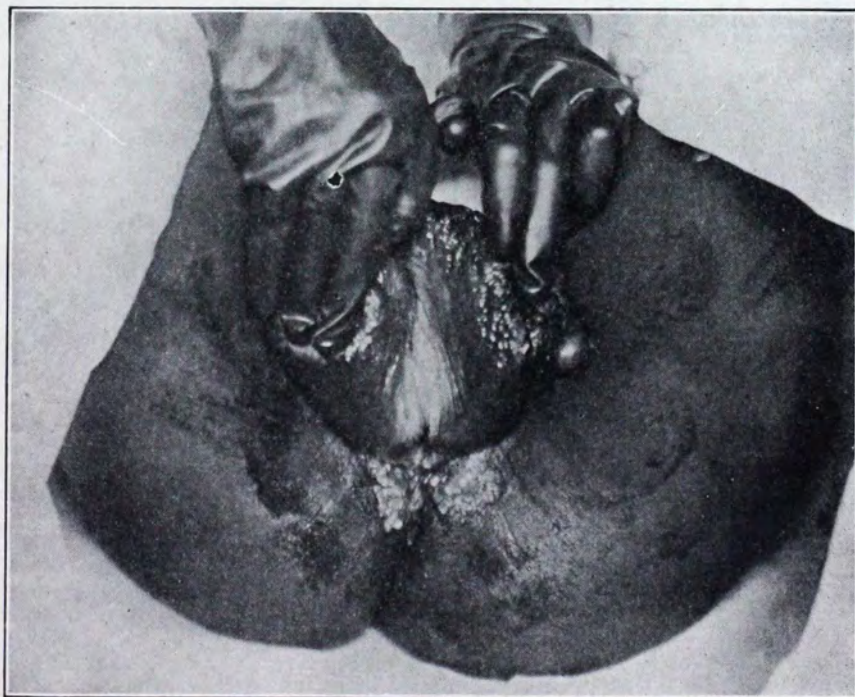


FIG. 61.—CHRONIC HYPERTROPHIC VULVITIS. Inguinolabial type with extensive ulceration.

taken at an interval of two years of the same vulval lesions. In the first of these, the ulcerative process is predominant and there is only moderate enlargement of the labia majora. At this time, the Wassermann test was still positive. When the second photograph was taken, just previous to a vulvectomy, the ulceration about the perineo-anal region was only slightly larger, whereas the labial tumor, including the clitoris, had developed into a pendulous nodular mass the size of a fist. At this time the Wassermann test was negative, and the condition was not influenced by the repeated salvarsan injection. I cannot, therefore, agree with Stein in using the term syphiloma for these cases. The Spirochaeta



A



B

FIG. 62.—CHRONIC HYPERTROPHIC VULVITIS (clitoris type). A, pendulous mass hanging from clitoris; B, mass lifted up to show ulcerations beneath.

pallida is probably less a direct cause of the vulvitis than are the ordinary pus germs present about the vulva. Recently, a case was reported by Healy in which the *Proteus vulgaris* was found and held responsible for the vulval infection. Since proteus is so often associated with other infecting germs, such as staphylococci and colon bacilli, the mere fact that temporary improvement followed the giving of proteus vaccine seems slim evidence for the assumption of any definite etiologic relationship. Probably it makes but little difference what germ prevails

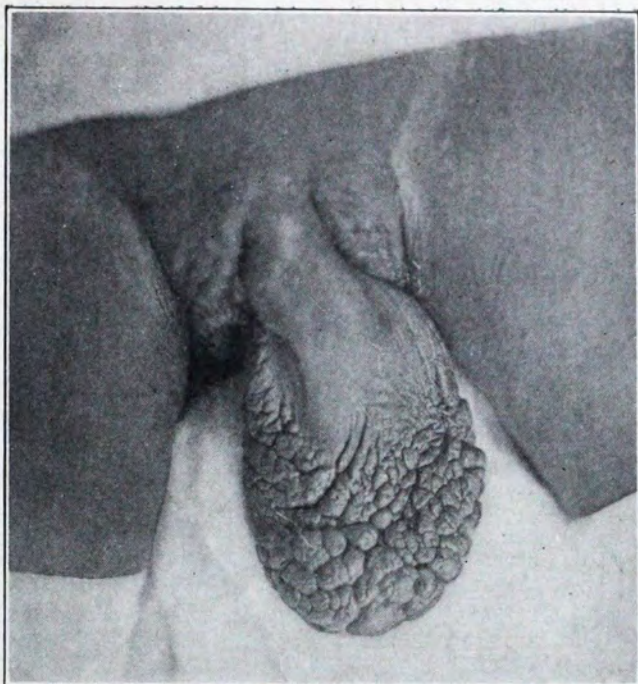


FIG. 63.—CHRONIC HYPERTROPHIC VULVITIS (diffuse ulcerative type).

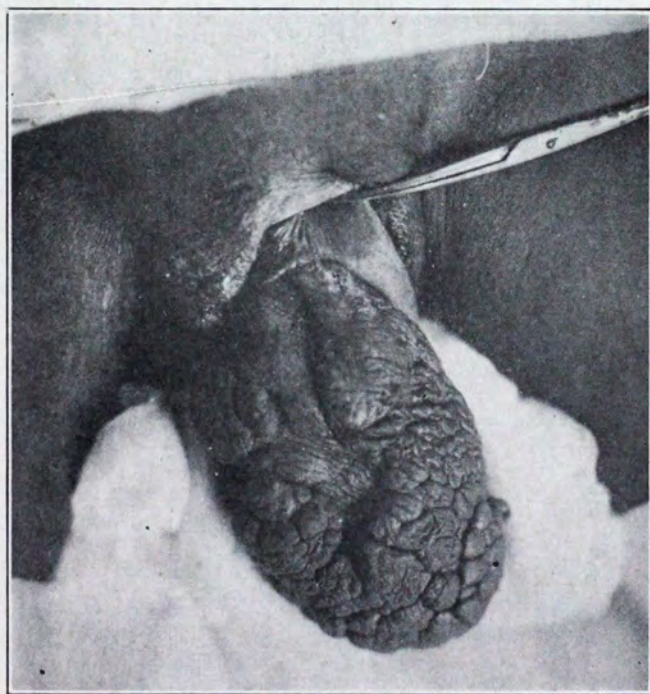
about the vulva and produces the inflammation. The essential factors in the hypertrophy are the predisposing ones already mentioned, that, so to speak, prepare the soil for the characteristic reaction to trauma and infection.

In general, we may distinguish three types of cases according to location: (1) an *inguinolabial* type, involving usually only one side and leaving the clitoris unaffected (Fig. 61); (2) a *clitoris* type involving the clitoris and usually both labia minora, but not the labia majora (Fig. 62); and (3) a *diffuse* type in which the hypertrophy is general, involving the entire vulva more or less (Fig. 63).

A further grouping of these cases is also possible according to the



A



B

FIG. 64.—CHRONIC HYPERTROPHIC VULVITIS (clitoris type, nodular form). This photograph was taken five days postpartum. During pregnancy, the mass was considerably larger. *A*, upper surface showing origin from left labium minus and clitoris; *B*, mass turned to show absence of ulceration beneath; evidence of old scars beneath the clitoris; right labium minus normal.

prevailing type of pathologic lesions. We may have (1) a *hypertrophic* form in which large smooth pendulous tumors are found, usually with only slight ulcerations (Fig. 61); (2) an *ulcerative* form in which the ulcerating granuloma makes up the bulk of the enlargement (Fig. 60); (3) a *papillary* form in which the tumor surface is covered with small nodular or papillary excrescences (Fig. 64). Often there is a combination of two or more of these forms.



FIG. 65.—DEEP-SEATED INFLAMMATION WITH KERATOTIC INTACT EPITHELIUM. Perivascular nests of round cells.

The photographs sufficiently illustrate the gross appearance of these various types of hypertrophic vulvitis. Microscopically, we find the usual picture of chronic inflammation. There is marked sclerosis of the connective tissue with round-cell infiltration, often in islands, as in Fig. 65. In freshly ulcerated areas, there may be numerous polynuclear leukocytes and blood extravasation with some superficial necrosis. Mast-cells and plasma cells are ordinarily present (Fig. 66). The blood-

vessels show such thickening of the intima as to block the lumen of the vessels (Fig. 67). This obliterative endarteritis is largely to be considered a result of a previous luetic condition which is present in the vast majority of these women. The epithelium may show no appreciable change, except near the edge of the ulcers. Here there are marked papillary extensions of the epithelium into the deeper layers, with occasional breaks in the basement membrane and the formation of

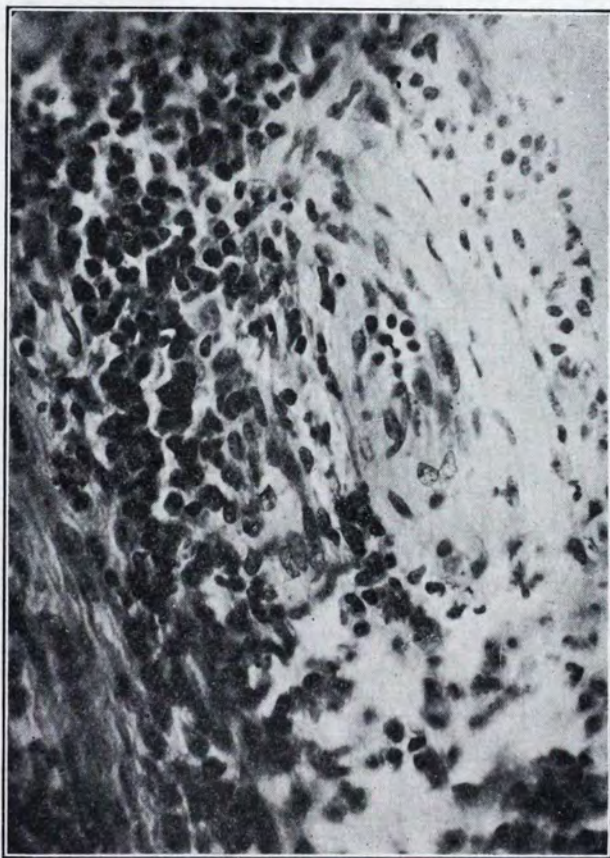


FIG. 66.—HIGH-POWER MICROPHOTOGRAPH OF AREA IN FIG. 65. Infiltration of tissue with lymphocytes is shown. Plasma cells and mast-cells are found in abundance.

apparent cell-nests closely resembling the picture of an early carcinoma (Fig. 68). I have repeatedly seen trained pathologists hesitate over the diagnosis of pieces excised from such areas, although clinically there was, as proved by the subsequent course, no malignant change. It should, however, be remembered that, on rare occasions, these ulcerations do become cancerous. Occasionally, we find giant cells in the areas bordering on the granulomatous ulcers (Fig. 69). These

giant cells have led some observers to diagnose the condition as tuberculosis, but they are usually isolated and not surrounded by epithelioid cells as in tubercle formation.

Symptoms are usually insignificant in this disease. This may be due, in part, to the low state of intelligence and lowered pain sense in these individuals. Some discomfort from weight of the pendulous mass, interference with walking, and urinary and rectal irritability may be

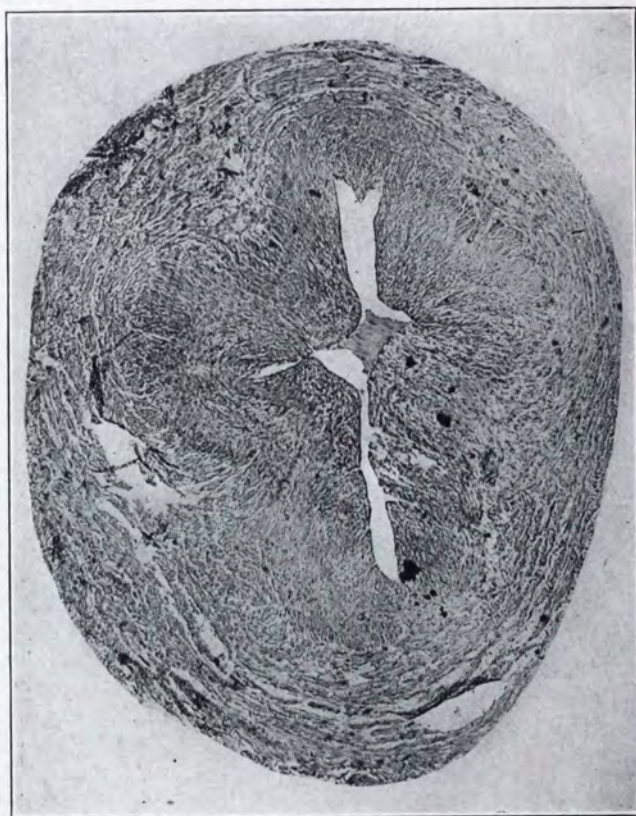


FIG. 67.—CROSS-SECTION OF BLOOD-VESSEL FOUND IN CASE SHOWN IN FIG. 65. Obliterative endarteritis.

noted. If the mass becomes more acutely inflamed from some cause or other, there may be pain. Dyspareunia is often the main reason for seeking medical advice, and it is more often the mechanical blocking of the vaginal canal than the pain produced at coitus that causes annoyance. When we think of the severe pain some women experience from small burns or chancroidal sores about the vestibulum, it is amazing that these extensive ulcerations produce so little discomfort. If

there is much destruction of the urethra, incontinence of urine will be present. Occasionally the weight of the pendulous mass produces such traction upon the urethra that a constant desire to void urine results with some dribbling. Fistulous passages leading into the rectum give rise to escape of gas or fecal matter, depending on the size of the opening. The usually profuse vaginal discharge is attended by itching and burning of the genitals.



FIG. 68.—PAPILLARY PROJECTIONS OF EPITHELIUM IN CHRONIC HYPERTROPHIC VULVITIS.
Some resemblance to malignant change is shown.

The course of the disease is slowly progressive. There may be temporary improvement of the ulcerations but, in the main, the condition tends gradually to grow worse. It requires years, as a rule, for the formation of the more extensive hypertrophies. When complicated by pregnancy, as in the case illustrated in Fig. 64, we get a history of marked edema with increase in size during the pregnancy, followed by rapid reduction in volume during the puerperium. The tendency to malignant degeneration is slight.

Treatment.—Although lack of cleanliness and traumatism are important factors in the formation of the swelling, prolonged rest,

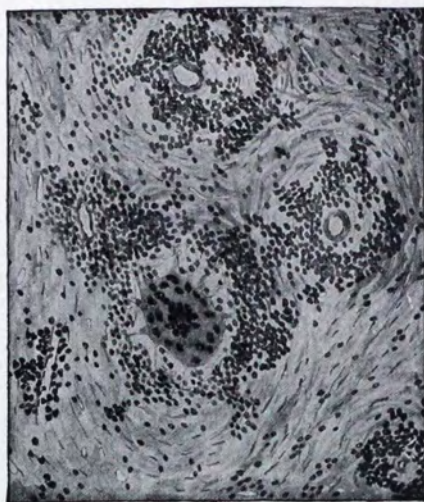


FIG. 69A.—GIANT-CELL FOUND IN A CASE OF CHRONIC HYPERTROPHIC VULVITIS DEVELOPING ON A SYPHILITIC BASE (Crossen, *Diseases of Women*).

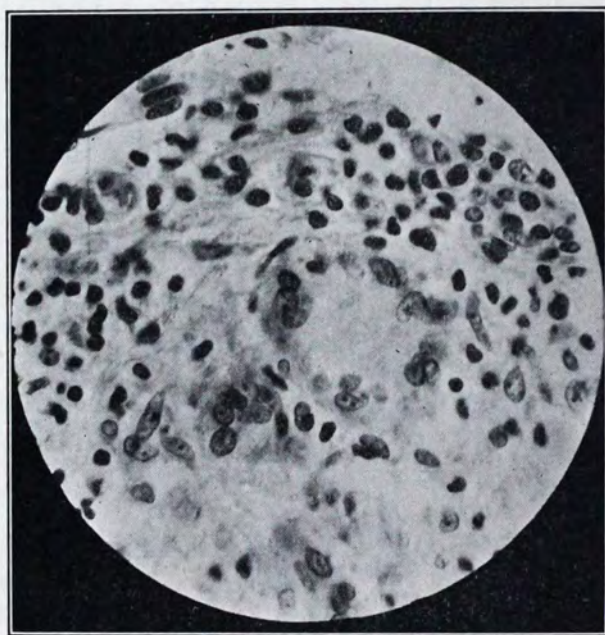


FIG. 69B.—HIGH-POWER MICROPHOTOGRAPH OF GIANT-CELL.

douches and hospital care accomplish relatively little in effecting a cure. Only temporary alleviation results. The effect of antisiphilitic treat-

ment likewise is but slight. After a considerable mass of hypertrophic tissue has developed, nothing short of vulvectomy, partial or complete, depending on the extent of the involvement, will give permanent relief. After operation, the giving of salvarsan or potassium iodid tends to hasten wound healing and improve the final result. Even under the most favorable conditions, however, we rarely get primary union after such a vulvectomy, but must be satisfied with reasonably good approximation and healing by granulation.

LITERATURE

- ABOULARAGE. *Policlin.*, 1919. 26:722.
BJOERLING. *Arch. f. Dermat. u. Syph.*, 1916. 121:647.
DRISCOLL. *Arch. of Dermat. and Syph.*, 1920. 1:170-174.
GALLAGHER. *Surg., Gynec. and Obst.*, 1919. 28:482.
HEALY. *Am. Journ. Obst. and Gyn.*, 1922. 4:286.
HEINSIUS. *Ztschr. f. Geburtsh. u. Gynäk.*, 1919. 82:96.
HOFMANN. *Zentralbl. f. Gynäk.*, 1920. 632.
JANUS. *Zentralbl. f. Gynäk.*, 1921. 543.
LINNERT. *Arch. f. Gynaek.*, 1919. 111:507-579.
MC EWEN. *Journ. Cutan. Dis. incl. Syph.*, 1919. 37:426.
RÜETTER. *Monatschr. f. Geburtsh. u. Gynaek.*, 1917. 46:543.
SCHADE. *Monatschr. f. Geburtsh. u. Gynaek.*, 1920. No. 3, 51.
STEIN. *Surg., Gynec. and Obst.*, 1921. 31:227.
TAUSSIG. *Am. Journ. Obst. and Gyn.*, 1922. 3:281.
VEIT. *Handb. d. Gynaekologie*, 1910. 4:648.

PART III
NEOPLASMS

CHAPTER XIII

BENIGN SOLID TUMORS OF THE VULVA

Benign tumors of the vulva may be grouped under two main heads:

1. Those of connective tissue origin: fibroma, fibromyoma, lipoma, myxoma, angioma, and lymphangioma.
2. Those of epithelial origin: papilloma or condyloma acuminata and hidradenoma.

I find no mention of chondroma, osteoma and neuroma or neurofibroma in recent literature, and the reports that are available from the past are not sufficiently conclusive to justify serious consideration in this chapter.

BENIGN TUMORS OF CONNECTIVE TISSUE ORIGIN

Fibroma or Fibromyoma of the Vulva.—Fibroid tumors of the vulva, while consisting largely of connective tissue elements, usually contain some muscle fibers as well, and, occasionally, as in the case reported by Condit, the growth may be entirely composed of smooth muscle fibers. A striped muscle fiber tumor (rhabdomyoma) of the vulva is reported by Stevens, but the diagnosis seems dubious, particularly as such fibers are often found in teratomata. So complete a description has been given of fibroid tumors of the vulva by Lynch, in his monograph on *Pelvic Neoplasms* in this series, that I will treat the subject rather briefly in this volume.

One should distinguish between fibroids springing from the tissue of the vulva itself, and fibroids that arise from the extra-abdominal portion of the round ligament of the uterus. The latter group of tumors are much more apt to contain a considerable amount of proliferating muscle fiber, and a few cases of adenomyoma in this region have been reported. These round-ligament tumors resemble more closely the fibromyomata of the uterus, whereas the fibroid tumors springing from vulval tissue have the characteristics of the ordinary skin fibroma, are harder than those of the uterus, and do not grow so large. Fibroids springing from the round ligament within the inguinal canal will, if they attain

any considerable size, work their way downward into the loose connective tissue of the labium, and form a pendulous mass hanging between the thighs. Leonard classified 131 cases of fibroid tumors in accordance with their point of origin. In 70 of these, the tumor originated in the vulval connective tissue and 53 were attached to the labium majus. In 53 of the fibroid tumors, the point of origin was either the round ligament or the subperitoneal connective tissue surrounding it. Of the remaining 8 cases, 4 were classified as springing from Bartholin's gland, 2 from hematomata, and 2 from the rectovaginal septum. As Lynch points out, Leonard's table does not include a number of fibromyomata springing from the round ligament, which both Emanuel and I reported in our articles upon this subject.

Nearly all of these tumors appear in women during the childbearing age, but in rare instances may be found in infants (Aichel, Goldreich), or in extremely old women (von Winckel). Ordinarily fibroid tumors appear as firm, smooth, round or oval nodules under the skin of the labia and the overlying skin is generally thick, so that there may be some resemblance to a scrotal sack with testicle. As the tumor grows, it may become pedunculated. At times, a somewhat nodular shape has been noted. In the mammoth fibroid tumor reported by Buckner in 1851, the total weight of the tumor masses was estimated at two hundred and sixty-eight pounds. Some observers have noted an increased swelling during the menstrual period.

Degenerative changes in the fibroid tumors are fairly common. Lynch mentions hyaline degeneration, calcification, edema and lymphangiectasis. It seems probable that some of these cases, classified as myxofibroma, are really degenerated fibroid tumors. Most observers have pointed out the frequency of sarcomatous changes in these tumors; in Leonard's tabulation, 22.5 per cent had undergone such malignant change.

The symptoms produced by fibroma of the vulva are, primarily, inconvenience in walking and chafing in the genital region. Pulling upon the urethra or pressing against it, the tumor may give rise to difficulty or increased frequency of urination. If ulceration has occurred upon the surface of the tumor, it may become very sensitive to pressure. Diagnostic considerations will be left to the special chapter on this subject. The treatment consists of surgical removal in all cases, in view of the frequency of sarcomatous changes.

Lipoma of the Vulva.—Somewhat less frequent than fibroma of the vulva, but not excessively rare, are the fatty tumors to be found in

this region. Kelly, in 1903, collected 20 cases from literature and approximately an equal number have been reported since that time. The most recent publication is that of Condit, who operated upon 2 cases, in both of which the tumors sprang from the left labium. Occasionally, as in the case shown in Fig. 70, the tumor may originate immediately lateral to the labia majora. In this patient, the main indication for



FIG. 70A.—LIPOMA OF THE VULVA IN A NEGRESS. The pendulous tumor was in this case attached to the genitocrural fold. It may arise from the tissues of the labia majora.

operation was a large fibromyoma of the uterus, and the lipoma of the vulva was removed at the same time, merely for the convenience of the patient and not because it was producing any especially annoying symptoms. The tumor had a small pedicle, was soft and multilocular. The microscopic sections (Fig. 71), show that the tumor was entirely composed of proliferating fat cells with practically no connective tissue and only a little blood supply.

While usually pediculate, these fatty tumors sometimes have a broad base, and, when springing from the region of the inguinal canal, may

simulate a hernia. The rate of growth is much slower than with fibroma of the vulva and, in some cases, the tumors had existed for from ten to fifteen years before operation.

The symptoms depend upon the size and position of the growth and are usually very mild. In Brountzel's case, the tumor partially obstructed labor.



FIG. 70B.—SECTION FROM TUMOR IN FIG. 70A.

A lipoma of enormous size springing from the labial region was recently reported by Lovelace. This woman, forty years of age, had noticed the tumor for three and a half years before its removal. As seen in Figure 71, the tumor hung down like an apron to below the knees. On microscopic section the epidermis was underlaid by dense white fibrous tissue and beneath this were large masses of lobulated fat tissue,

In the network of this adipose tissue was considerable round cell infiltration, particularly numerous around the blood-vessels. The tumor weighed 44 pounds (20 kg.).

Lovelace reviews the literature of lipoma, finding record of 45 cases. In most instances the indication for removal has been obstruction in walking or at sexual intercourse. There is no tendency to recurrence.



FIG. 71.—HUGE LIPOMA OF VULVA (Lovelace, *Jour. A. M. A.*).

In Emmet's case the woman had learned to accommodate herself to the tumor so well, carrying it in a bag attached to her waist, that after being assured it was not malignant, she refused all treatment and would not even allow a second examination for the purpose of making a sketch of the growth.

Myxoma of the Vulva.—Several cases of myxoma of the vulva have been reported and, in recent years, two are recorded in American literature. W. H. Fisher, in 1919, removed a pure myxoma of the labium majus weighing seven pounds (Fig. 72), which was attached by

a broad pedicle to the pubic region. On section, the tumor showed the characteristic soft gelatinous consistence of pure myxoma. Condit, in 1920, records the removal of a myxoma of the right labium majus, which had been diagnosed as an inguinal hernia.

Angiomatous Tumors of the Vulva.—I was unable to find in American literature any record of a case of hemangioma of the vulva. It would seem that these tumors are extremely rare. Hemangiomas are most frequently found in little children, and cases of this sort have

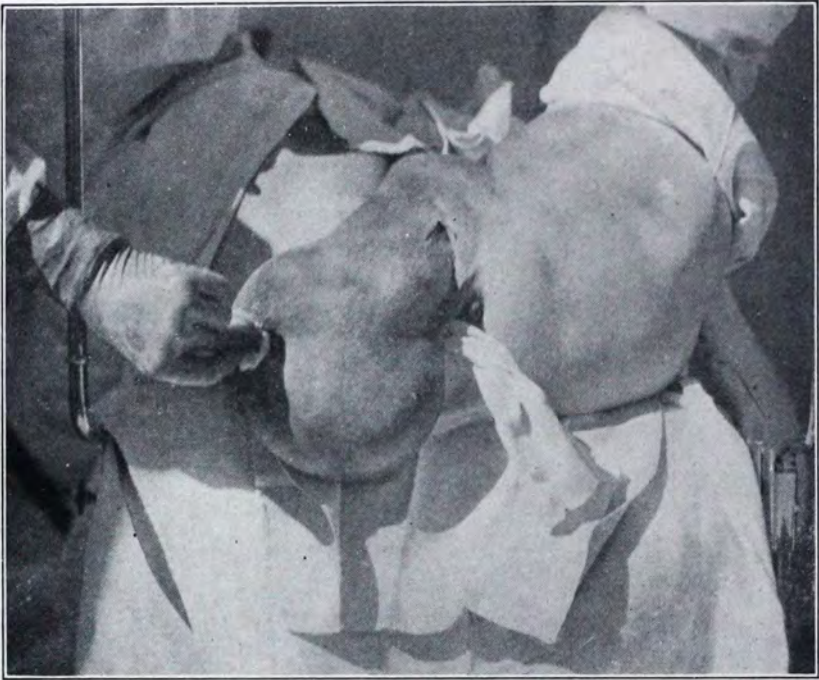


FIG. 72.—MYXOMA OF THE LABIUM MAJUS (W. H. Fisher, *Annals of Surgery*)

been reported by Hennig, Guyot and Saenger. Burgio records a hemangioma in an adult woman.

A confusion between true angioma and telangiectatic swellings has occasionally arisen, as Jaschke points out. The latter are not true neoplasms, but are due to the varicose veins of pregnancy. The large tumor of the labium majus, reported by Amandoni, should be classed among these varicose swellings. Lymphangioma of the vulva has been described by Brindeau, Duret, Jayle and Bender and, in American literature, by Epstein.

By a strange coincidence, it has been my good fortune in the past

three years to operate upon 2 cases of angiomatous tumors: (1) an angioma in a baby of four months; (2) a case of lymphangioma of the vulva in a young girl of fifteen years, springing from a nevus unius lateralis. A brief record of these two cases, with photographs, is here-



FIG. 73.—ANGIOMA OF THE VULVA. Section from a tumor removed from the labium majus of an infant.

with appended. A more complete description will be published elsewhere.

CASE I. *Angioma*.—At birth a flat nevus was observed in the region of the left anterior labium majus. This had grown steadily, so that when the child was first seen at the age of four months its dimensions were 1.5 by 1.5 cm. with an elevation of 2 mm. above the level of the skin. For the preceding three weeks, there had been considerable pain

on urination. The surface showed a slight tendency towards ulceration. The case seemed more suited for surgical than radium treatment. Excision of the tumor was effected without difficulty and included a

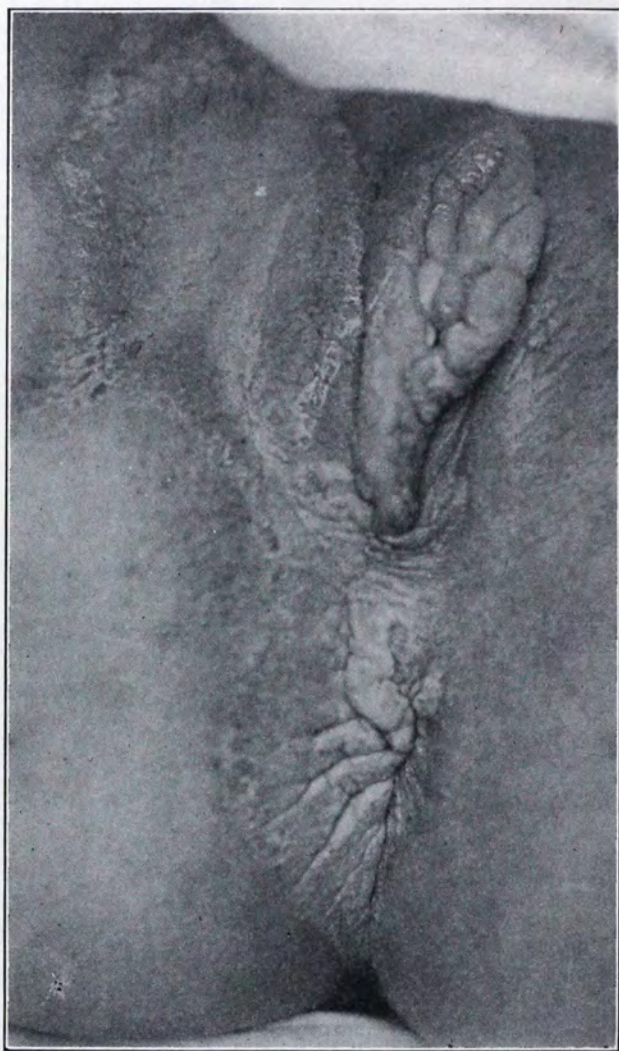


FIG. 74A.—LYMPHANGIOMA OF THE VULVA DEVELOPING FROM A CONGENITAL NEVUS UNIVS LATERALIS. Enlargement of right labia and papillary growth about anus is shown. The lesion extending toward the right thigh is a superficial dermatitis due to the profuse lymphorrheal discharge.

second tiny nevus at the posterior end of the labium minus on the same side. As seen in the microscopic sections (Fig. 73), the tumor had the characteristic structure of an angioma.

CASE 2. *Lymphangioma*.—This patient, a girl of fifteen years, stated

that her mother had noticed a small reddish area in the region of the vulva at the time of her birth. Eighteen months later it became more prominent. Gradually it grew larger and, at various times previous to



FIG. 74B.—LABIA PULLED ASIDE TO SHOW HOW COMPLETELY ONE-SIDED IS THE LYM-PHANGIOMATOUS TUMOR. The left half of the prepuce and left labium minus are perfectly normal and the edge of the growth over perineum and anus stops at the midline making a sharp line of demarcation sagittally.

her admission to the hospital, had been treated elsewhere with washes and salves, but with only slight relief. A profuse milky-white discharge exuded from the surface of the tumor and caused pronounced burning and pruritus. Menstruation set in at the age of thirteen and returned at intervals of from six to eight weeks since then.

On examination of the vulva, the tumor was seen to be limited to the right side (Fig. 74). It involved the labium majus, labium minus and half of the prepuce, and showed marked hypertrophy of a diffuse

nodular type, with papillary excrescences in the region of the clitoris. Sharply limited to the right side was a somewhat similar lesion, half surrounding the anus. The right half of the lips and the tongue in this patient also showed a typical *nevus unius lateris*. Dermatologic consul-



FIG. 75.—SECTION FROM LABIAL TUMOR. Papillary formation in the epidermis and lymph-vessel proliferation in the connective tissue beneath is shown. The crevices of these papillary projections are filled with desquamated keratinized epithelial detritus. Area shown in Fig. 76 outlined by broken line.

tation with Drs. Engman and Mook confirmed the diagnosis of lymphangioma on the basis of a *nevus unius lateris*. In the region of the genito-crural folds on each side, the lymphorrheal discharge had resulted in pronounced irritative lesions which at first sight seemed to be a portion of the original growth, but cleared up rapidly as soon as the patient was kept in bed and the parts kept clean and dry.

The hypertrophic right half of the vulva was removed surgically and the condylomatous lesions around the anus were treated with radium. Microscopic sections made of the tissue removed showed the typical structure of a lymphangioma (Figs. 75, 76).¹

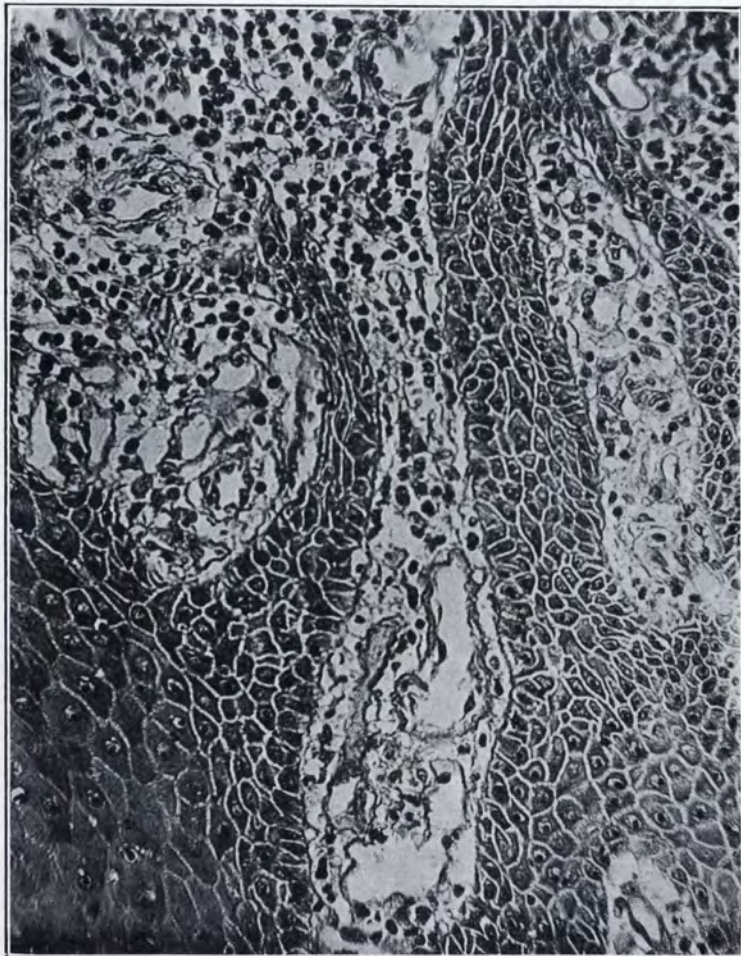


FIG. 76.—HIGH-POWER VIEW OF PROLIFERATING LYMPH-VESSELS. From an area of the field shown in Fig. 75.

BENIGN TUMORS OF EPITHELIAL ORIGIN

Papilloma.—Whether the papillary excrescences, commonly known as acuminate warts, should be classified as benign epithelial

¹ In view of the absence of a definite capsule, the suggestion made by Prof. Otto Frankl, of Vienna, to whom I recently showed the record of the case and sections, to use the term lymphangiectatic hypertrophy rather than lymphangioma seems correct. Prof. Frankl stated that he had in the past few months seen a similar case in his clinic in Vienna, but it had not yet been reported.

growths, may be questioned by some. I prefer to follow Jaschke's example by discussing them under this head.

These pointed condylomata may be found as small soft excrescences scattered here and there over the surface of the vulva. They vary in size from a millet seed to tumors the size of a hen's egg. They have a marked papillary character that at times, especially if closely grouped, gives them a cauliflower appearance (Fig. 77). The pedicle by which



FIG. 77.—CONDYLOMA ACUMINATA OR PAPILLOMA OF THE VULVA. These growths are most frequent in gonorrhoea but are occasionally found, as in this case, in old women with irritating vaginal discharges. The patient has been under my observation for 14 years and the warts have remained unchanged during that time (see also Fig. 86).

they are attached to the skin is usually quite small. A certain degree of contagiousness is ascribed to them. The favorite seat of these proliferations is in the sulcus between the labia and about the frenulum. They are not infrequently present upon the vaginal mucosa as well as the vulva, but, in this location, they form only relatively small outgrowths.

Histologically they will be seen to consist primarily of a hypertrophy of the papillary layer of the skin covered by a somewhat thickened layer of epidermis. The connective tissue shows infiltration with lym-

phocytes and plasma cells. There is usually an interlacing of epithelium and connective tissue elements, which might at first be mistaken for malignancy. It will be seen, however, that the epithelial cells retain their original uniform character and have none of the irregular pigmentation and size of malignant cells. In gross appearance they are easily distinguished from a proliferating cancer by the absence of ulceration and friability.

The fact that condyloma acuminata are so frequently found associated with gonorrhea has led many to consider them pathognomonic of this disease. This, however, is not true, since they may be present in some individuals wherever there is a profuse irritating vaginal discharge (cancer, vesicovaginal fistula). Especially during pregnancy, the increased hyperemia of the vulva predisposes to such hypertrophic outgrowths in the presence of irritating discharge. In extreme cases, the presence of large masses of these warts along the vulva may present a disagreeable complication to the proper management of the patient when she goes into labor. On the other hand, the removal of the growths during pregnancy is attended with some risk of bringing on the premature expulsion of the ovum. During the puerperium, these warts usually disappear spontaneously or become greatly reduced in size. If the mass of warts is large, surgical removal under a general anesthetic is advisable. Small warts, if not numerous, can be snipped under local anesthesia or removed by chemical or actual cautery. Radium has been recommended by Gellhorn. The results are slower and less certain than with surgery, but where an operation is refused by the patient, radium can well be employed.

Sweat Gland Tumors or Hidradenoma.—Lynch found only about 20 cases of this form of tumor described in literature. But these tumors are so small, and the symptoms produced are so slight, that doubtless they are often overlooked. The first accurate description of these tumors was made by Ludwig Pick in 1904. He proved beyond dispute that the tumors originated from sweat glands and could show the duct leading from the tumor to the skin surface. There is no essential difference between the solid and the cystic type of cases except for the accumulation of secretions in the latter group.

The histologic picture is fully described and illustrated in Lynch's monograph. The rate of growth is very slow; in some cases, the tumor existed for over ten years before operation. While some question has been raised by Ruge, Outerbridge and Emil Schwarz as to the frequency of malignant change, most writers consider these tumors benign. Not

included in Lynch's review is the case of J. Schiffmann in which there was so strong a probability of malignancy that he called his tumor "sweat gland adenocarcinoma of the vulva." The history in Schiffmann's case, of a rapidly growing tumor originating from a small warty nodule, points to malignancy. Microscopically, he found a typical tubular adenoma, which contained nests of polygonal cells of irregular size with occasional vesicular nuclei. Elsewhere these cells formed typical pearls.

LITERATURE

- AICHEL. Zentralbl. f. Gynäk., 1912. 57.
 BRINDEAU. Soc. d'obstet. de Paris, 1906.
 BROUNTZEL. Zentralbl. f. Gynäk., 1882. 626.
 BUCKNER. Ann. Surg., 1905. 41:824.
 BURGIO. Arch. di ostet. e. ginec., 1899. No. 8, 6.
 CONDIT. Surg., Gynec. and Obst., 1920. 31:487-492.
 DEGRAIS. Gynécologie et Obstétrique, 1921. 4:493.
 DURET. Journ. d. sc. méd. de Paris, 1906.
 EMANUEL. Ztschr. f. Geburtsh. u. Gynäk., 1903. 48:383.
 EPSTEIN. Journ. Cutan. Dis. incl. Syph., 1892. 10:213.
 FISHER. Ann. Surg., 1919. 69:596.
 FRANK. Gynecological and Obstetrical Pathology, 1921. 115.
 GELLHORN. Bull. St. Louis Med. Soc., 1921.
 GOLDREICH. Cited by Lynch, 3.
 GUYOT. Soc. d'anat. et de physiol. de Bordeaux, 1903. No. 8.
 HENNIG. Handb. d. Kinderkrankh., 4:iii, 82.
 JAYLE ET BENDER. Bull. et mém. Soc. anat. de Paris, July, 1905.
 KELLY. Johns Hopkins Hosp. Rep., 1894. 3:321.
 LEONARD. Johns Hopkins Hosp. Bull., 1917. 28:373.
 LIEPMANN. Handb. d. Frauenheilk., 1914. 2:277.
 LOVELACE. Journ. A. M. A., 1923. 80:375.
 LYNCH. Pelvic Neoplasms, 1921. 1-18.
 MOREL. Bull. Soc. anat. de Paris, 1905. 812.
 OUTERBRIDGE. Am. Journ. Obst., 1915. 72:32.
 PICK. Arch. f. Gynaek., 1904. 71:349.
 RUGE. Ztschr. f. Geburtsh. u. Gynäk., 1905. 56:307.
 SAENGER. Zentralbl. f. Gynäk., 1882. 125.
 SCHIFFMANN. Zentralbl. f. Gynäk., 1920. 59.

- SCHWARZ. Am. Journ. Obst. and Gyn., 1921. 1:695.
STEVENS. Proc. Roy. Soc. Med., 1915. 8; Obst.-Gyn. Sec., 67.
TAUSSIG. Surg.; Gynec. and Obst., 1914. 19:218-223.
VEIT. Handb. d. Gynaekologie, 4: ii, 708-724.
WINCKEL, v. Cited by Lynch, 3.

CHAPTER XIV

BENIGN CYSTIC TUMORS OF THE VULVA

Retention cysts of varying size occur frequently about the external genitals. Most frequently they are found springing from Bartholin's glands, but they may be due to retention of secretion of sweat or sebaceous glands, or they may arise from fluid accumulation in pockets of the peritoneal tissue lying close to the round ligament (hydrocele of the round ligament). Occasionally, we have cyst formations resulting from persistent remnants of the wolffian duct, most often located in the hymen or at its insertion. Neoplastic cysts of the vulva are extremely rare.

Cysts of Bartholin's Gland.—Retention cysts of Bartholin's gland are, practically always, the result of a previous inflammation of this gland, and this previous inflammation is, in approximately from 90 to 95 per cent of cases, the result of gonorrhea. Such cysts are apt to be double-sided and, in these cases, a presumptive evidence of a previous gonorrhea is very strong. Even where we find cyst formation in only one gland, the other gland will usually show some enlargement and its meatus will be reddened, often permitting a small quantity of pus to be expressed. In such instances one may obtain a history of a swelling similar to the one on the affected side that has ruptured spontaneously.

Great variations in size are found; occasionally cysts may attain in size the dimensions of a large orange, though ordinarily they do not exceed in dimensions a hen's egg, and may be as small as an almond. Large cysts, owing to their location directly beneath the labium minus on the same side, will produce a partial obliteration of this labial fold, so that it encircles the swelling, not dissimilar to the manner in which the fallopian tube rides upon and encircles a parovarian cyst.

The contents of the cyst are usually mucopurulent, the amount of pus being inversely proportioned to the duration of the infection. Characteristic of gonorrhea, of course, is the danger of reinfection, and we find, not infrequently, that a simple retention cyst of a Bartholin gland will be the site of a fresh gonorrheal focus and an abscess of this cyst will arise very quickly. In a few instances, cysts of Bartholin's gland

have been found in young girls with intact hymen and without visible evidence of gonorrhea. In view, however, of the relative frequency of gonorrheal vulvovaginitis in children, the most plausible explanation for these cyst retentions in young girls is upon the basis of a mild infection of this sort early in infancy. Bartholin cysts, except in the stage of acute infection, do not ordinarily produce symptoms; occasionally, we may have patients complain of some discomfort in walking, but the most frequent symptom noted is dyspareunia. The differential diagnosis between Bartholin cysts and other tumors arising in this region is relatively easy and will be considered in the special chapter on Diagnosis.

The treatment of these cysts consists in their careful dissection and removal in association with the remaining gland tissue. It is usually advisable to remove the gland on the other side, even if it is not markedly affected. Incision and cauterization, while permissible in case of abscess of the gland, should never be employed in these cysts because of the marked tendency to reformation and the simplicity of their excision at this time. After thorough excision, there is no tendency toward a recurrence of the former trouble. Of course, in every instance, we should await the cessation of all acute symptoms before proceeding with the extirpation of the cyst.

I have already mentioned the presence of numerous sweat and sebaceous glands about the vulva. Both of these glands form, at times, retention cysts varying in size from that of a split pea to large tumors. Sweat-gland tumors are usually termed hidradenomata, and are most often found associated with some degree of proliferation of these glands. Their occasional malignant degeneration has been considered in Chapter XIII. Sebaceous cysts, usually found about the labia minora, have a thin wall and a typical yellowish color due to their contents. In one of my patients, a cyst in this region would swell and become painful at each menstrual period so that its removal was finally decided upon. Ordinarily, however, these simple retention cysts cause so little disturbance that they are only noted casually at the time of examination for other conditions.

As to their location, they are found more frequently about the labia minora, the prepuce of the clitoris, and the hymen; if they occur upon the edge of either the prepuce or the labium minus, they may assume a somewhat pedicled appearance. Argaud has recently described a cyst of the left labium minus near the clitoris, 4 cm. in diameter, containing a brown viscid material and due to epithelial inclusion. Kelly has a good illustration of a similar small cyst of the labia (Fig. 78). Cysts

of the hymen not infrequently have their origin from remnants of the wolffian duct and, if we study Rudolph Meyer's sections of embryos in the last months of fetal life and note the frequency with which the wolffian duct is found emptying into the edge of the hymen or even running through its center, we can readily understand the etiology of these retention cysts. They are occasionally found in newborn children and are not so extremely rare in older individuals. Cysts situated at

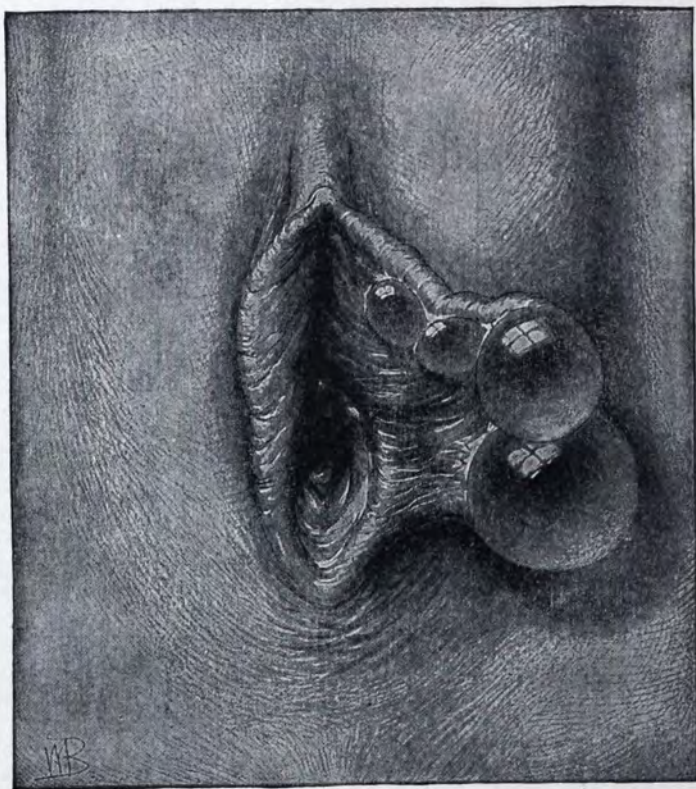


FIG. 78.—CYSTS OF THE LABIUM MINUS (Kelly, *Operative Gynecology*).

the vulval orifice, but of vaginal origin, may occasionally be found in multiparous women; often they are seen at the site of perineal tears, and, in such instances, may be regarded with reasonable certainty as due to epithelial inclusions. Weibel describes an atheromatous cyst the size of an apple, in a woman of thirty-one years, situated in the upper labial region and containing the mushy material characteristic of atheroma. Forgue-Massabuau records cases of dermoid cysts of the vulva.

Hydrocele of the Round Ligament.—It was thought, in former days, that the round ligament contained a small canal in certain individuals, and the retention of fluid in portions of this canal led to the cyst formation that was not infrequently found about the external genitals of women and in the inguinolabial fold. Closer anatomical studies, however, showed that these cysts sprang from portions of the peritoneum that followed the course of the round ligament from the abdominal cavity to the labium majus. The term "cysts of the canal of Nuck" is, therefore, an improper one, and the term "hydrocele" is preferable. We are, in reality, dealing in these cases with a partial hernial sac. We may also interpret the condition as due to hernia that later in life, either through the wearing of a rupture band or spontaneously, became shut off from the abdominal cavity. From the peritoneal pocket thus formed a cyst develops, due to the secretion of fluid by the peritoneal surface.

It is noteworthy that such hydroceles are always situated in the upper portion of the labia majora, or along the course of the inguinal canal; they are often somewhat pear-shaped, with a narrow end projecting part way through the inguinal canal. It should be remembered in differential diagnosis that we may find, in this region, cysts originating from remains of the wolffian duct, portions of which embryologically are in continuity with the round ligament. Such cysts of wolffian duct origin can, however, readily be differentiated from hydrocele by the presence of more marked glandular proliferation in their wall and the embryonal tissue in which these glands lie imbedded. The usual size of such hydrocele sacs is that of a walnut or a trifle larger.

They may produce a certain degree of discomfort in walking, and, in view of the ease with which they can be enucleated, and the increased danger of hernia if they are allowed to remain, their surgical removal is usually indicated. Nothing short of the complete excision of the hydrocele sac is justified, since incomplete surgical measures lead to frequent recurrences. Where the condition occurs in girls before puberty, it is well to delay operation, since some of these conditions disappear spontaneously.

Echinococcus Cysts.—A few very rare cases have been reported in literature in which echinococcus cysts have occurred about the vulva; in view of the fact that hooklets were not found in the cases reported, some question must arise as to the diagnosis in these cases. They have no special clinical importance.

LITERATURE

- ARGAUD ET DUBOUCHER. Bull. Soc. d'obst. et de gynéc de Paris, 1920.
75:135.
- BOUQUET. Internat. Abst. Surg., 1920. 31:313.
- DAVIS. Am. Journ. Obst., 1917. 75:58.
- FEIS. München. med. Wchnschr., 120. 67:755.
- FORGUE-MASSABUAU, Paris, 1916. 68.
- FORMIGGINI. Policlin., 1921. 28:509-511.
- JOVINE. Riv. di ostet., 1920. 2:398-401.
- KELLY. Operative Gynecology, 1:178.
- WEIBEL. Zentralbl. f. Gynäk., 1920. 325.

CHAPTER XV

CANCER OF THE VULVA

Both because it is extremely malignant and because it is the most frequent of the neoplasms found about the external genitals of women, carcinoma of the vulva demands our especial attention.

Frequency.—Approximately 1 out of every 20 cases of cancer of the pelvic organs of women takes its origin in the vulva. Next to the uterus and the ovary, the vulva is most often attacked by this disease. In the past twenty years especially, cases have been reported in considerable number, so that Ederle found record of a total of 677 cases. Even allowing for slight duplication in these records, we have at hand sufficient material to establish certain definite conclusions concerning this disease. Since Ederle's article was published in 1919, R. Mueller (1920) analyzed 46 cases from the Breslau clinic and Giesecke (1921) reviewed the history of 44 vulval cancers seen at the Kiel clinic. Out of a total of 6,407 gynecologic patients coming to the Heidelberg clinic in the years between 1902 and 1909, Flater recorded 174 uterine cancers (2.7 per cent), 7 vaginal cancers, and 8 vulval cancers (0.1 per cent). Rothschild, at Freiburg, found cancer of the vulva in 6 patients out of 9,643 who came to the clinic in the years between 1904 and 1911.

As to the frequency with which various parts of the vulva are involved, the tabulation of Rothschild of 395 vulval cancers was as follows:

	<i>Cases</i>
Clitoris	62
Clitoris and labia on one side	41
Clitoris and both labia	21
Labia majora	105
Labia minora	35
Labia majora and minora	29
Peri-urethral	6
Posterior commissure	11
Bartholin's gland	17

Although the majority of these cancers are thus seen to take their origin from the labial tissue, the percentage of those springing from the clitoris almost equals them. As Ederle points out, if we compare the relative size of the clitoris to the surface occupied by the labia majora and the minora, there is certainly a marked predisposition of this little structure to a malignant change. In Ederle's tabulation of 677 vulval cancers, he found 109 starting from the clitoris. This would be approximately 16 per cent of the total. In many instances, the cancer is so far advanced at the time the patient comes to the physician that it is impossible to determine the exact point of origin.

Age.—Cancer of the vulva, like cancer of the skin, is essentially a disease of old age. The decade in which it most frequently makes its appearance is between 61 and 70; yet, occasionally, it is found in younger women. Where the tumor has been found in girls from four to five years of age, the diagnosis of cancer seems questionable, according to the views of most pathologists. We have, however, a record of cancer of the vulva in a fourteen-year-old girl by Kinoshita and 9 other cases by various observers up to the twenty-fifth year. In Rothschild's tabulation of 331 cases, the following distribution as to the age is given:

Years.....	10-20	21-30	31-40	41-45	46-50	51-55	55-60	61-65	66-70	71-75	76-95
Cases.....	2	9	28	26	34	40	48	50	54	24	16

Ederle found that out of 22 vulval cancers in women under thirty-five years of age, 12 were cancers of the clitoris. I notice that Ederle, however, had not read my report of 15 cases published in 1917. These cases included one peri-urethral cancer in a woman twenty-seven years of age and one cancer of the clitoris in a woman thirty-three years of age. Apparently then, where cancer of the vulva appears in younger women, the clitoris is the most common site. Cancer of the vulva occurs both in married and unmarried women. Unlike cancer of the cervix, it is almost as frequent among nullipara as among multipara. Out of 44 women with vulval cancer, Giesecke found 8 nulliparae (18 per cent). In my series of 23 vulval cancers, 10 women had no children (43 per cent). All writers have noted that a considerable number of cases occurs in virgins, and in my own series I found 5 virgins out of a total of 23 women. Apparently, therefore, cancer of the vulva is not especially a disease of the multiparous woman.

Classification.—To avoid unnecessary repetition, it seems best not to treat cancer of the clitoris and cancer of Bartholin's gland as separate diseases, but to take them up under the general subject of cancer of the vulva. In pathology, symptomatology and treatment, there is no



FIG. 79.—CARCINOMA OF BARTHOLIN'S GLAND. This shows the nodular subepithelial character of the growth. A small area of ulceration (about 1 cm. square) was present at the meatus of the gland.

radical difference between these various forms. From a histologic standpoint, we may divide carcinoma of the vulva into three groups:

1. Squamous-cell carcinoma, or cancrroid, characterized by the formation of numerous epithelial pearls (Figs. 81A and B).
2. Medullary carcinoma, springing from undifferentiated epithelial cells (Fig. 80).
3. Adenocarcinoma, arising from glandular structures about the external genitals (sweat glands, mucous gland, Bartholin's gland) (Fig. 82).

Lynch points out that both squamous-celled carcinoma and adenocarcinoma have been found to develop from Bartholin's gland (Fig. 79). This is readily explained by the fact that, while the acini of the gland are lined by columnar epithelium, the ducts of the gland are lined by

squamous cells. If the cancer develops from the former, it is adenomatous in type; if it springs from the latter, the cancer will be either medullary or typically squamous-celled. The only cancer of Bartholin's gland included in my series was operated on by Dr. Gellhorn and microscopic section showed it to be medullary in type (Fig. 80).



FIG. 80.—SECTION FROM CARCINOMA OF BARTHOLIN'S GLAND (FIG. 79) SHOWING MEDULLARY TYPE OF GROWTH. Where the tumor springs from the gland itself, it is adenomatous in type; where its origin is from the duct of the gland, it resembles more the squamous type.

In point of frequency, the typical squamous-celled cancers predominate (Fig. 81). Outside of Bartholin's gland, adenocarcinoma of the vulva has hardly ever been recorded. The following case of adenocarcinoma with colloid degeneration presents such unusual pathologic characteristics that I do not know how to classify it. The case was also of special interest because the patient was a negress. This is the only

case of primary cancer of the vulva I have ever seen in this race. As shown in Fig. 82, the cancer was for the most part independent of the surface of the epithelium and consisted largely of colloid masses surrounded by columnar epithelium, which formed nests and had the typical characteristics of a malignant tumor.

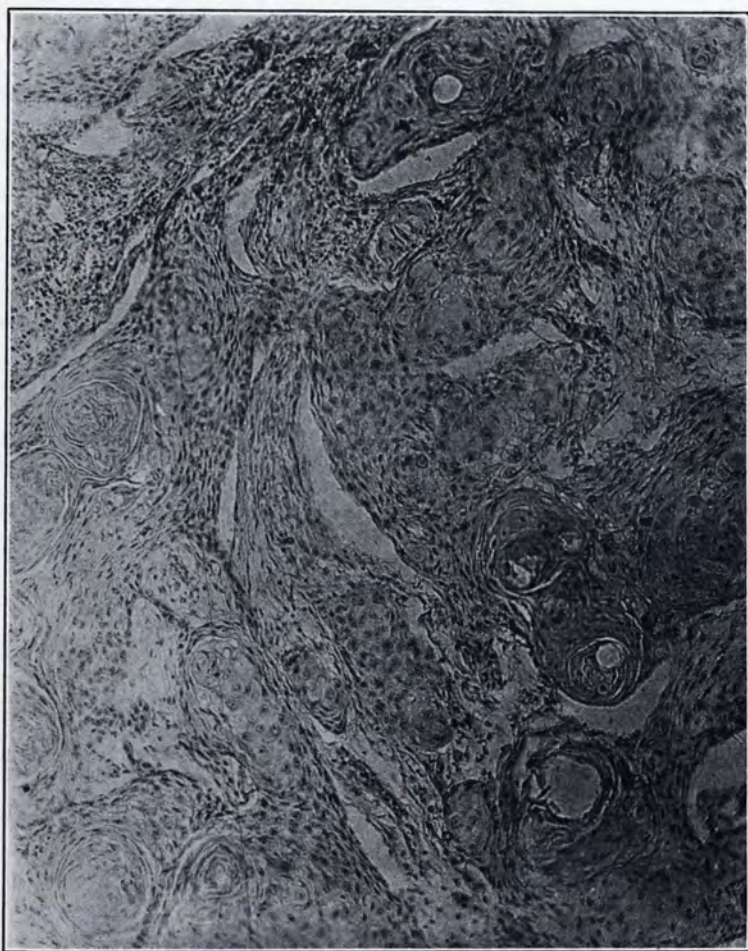


FIG. 81.—SQUAMOUS-CELLED EPITHELIOMA OF THE VULVA WITH MARKED DIFFERENTIATION OF CELLS AND PEARL FORMATION.

Of greater clinical interest than this histologic classification of vulval cancer is the division into:

1. An inverting type.
2. An everting type.

In Figs. 83 and 84 may be seen side by side illustrations of these two main types of vulval cancer.

The inverting type is characterized by greater malignancy. It forms

deep ulcers which infiltrate the subcutaneous tissues, spread rapidly to the tributary lymph glands and, in spite of radical operation, is prone to recur and end fatally. The inverting type is found more frequently in somewhat younger women.

The everting type of cancer, on the other hand, is seen primarily in women of advanced age, and is almost always associated with that peculiar atrophy described in a previous chapter as leukoplakic vulvitis.

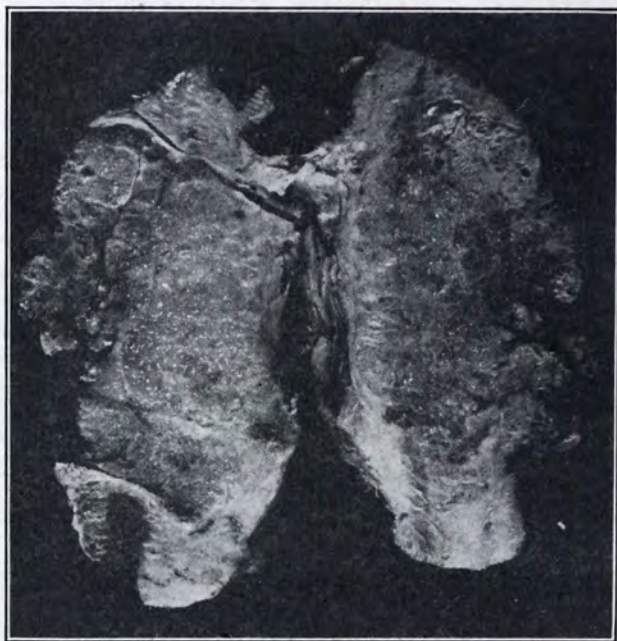


FIG. 82A.—GROSS SPECIMEN OF ADENO-CARCINOMA OF THE VULVA WITH COLLOID FORMATION. This tumor, although showing a large area of ulceration, was essentially subepithelial in its growth and with great probability took its origin from Bartholin's gland. The case was of further interest in being associated with extensive tertiary luetic changes about the urethra and perineum.

Here the very factors which seem to predispose to the formation of the cancer tend at the same time to inhibit its spread to the deeper subcutaneous tissues and hence to the lymph glands. This type of case is far more easily cured by operation and, even where only a partial vulvectomy is done, may remain free of recurrence.

Etiology.—In our search for the cause of cancer, there is hardly any portion of the body, unless it be the lip or mouth, that offers so fertile a field for investigation of the predisposing factors as the vulva. We have already discussed leukoplakic vulvitis, which is undoubtedly the most frequent factor in the causation of carcinoma of the vulva.

But there are other conditions besides this that lay the foundation for malignant change. In a study of this subject made in 1917, I cited cases in my own series in which there was definite evidence of syphilis, of acuminate warts, and of trauma, preceding, and apparently predisposing to, the formation of cancer. In this first study of 15 cases, I classified kraurosis and Paget's disease separately as etiological factors



FIG. 82B.—MICROSCOPIC SECTION OF TUMOR, SHOWN IN FIG. 82A. Some acini showed nests of cancer cells, others were filled with masses of colloid material surrounded by a rim of cylindrical epithelium.

in vulval cancer. Later studies of a more extended series, totaling 23 cases, have inclined me to simplify this classification.

The case of so-called Paget's disease I now believe to be a somewhat atypical carcinoma, developing on a leukoplakic base. The cases classified under kraurosis also had marked leukoplakic vulvitis and I am convinced that the kraurosis is merely a secondary development of the atrophic inflammation of the vulval skin. With Berkeley and Bonney, I believe that simple kraurosis without leukoplakic change does not predispose to malignancy.

The 23 cases of carcinoma of the vulva reported in 1921 may be classified according to etiology as follows:

	<i>Cases</i>
Syphilis	2
Trauma	2
Condyloma acuminatum	1
Leukoplakic vulvitis	14
Uncertain	4



FIG. 83.—CARCINOMA OF THE VULVA (inverting type). Marked leukoplakic vulvitis.

The high incidence of leukoplakic vulvitis in this series indicates its importance and justifies its classification as a precancerous lesion. The histologic changes that precede such malignant degeneration have been fully described in Chapter XI. Very few careful etiological studies have thus far been made of this condition. In all my cases, before forming my conclusions, I took blocks of tissue from five or six different points and stained the sections with the various stains used in studies of skin pathology.

Perruchet was even more convinced than I have been of the intimate

relation existing between leukoplakic vulvitis and cancer. He found only 3 cases out of 19 in which cancer had not already developed upon the leukoplakia and came to the conclusion, as did also Paul Petit, that the leukoplakia is just the first stage of a cancer and sooner or later, in every case in which this form of vulvitis has occurred, a cancer is certain to develop. I believe that this is perhaps going too far, although it will be noted that, out of the 21 cases of leukoplakic vulvitis that I reported in 1920, 14 had already formed a cancer. Of the remain-

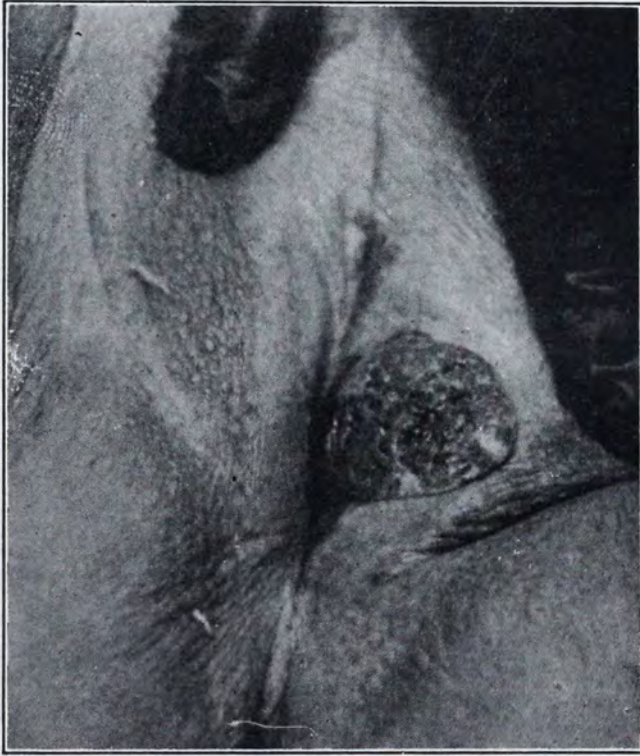


FIG. 84.—CARCINOMA OF THE VULVA (everting type). A benign tumor with extreme kraurotic changes at the vaginal entrance due to leukoplakic vulvitis of long standing.

ing 7 without cancer, 5 gave a history of trouble dating back more than ten years and the youngest of these 5 women was fifty-seven years old.¹ If, therefore, a cancer had not developed at this age, it is likely that a certain number of these women, even in the absence of any treatment, would have died of other causes before a cancer had had time to develop. On the other hand, I do not agree with Berkeley and

¹ Between 1920 and May, 1923, an additional 19 cases of leukoplakic vulvitis were observed, many of them referred to me by my colleagues. Out of this total of 40 cases, 18 had already developed a carcinoma.

Bonney, as already stated in Chapter XI, that there is any terminal, cured stage in leukoplakic vulvitis. I believe it will inevitably proceed to the development of a cancer, but the rate at which this change takes place may be so slow that death supervenes before its accomplishment.

Syphilitic ulcers have been definitely established as an occasional predisposing cause of cancer. Of the two cases in my series classed under



FIG. 85.—CARCINOMA OF THE VULVA. This developed at the edge of old syphilitic ulcerations in the vestibulum.

this head, one refused operation and, hence, could not be subjected to careful histologic study.¹ In the other patient, the tertiary ulcer was under observation for six months before the first evidences of malignancy developed. As seen in the photograph (Fig. 85), the ulcer was

¹ This patient recently (March, 1923) returned to my clinic and was operated on by me. It was unquestionably a case of carcinoma, developing on the basis of tertiary syphilitic ulceration.

peri-urethral. The patient had acquired lues five years previously, had old luetic scars over the body, a small rectovaginal fistula surrounded by induration and a stricture of the rectum, in short, she possessed all the usual lesions of a tertiary syphilis. The microscopic sections of this case show a medullary carcinoma developing at the edge of the syphilitic ulcer.

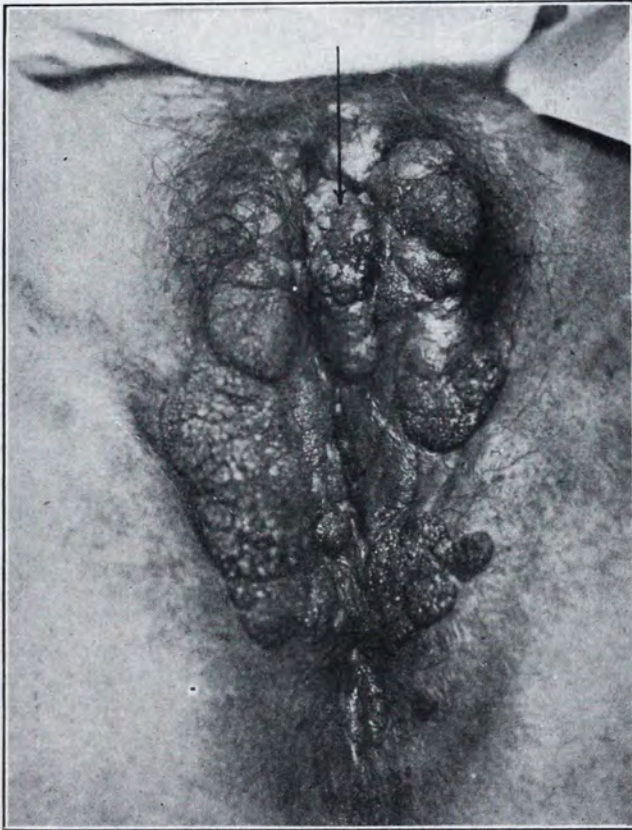


FIG. 86.—CARCINOMA OF THE CLITORIS SPRINGING FROM THE EDGE OF CONDYLOMATA ACUMINATA. This case proved very malignant, early developing lymph gland metastases four times the size of the primary tumor (see Fig. 91). The arrow marks the site of the cancer.

Acuminate warts were first mentioned as a possible factor in vulval cancer by von Winckel. One case in my first series is a beautiful example of cancer of the clitoris developing on the base of such a formation of warts (Fig. 86). In view of the positive history in this case, that the warts had existed for ten years previous to the formation of the cancer and the fact that the cancer itself was so small, we cannot assume that the warts developed from the cancer, but rather that the cancer developed from the warts. Apparently these warts are more apt

to produce a carcinoma of the clitoris than of other portions of the vulva. Ederle found such a papillomatous growth preceding cancer in the case reported by Czerwinsky and one each by Flatau and Roberts. It might be mentioned at this point that Ederle considers adhesions of the prepuce, with the irritation often resulting therefrom, as a factor in the formation of cancer of the clitoris.

Trauma has been frequently given as a predisposing cause of cancer. It is perhaps the most difficult to prove of any of the etiologic factors

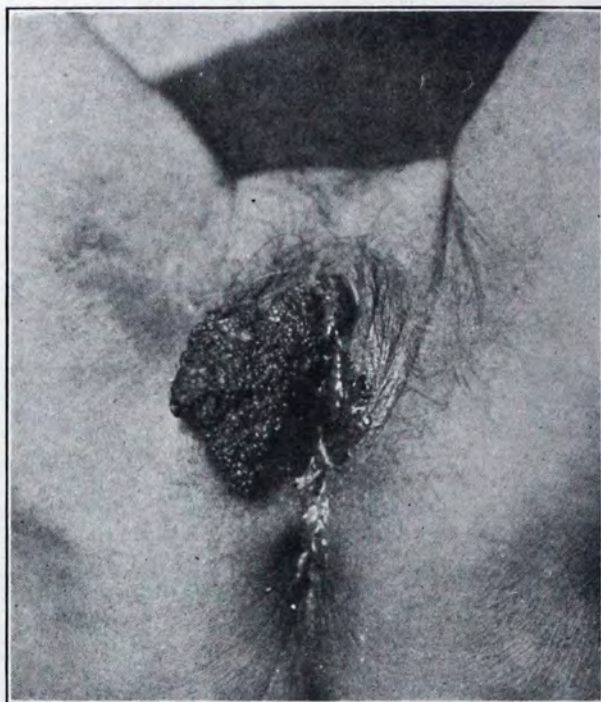


FIG. 87.—PAPILLARY TYPE OF CARCINOMA OF THE VULVA. It is of interest that this patient also had a papillary carcinoma of the lobe of the ear.

above mentioned. In both the cases that I grouped under this head in my series, the evidence of such a relationship was reasonably certain. In one case, a considerable hematoma was present for several months previous to the first indication of a malignant tumor.

Infections of Bartholin's gland, occasionally proceeding to abscess formation, have been noted by several observers as present previous to the formation of a cancer in this organ. The frequent tears of the perineal body following childbirth, even when a considerable amount of scar tissue develops, apparently have no tendency to form cancer. This

is probably due to the fact that infections do not persist in such perineal tears. If from this we can draw an analogy between vulval and cervical cancers, the conclusion seems justified that, in cervical cancers, the cervical infection and not the cervical tear is primarily the important predisposing cause.

Gross Appearance and Development.—In the classification of vulval cancer, I have distinguished between an inverting and an everting type of tumor.

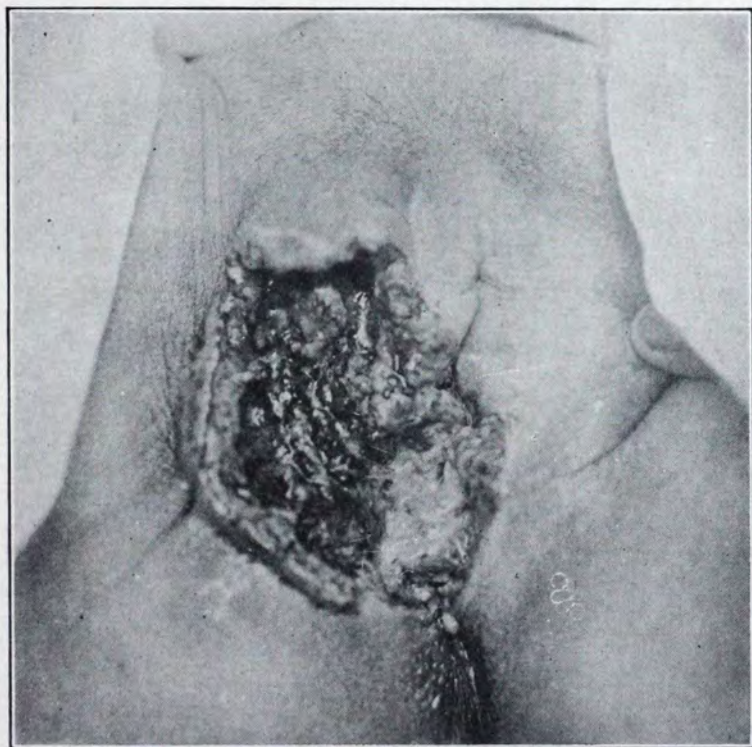


FIG. 88.—CRATER FORMATION IN CARCINOMA OF THE VULVA. A small localized area of leukoplakic vulvitis is still visible on the uninvolved side of the labia.

In the *inverting* type of vulval cancer, we have, at the outset, a small ulcer with a nodular rim that rapidly infiltrates the underlying connective tissue. By so doing, it undermines the skin, and brings about, in a short time, an extension of the ulcerated surface. It is not unusual to find such ulcers spreading over two thirds of the labial surface on one side, in a relatively short period of time. This inverting type forms a craterlike mass more quickly than the everting type, and deeper infiltration is more commonly found.

In the *everting* type, we find, in the earliest stages, a hard papillary

nodule with friable surface, permitting particles to break off readily. The base is infiltrated, but the nodule as a whole is freely movable. The papillary growth may develop into a tumor the size of a walnut, as seen in Fig. 87, before it begins to ulcerate. This ulceration usually starts along one edge of the tumor, and at this time we may find the remaining papillary excrescences over-riding a shallow infiltrated ulcer. Still later the entire mass sloughs away and there remains a deep crater with hard, infiltrated edges, firmly fixed to the underlying

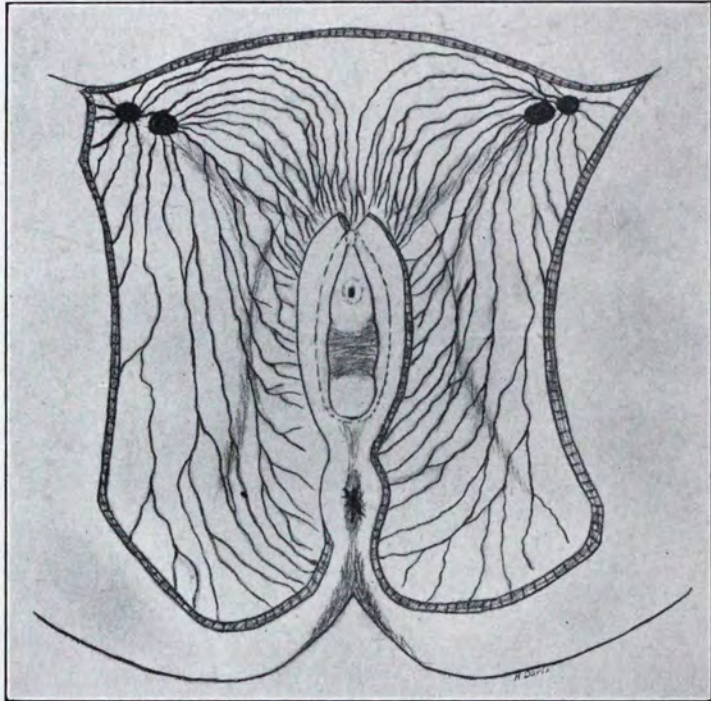


FIG. 89.—LYMPHATICS OF THE VULVA (redrawn from Corning). The lymph-channels, even from the anal and perineal region, drain up into the femoral and inguinal systems.

structures (Fig. 88). At this stage no evidence of the original everting type remains.

Cancers originating from the clitoris or peri-urethral tissues, as they grow larger, surround and invade the walls of the urethra and may extend upward even to the bladder wall itself. Another important extension of the growth, both in cancers of the labia and of the clitoris, is in the direction of the periosteum of the pubic bone. In advanced cases, the mass is immovably attached to the bone and may even infiltrate the bony tissue itself.

A third form of tumor that is relatively rare, and usually found only in cancers originating from Bartholin's gland, is shown in Fig. 79. Here we have only a small area of ulceration on the surface, but nodular masses lie beneath the skin, usually partly encapsulated, even though adherent to deeper structures.

The cancerous ulcer is characterized by its uneven papillary surface, its dirty gray base and its irregular margins. The tissues are very friable and bleed readily. Infection is always present in such an ulcer, giving rise to a purulent, foul-smelling discharge.

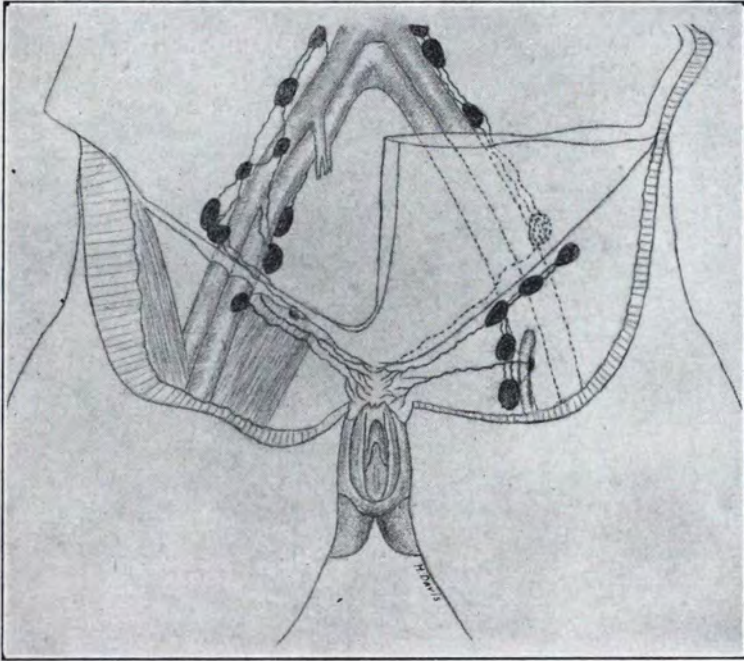


FIG. 90.—LYMPH-GLANDS TRIBUTARY TO THE VULVA (redrawn from Corning). This sketch should be studied in connection with Figs. 92 to 95. Where the cancer has extended to the deeper iliac and aortic lymph-glands it is hopeless to remove it by surgical measures.

Extension.—The chief mode of extension in vulval cancer is along the lymphatics. Even when the ulcer is no larger than a dime, metastases may have already occurred to the tributary femoral and inguinal lymph glands. How this effects the mode of treatment and prognosis will be taken up later. The distribution of these lymphatics can better be understood by studying Figs. 89 and 90 than from a description. It will be noted that the inguinal glands, as a whole, lie either superficially or at some little distance from the important vessels. The femoral glands, on the other hand, are situated in Scarpa's triangle,

overlying the femoral sheath and partly within the femoral ring. It is this group of glands that is almost always involved and that so seriously complicates the ultimate cure of vulval cancer. The enlarged cancerous lymph glands soon become adherent to the underlying femoral vessels, making their removal either impossible or attended with great danger of hemorrhage. Two of my cases of vulval cancer died from hemor-



FIG. 91.—CARCINOMATOUS LYMPH-GLAND SECONDARY TO CARCINOMA OF THE CLITORIS.
Same case as Fig. 86.

rhage, following erosion of the femoral artery by a cancerous metastasis. Infection or liquefaction necrosis of these cancerous lymph glands frequently occurs. In such instances, the overlying skin is thinned out, as in an abscess, then it ruptures, permitting the escape of purulent, grumose material. The opening thus made rapidly widens as the cancerous masses grow upward from beneath (Fig. 91).

The lymph glands usually involved in vulval cancer are the deep and superficial inguinal and femoral glands. At times, however, the iliac lymph chain is involved, and the obturator gland is also occasionally

found to be the seat of a metastasis. Only in far-advanced cases are we apt to find extension beyond the pelvis. Kuestner and Leger have found metastasis in the lung, liver, heart, spleen and kidney following carcinoma of the vulva.

The rapidity with which cancer spreads varies greatly in different individuals. In younger persons, the entire vulva may become involved within three or four months, large nodular masses forming in both inguinal regions and death supervening before a year has elapsed. Ordinarily, however, the progress of the disease is slower, being somewhat less rapid than cervical cancer in its growth. In older women, particularly in the everted type developing on a leukoplakic basis, the growth may spread slowly. I observed one case in which the cancer had existed for one and one half years with involvement of only 2 cm. square of the skin as seen in Fig. 84. In this instance, excision of the vulva with tributary lymph glands in March, 1916, has not as yet (September, 1922) been followed by any recurrence.

Symptoms.—The earliest symptoms of cancer of the vulva are either pruritus or burning on urination. If the origin of the cancer is about the labia, pruritus is usually first noticed; while, if it originates near the urethra, urinary discomfort is first observed. As soon as the ulceration begins, the symptoms are more pronounced, and definite pain, worse on walking or during menstruation, is experienced. This pain is usually sharp and lancinating and, when the growth has extended up to the pubic ramus, there may be radiating pains down the leg of the affected side. In general, however, the dictum that pain is a late symptom of cancer applies equally to the vulval form. Since so many vulval cancers are preceded by leukoplakic vulvitis, the symptoms of the latter disease (itching, burning and chafing of the genitals) have usually been present for some time. The cancer merely aggravates these symptoms. The slight serous discharge, which previously may have been noted, becomes blood tinged and slightly odorous. Occasionally, there is a free flow of blood, if the cancerous ulcer has been abraded. This bleeding is rarely pronounced, even in cancer of the clitoris. There is naturally considerable dyspareunia, and when the cancer extends to the urethra, urinary symptoms are more pronounced. Marked obstruction to the flow of urine may occur, necessitating repeated catheterism. Later there is incontinence. Metastases to the groin result in pains in the hip and leg that equal in severity the pain that is experienced in advanced cancer of the cervix.¹

¹ For Literature on Cancer of the Vulva, see Chapter XVI.

CHAPTER XVI

TREATMENT OF CANCER OF THE VULVA

Operative Treatment.—Whenever the patient's condition does not positively contra-indicate surgical intervention, the operative excision of the tumor, with a wide margin of surrounding tissue and the complete removal of the tributary lymph glands, as far as possible in continuity with the tumor, gives the best hope of permanent cure. Although radium and the X-ray have been extensively used in the past ten years, the results thus far do not indicate that they will to any noticeable degree supplant surgery in the treatment of cancer of the vulva. I shall consider the results of radium therapy a little later under the head of nonoperative treatment.

The type of operation depends on the size and location of the primary tumor. In former years, a partial vulvectomy was at times employed, but the percentage of local recurrences proved to be very much greater where such an incomplete operation was done, even in early cases. Thus Giesecke saw recurrences in 5 out of 8 cases in which only half of the vulva was amputated, whereas there were but 5 out of 16 cases recurrent after complete vulvectomy. If the growth extends down over the perineum, the excision will have to be extended to include the entire perineal skin. Wherever the carcinoma develops on a foundation of leukoplakic vulvitis, the incision should include as much of the thickened leukoplakic skin as it is surgically feasible to remove, since a second cancer may develop later on from such diseased skin. This usually requires the extension of the incision to the margins of the anus. Even where the tumor has not infiltrated deeply, it is best to remove the entire labia and clitoris with subjacent connective tissue down to the pubic arch, including the entire vestibulum and about $\frac{1}{2}$ cm. of vaginal cuff. Only anteriorly around the urethra should we try to conserve as much tissue as conditions will permit. If the growth has extended to the meatus urinarius, we are compelled to include the outer half of the urethra in our excision. I have in the past had occasion to regret too radical an excision in this direction. It is almost impossible to prevent

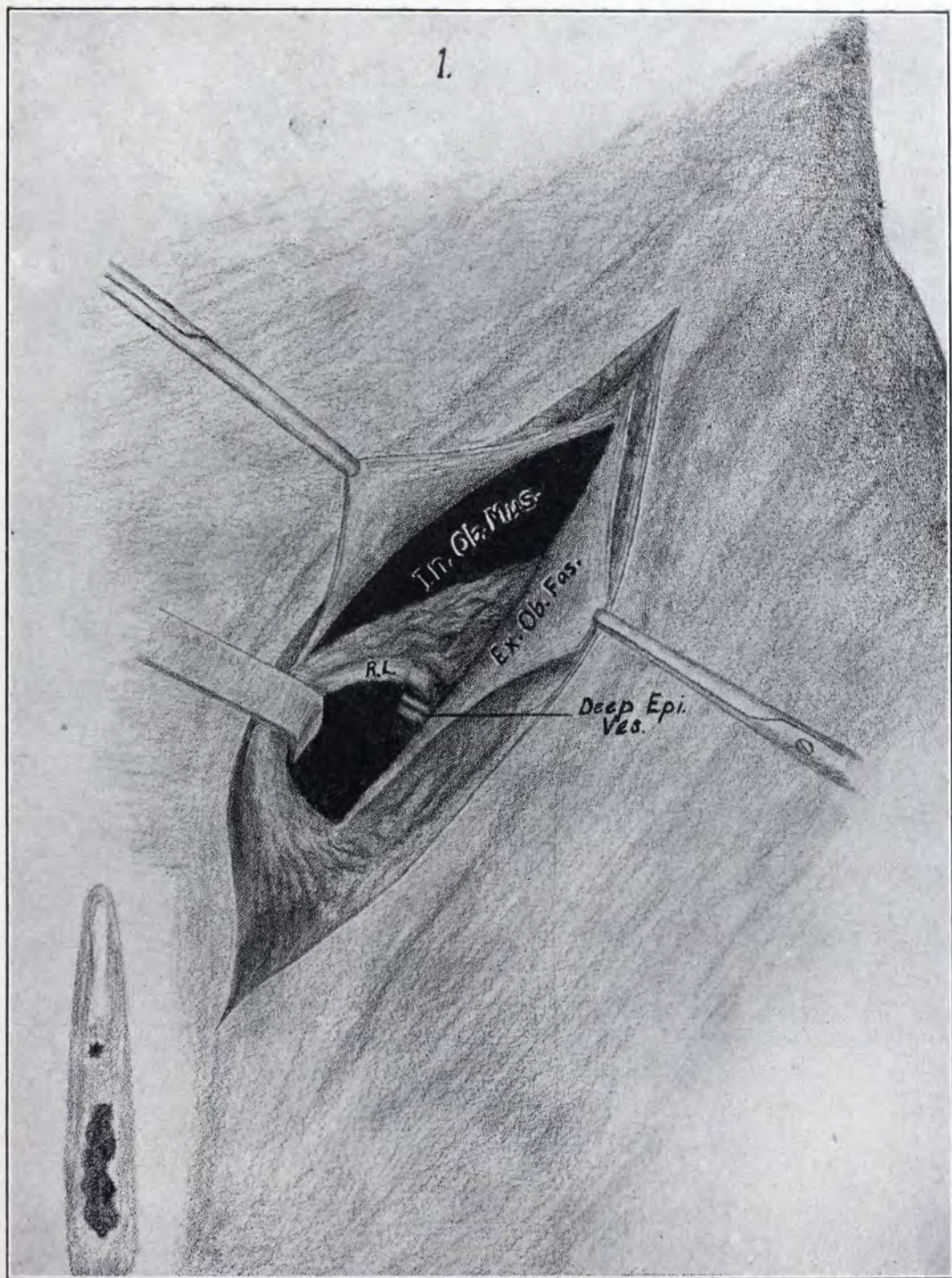


FIG. 92.—BASSET'S OPERATION FOR LYMPH GLAND RESECTION IN CARCINOMA OF THE VULVA (step 1). Incision over inguinal canal. Canal opened and round ligament isolated and lifted up. *R. L.*, Round ligament; *Ex. Ob. Mus.*, External oblique muscle; *Ex. Ob. Fas.*, External oblique fascia; *Deep Epi. Ves.*, Deep epigastric vessels.

partial urinary incontinence when much of the urethra is removed, and, if a short time afterwards a recurrence develops in the lymph glands, we will have only succeeded in making the last few months or year of the patient's life a source of increased discomfort through the dribbling of urine. The application of radium to such a urethral extension in place of a radical excision has much to recommend it.

In view of the undoubted chance of implantation metastasis, where the tumor is excised with the scalpel, I have in the past few years preferred to do this excision with the cautery knife. Recently Matthaei has recommended the removal of the primary growth with diathermocautery. He noted the absence of pain in the wound after this method of operation. Kehrer recommends the removal of the cancer with the cautery knife, followed by the implantation of radium into the wound. After excision of the tumor with the cautery knife, I have usually followed Cullen's suggestion to remove with the scalpel approximately 1 cm. of tissue from the edges of the wound before attempting to bring them into coaptation. By so doing, one avoids the prolonged wound healing that usually follows ordinary cautery excision.

The complete dissection of the tributary lymph gland chains on both sides will undoubtedly improve the final operative result in vulval cancer. But here again, I advise against too radical a type of operation. The more radical the incision, the greater the primary mortality, and, while we rarely see the profound postoperative shock so common after the radical abdominal hysterectomy for cancer of the cervix, our patients are usually old debilitated women who do not tolerate prolonged operative procedures and it is wise to shorten the time of operation as much as possible. Occasionally the two-stage operation is preferable.

The most radical operation thus far suggested is Stoeckel's method of removing the iliac glands together with the inguinal and femoral glands. Stoeckel makes a U-shaped incision running along the outer border of the rectus muscle on each side and across this muscle over the region of the mons veneris. He avoids opening the peritoneal cavity, pushes the parietal peritoneum off the iliac vessels and exposes the lymph glands lying in the iliac fossa, as well as those situated in the angle between the internal and the external iliac vessels. He then proceeds with the lymph gland dissection, starting from the hypogastric lymph glands in the iliac angle and extending downward to Poupart's ligament. Slight modifications of this procedure have been suggested by MacCann and Kehrer.

I cannot see that enough is gained to justify these deeper dissections

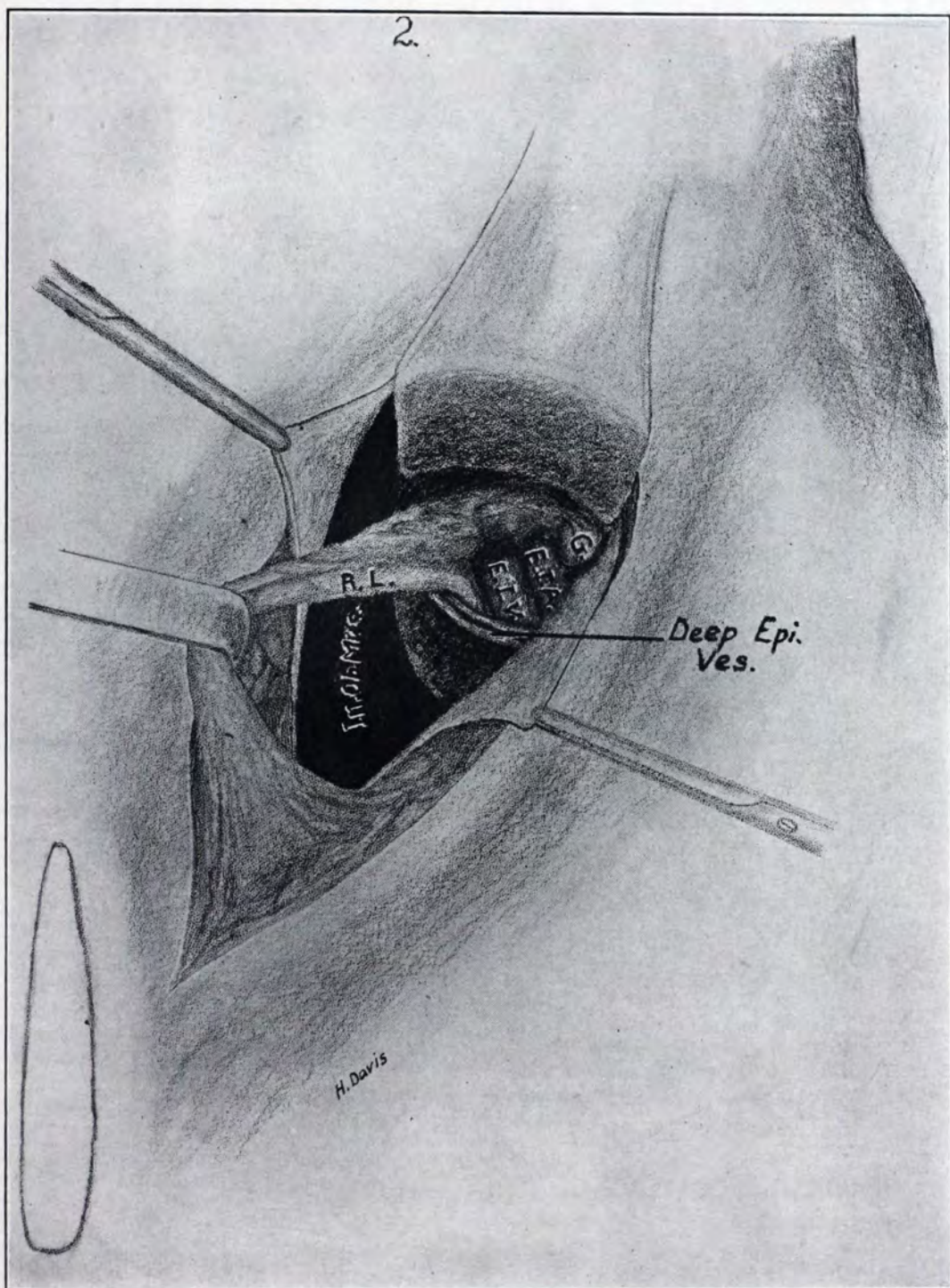


FIG. 93.—BASSET'S OPERATION (step 2). Muscle retracted to expose internal iliac vessels and lymph glands to either side in iliac fossa. *G.*, Gland; *E. I. A.*, External iliac artery; *E. I. V.*, External iliac vein; *R. L.*, Round ligament; *Ex. Ob. Mus.*, External oblique muscle; *Deep Epi. Ves.*, Deep epigastric vessels.

of the lymph glands. Experience with cancer in other organs has sufficiently demonstrated that, if metastases have occurred beyond the first step in the lymphatic chain, it is almost impossible to effect a cure. For this reason it seems to me best in almost all cases to limit surgery to the removal of the superficial and deep, inguinal and femoral glands.

The technic of this procedure is not as simple as it might seem and I think it no exaggeration to state that in nine out of ten operations done by the average surgeon for carcinoma of the vulva, only the superficial, easily accessible, glands are removed. We owe to Basset the suggestion of a method of operation that systematically includes all the important tributary lymphatics in this region. The most important and novel suggestion made by Basset is the division of Poupart's ligament over the femoral ring, exposing the important, but usually inaccessible, lymph gland situated at this point.

The technic of Basset's operation can be seen in Figs. 92, 93, 94, 95. The chief steps in the operation are:

1. An excision extending from a point 2 cm. internal to the anterior superior spine of the ilium, downward and inward, parallel to the inguinal canal, to the tubercle of the pubis.

2. After pushing aside the skin and subcutaneous tissue, the aponeurosis of the external oblique muscle is incised parallel to the inguinal canal. The round ligament is thereby laid bare and then exposed along its entire course up to the inguinal ring. The peritoneum is pushed backward from the round ligament and the muscles of the abdominal wall retracted upward. In so doing, the lymph glands lying in the iliac fossa at either side of the external iliac vessels are exposed and can be removed in continuity with the round ligament which is ligated before being cut. Care should be taken at this point not to cut the important nerve trunks running parallel to the incision.

3. After clamps are placed on the fascia above the femoral ring, Poupart's ligament is drawn up and cut 1 cm. internal to the femoral vein. The two ends of the ligament are now drawn apart and the inferior epigastric vessels tied off close to their origin from the iliac. The lymph gland of Cloquet, situated close to the femoral vein, is thus exposed and can readily be freed from its attachments. It is important, however, to retain its connection with the lymph channels running directly to the clitoris from this point. To do this will occasionally necessitate an additional skin incision downward to the region of Bartholin's gland. All the lymph glands in Scarpa's triangle should be dissected

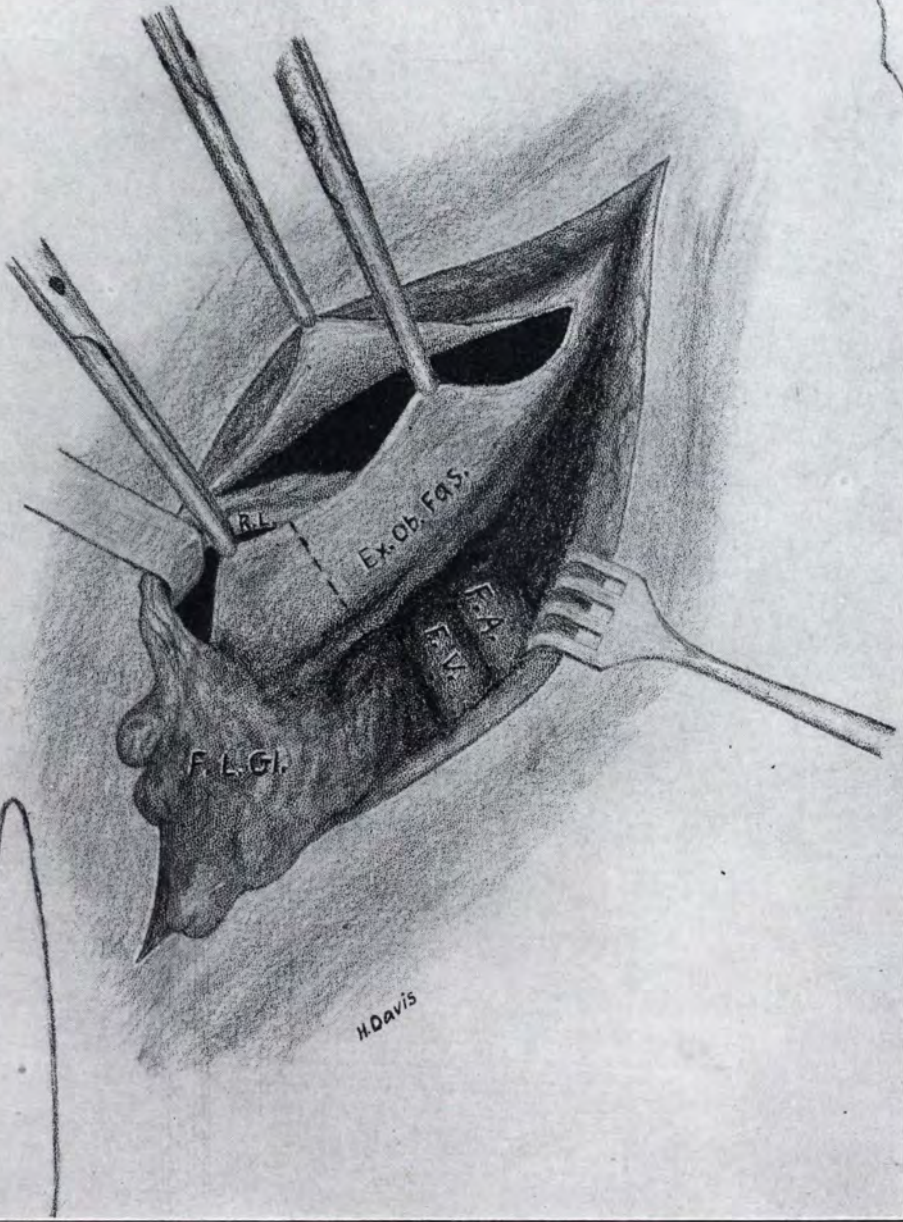


FIG. 94.—BASSET'S OPERATION (step 3). Fascia drawn up and femoral lymphatics with surrounding fat dissected free from saphenous vein down to the femoral ring. The dotted line indicates where the cut is made through Poupart's ligament. *F. L. Gl.*, Femoral lymph glands; *F. V.*, Femoral vein; *F. A.*, Femoral artery; *Ex. Ob. Fas.*, External oblique fascia.

free. Thus the entire inguinal and femoral lymph glands are laid bare in continuity with the tissues of the external genitals.

4. The closure of the inguinal wound can now be undertaken, first bringing the ends of Poupart's ligament together, and suturing them to the aponeurosis of the pectineus muscle, without, however, compressing the femoral vein. Now the transverse and oblique muscles of the abdominal wall are sutured to Poupart's ligament, as in a hernia operation, and the aponeurosis of the external oblique muscle sutured over the top of the ligament.

The further steps of the operation consist of the removal of the primary growth of the vulva and need not be described in detail. A similar dissection of the lymph gland chain on the opposite side should precede the excision of the primary tumor.

This complete but extensive operation will ordinarily consume so much time that, except in early growths, I have hesitated to employ it as a single operative procedure. It has seemed wiser to adopt a two-stage operation. The first operation consists of the complete removal of lymph glands according to Basset's method. The second operation, done two weeks later, includes the removal of the entire vulva with the cautery up to the inguinal incision on either side. Kehrer has recently recommended this type of operation with the addition of radium application in the vulval wound. It will often be necessary to cover the large defect in the region of the vulva by skin flaps taken from the thighs or abdominal wall. It is advisable to avoid putting these flaps under any tension, for necrosis occurs readily in such old women, and a greater defect of tissue will remain after such necrosis than if the tissues had not been completely approximated at the start.

Wound healing is rarely by first intention and the insertion of drains, both in the inguinal incision and in the vulva, for a short period of time, is usually necessary. Moist boric acid or aluminum acetate packs should be applied to the vulva and frequently changed if there is much discharge. Frequent irrigations, with exposure of the wound to warm dry air by removing the vulval dressing and placing an electric-light cabinet over the pelvis for a period of an hour or two each day, have in my experience led to more rapid wound healing.

Nonoperative Treatment.—Radiotherapy alone, of all the non-operative measures in cancer of the vulva, deserves serious consideration. Arsenic pastes have been used in the past with slight temporary relief and Reusch, in 1915, reported a case that had refused operation in which the use of the paste caused a disappearance of the local lesion;

4.

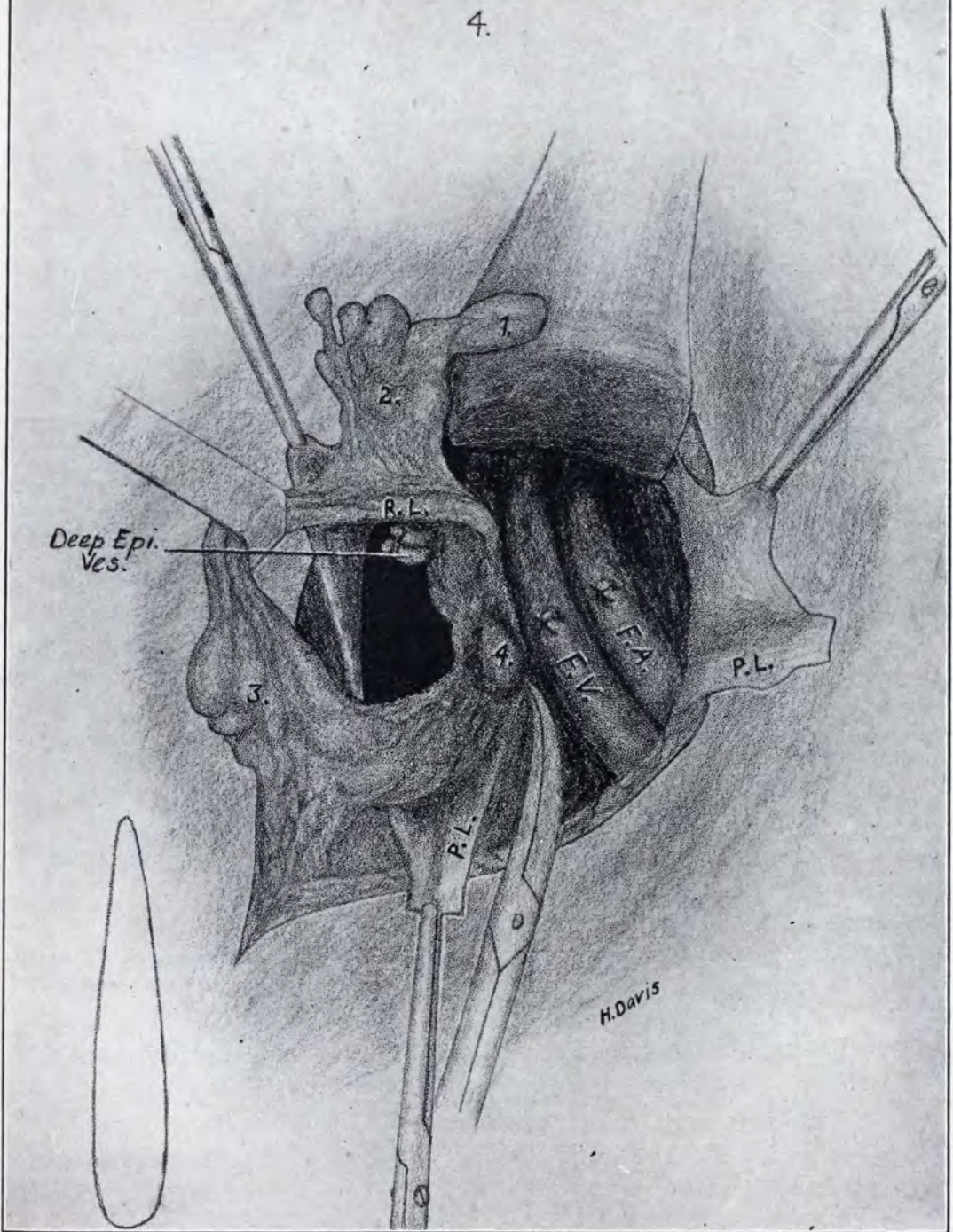


FIG. 95.—BASSET'S OPERATION (step 4). Poupart's ligament with the lower flap of the external oblique fascia has been divided and drawn apart to expose Cloquet's gland just within the femoral ring. The inguinal lymphatics running along the round ligament have been dissected free. The deep epigastric vessels have been ligated and cut near their origin from the external iliac vessels. After resecting the round ligament and shelling out the gland of Cloquet, the whole mass is excised. The ends of Poupart's ligament are then sutured together and the oblique muscle fastened to it as in the operation for inguinal hernia. *P. L.*, Poupart's ligament; *F. A.*, Femoral artery; *F. V.*, Femoral vein; *R. L.*, Round ligament; *Deep Epi. Ves.*, Deep epigastric vessels; (1) Deep inguinal gland (lateral to vessels); (2) Inguinal glands along round ligament; (3) Superficial femoral glands; (4) Deep femoral gland or gland of Cloquet.

but such results are rarely obtained. Janeway reports a few cases of vulval cancer in which the primary ulcer was completely melted away with radium, applied in the form of emanation tubes surrounding the border of the lesion. Bailey has also used radium in the form of emanation tubes, but has recently modified his technic. He has treated 9 cases of cancer of the vulva, varying in size from 2 to 7 cm. in diameter. His technic is described as follows:

"(1) Radiating the primary lesion with filtered radium. (2) Radiating the groin on both sides with filtered radium. (3) Imbedding unfiltered tubes of 0.5 mc. each, in the primary growth, placed 0.75 cm. apart. (4) Dissection of the groin, when necessary, with further radiation by means of buried emanation.

"In our first enthusiasm with the method of embedding many bare tubes of weak strength, we saw such regular and prompt retrogression of the ulcer that it seemed unnecessary to treat the lesion further. However, the marked and early involvement of the glands caused us to turn again to the primary ulcer. This was then treated with filtered radium, but recently the procedure has been reversed and the filtered radium is used, first, to avoid the possibility of spreading the disease by trauma at the time of implantation of the tubes.

Treatment of the Ulcer.—"In inserting the glass tubes, of approximately 0.5 mc. emanation, the tumor is theoretically marked off into square centimeters, and one tube is placed in each area. In larger lesions, from 5 to 7 cm. in diameter, it is well to implant the tubes along the edge of the growth at about three quarters of a centimeter distance and, leaving the needles in place, implant the remainder in parallel lines from the edges. The needle carrier is inserted as near as possible to the base of the ulcer; and before the radium is discharged, the carrier is withdrawn slightly as the style deposits the bare tube (Fig. 96).

"All the cases should be seen after three weeks, and then it will be evident what areas, if any, have been untreated or ineffectively radiated. We find that a second treatment is usually necessary.

Treatment of the Lymph-nodes.—"Although external radiation is usually considered as having only a feeble effect upon glandular metastasis, we have relied upon it to the extent of first treating the groins with a dose of 3,000 mc. hr., at a distance of 4 cm. with the lead 'block,' or with 2,000 mc. hr. with the brass 'block.' After a period of six weeks, or two months, if there is palpable involvement, the glandular areas are dissected on one or both sides. If the lesion is in the upper part of the vulva, the glands of both sides may be involved.

"We have been satisfied with simple dissection of the inguinal chain

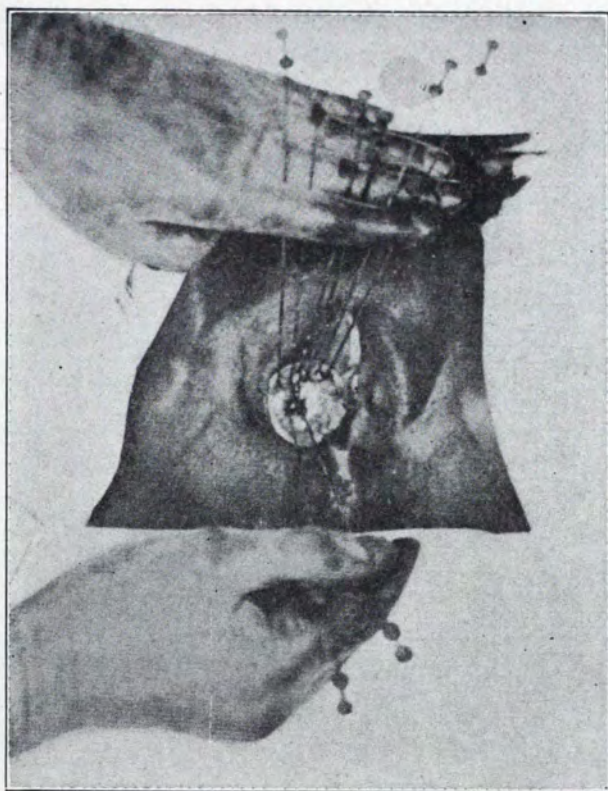


FIG. 96A.—RADIUM EMANATION TUBES BEING IMBEDDED THROUGH TROCHARS INTO THE TISSUE OF AN EPITHELIOMA OF THE VULVA (Bailey, *Trans. Amer. Gyn. Soc.*).

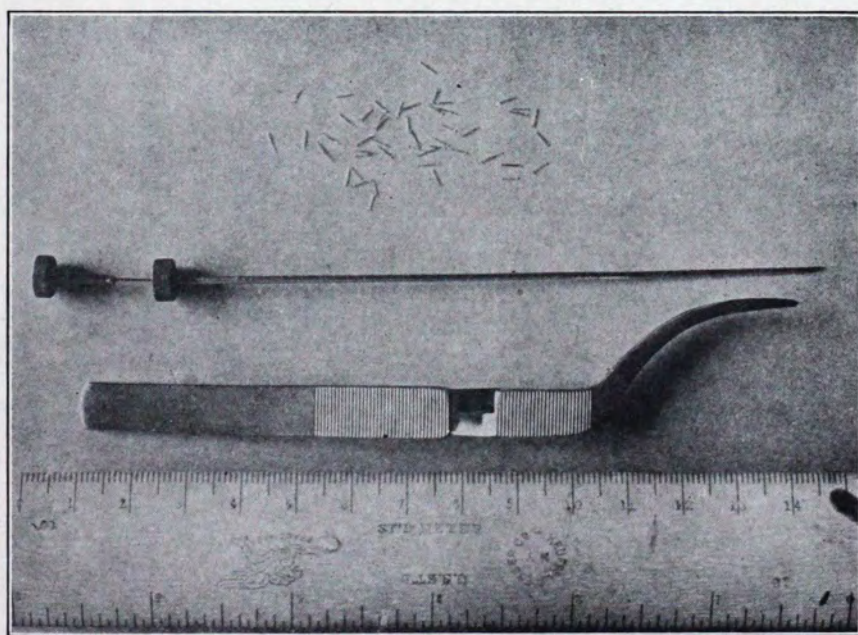


FIG. 96B.—APPARATUS FOR IMBEDDING RADIUM EMANATION TUBES.

with sometimes an additional incision over the femoral areas. On removal of the glands, unfiltered tubes of from 0.3 to 0.5 mc. each are laid 1 cm. apart and, if possible, also into the stump of the lymphatic chain. Bare tubes have been laid in glandular masses entering the femoral ring, and also in glands above Poupart's ligament. If the radium is not laid directly against the vessel, or into its lumen, tubes of 0.3 mc. apparently do not lead to erosion. There have been no secondary hemorrhages in this location and none within two months of such insertion directly through the vaginal vault. We have had only two primary hemorrhages in the pelvis from direct injury by the needle during insertion, and these were readily controlled."

The final outcome of Bailey's cases has not yet been reported. Berven, of Stockholm, reported 15 cases of vulval cancer treated with radium, from 1916 to 1919, five of which were clinically well at the time of publication (1920). Since only 2 had been observed longer than two years, he could not speak of permanent cures. Giesecke's results were even less satisfactory. Of the 32 cases treated longer than five years ago, 5 were treated with radium and X-ray and all 5 died. Of more recent cases, he has had 2 radium cures that have been clinically well for one or two years. Bumm treated 13 operable cases of vulval cancer with radium and obtained a four-year clinical cure in 3 cases. Kroenig and Latzko recommend the use of radium in vulval cancer, but base their opinion on 1 or 2 cases. Warnekros used a combination of X-ray and radium in 4 cases of vulval cancer with good results.

The question of surgery versus radiotherapy was discussed at length by Kehrer in 1918. He came to the conclusion that X-ray alone has given very unsatisfactory results in the treatment of vulval cancer. At times it has seemed to increase the malignancy of the growth. This view is also held by Heimann, Calmann, Winkler and Prochownik. While the results with radium are far from satisfactory, they are better than those with the X-ray, particularly if amounts reaching up to 100 mg. are employed. In general, Kehrer prefers surgical removal of the carcinoma, but when surgical intervention is dangerous because of the age or physical condition of the patient, he believes that radium should be given a trial. If the tumor is refractory to this treatment, operation will have to be resorted to and, in this event, Kehrer believes the previous radium treatment will not complicate the vulvectomy.

My own experiences with X-ray and radium have been equally unsatisfactory. I have seen temporary retrogressions, but no permanent cure, in 6 cases. One of the chief objections to radium treatment in this part

of the body is the excruciatingly painful radium burn produced by the usual method of external application. The insertion of radium emanation tubes of low strength (from 1 to 2 mc.) into the rim of the cancerous ulcer, as suggested by Janeway and Bailey, seems to reduce the external burns to a minimum and is to my mind the best form of application. A total of 20 mc. of radium emanation, in tubes buried in an ulcer from 2 to 5 cm. in diameter, will produce, until the radium is exhausted, 2,640 mc. hr. in all, an amount usually sufficient to cause complete retrogression. I cannot see, however, that this form of treatment has any advantage over a cautery excision, except where the patient's condition contra-indicates operative measures or where the cancer involves the urethra to an extent which makes necessary the removal of that structure. Through the use of radium, the urethral control can be preserved.

Final Results.—The prognosis of cancer of the vulva has always been bad and only slight improvement has been noted since a more radical method of operation has been employed. Death invariably results, unless the tumor with its lymph metastases is completely removed. Relatively few reports concerning five-year results are to be found in literature. Giesecke followed the outcome of 32 cases dating back longer than five years. Ten of these (31 per cent) were clinically well at the end of this period. Goldschmidt tabulated 214 cases that had been observed longer than five years and found only 8 that gave no evidence of recurrence. Rothschild reports, from literature, 4.87 per cent out of 164 cases that were free from recurrence at the end of five years. That a certain number of these cases will have a recurrence even after five years has also been shown in Rothschild's tabulation. He found 8 cases in which the disease returned from five to ten years following operation. Recurrences are three times more frequently found in the lymph glands than in the region of the vulva.

Concerning the 15 cases which I reported in 1917, I can now give the following five-year results. Of these, 1 refused operation; 3 received only X-ray treatment without operation, and died; 2 died within a week after operation; 2 were given only palliative excision of the vulva. Of the remaining 7 cases operated on by radical excision, 3 showed a rapid recurrence and died within the first two years after operation. One was free of recurrence for two years and since then has not been under observation. The remaining 3 whose photographs are shown in Figs. 83, 84 and 97 have all been examined in the course of the past four months and found to be free of recurrence. The oldest of these cases,

with an extensive ulcer involving the entire right labia on one side with implantation metastases on the opposite side, was operated on November 12, 1915. This is sufficient evidence to my mind, particularly if we consider the more recent operative reports, to conclude that cancer of the vulva can be permanently cured in from 30 to 50 per cent of all cases, provided a radical lymph gland dissection is done coincident with the wide removal of the primary growth.



FIG. 97.—EXTENSIVE CARCINOMA OF THE VULVA. After radical excision with lymph-gland dissection, it remained free of recurrence for over six years.

Systematic education of the laity regarding the significance of pruritus and small ulcers about the external genitals will doubtless aid considerably in the early recognition and treatment of the disease. Of even greater importance, however, is the education of the medical profession on this subject. A large portion of cases coming to the specialist have been either wrongly diagnosed or tampered with by the uninformed physician, until the opportunity for permanent cure has slipped away. Cases of vulval cancer are so rare that the average surgeon not infre-

quently is puzzled to know how to handle them properly. I have repeatedly seen cases in which only a partial vulvectomy without gland dissection was done in early cases. This does more harm than good, since it temporarily gives relief from symptoms and allows time for the spread through the lymphatics.

Finally, we may hope for a considerable reduction in the mortality from vulval cancer when the laity and profession awaken to the importance of excising the vulva in the "precancerous" stage of leukoplakic vulvitis. Excision at this time will produce almost 100 per cent cure, and since this form of vulvitis is the most common etiological factor in the production of vulval cancer, we may hope for a material decrease in the death rate from vulval cancer through operation at this early stage.

LITERATURE

- BAILEY. Tr. Am. Gynec. Soc., 1921. 46:319-330.
 BASSET. Rev. de chir., 1912. 32:546-570.
 BERKELEY and BONNEY. Tr. Roy. Soc. Med., 1909. 3:ii, 29.
 BERVEN. Zentralbl. f. Gynäk., 1920. 210.
 BJORKQUIST. Mitt. a. d. gynaek. Klin. d. o. Engström in Helsingfors, 1903. 5:309.
 BUMM. München. med. Wchnschr., 1913. No. 31.
 CULLEN. Tr. Am. Gynec. Soc., 1917. 42:480.
 CZERWINSKY. Kron. lek., 1901. 1025.
 DITTRICH. Am. Journ. Med. Sc., 1905.
 DUVERGEY. Journ. de méd. de Bordeaux, 1912. 42:121.
 EDERLE. Ztschr. f. Geburtsh. u. Gynäk., 1919. 81:110-155.
 FABRICIUS. Monatschr. f. Geburtsh. u. Gynaek., 1914. 40:69.
 FLATAU. Frankfurt. Ges. f. Geburtsh. u. Gynäk., June, 1903.
 FLATER. Inaug.-Dissertation, Heidelberg, 1912.
 GIESECKE. Zentralbl. f. Gynäk., 1921. 369.
 GOLDSCHMIDT. Cited by Ederle.
 HARTMANN. Ann. de gynéc. et d'obst., 1912. 2e Ser., 9:273.
 HEIMANN. Berl. klin. Wchnschr., 1915. No. 47, 1210.
 JANEWAY. Surg., Gynec. and Obst., 1919. 29, 256.
 KEHRER. Monatschr. f. Geburtsh. u. Gynaek., 1918. 48:364.
 KINOSHITA. Med. Gess., Tokio, 1907.
 KROENIG. München. med. Wchnschr., 1913. No. 31.

- KUESTNER. Ztschr. f. Geburtsh. u. Gynäk., 1882. 7:70.
LATZKO. Versamml. deutsch. Naturf. u. Aerzte, 1913.
LEGER. Cited by Ederle.
MACCANN. Cited by Ederle.
MATTHAEI. Zentralbl. f. Gynäk., 1921. 721.
MUELLER, R. Rev. in Zentralbl. f. Gynäk., 1920. 1071.
MUELLER. Dermat. Ztschr., 1921. 35:70.
PERRUCHET. Gynécologie, 1904. No. 2.
PETIT and PICHEVIN. Semaine gynéc., 1897. No. 7, 49.
PROCHOWNIK. Cited by Kehrler.
REUSCH. München. med. Wchnschr., 1915. 62:1607.
ROBERTS. Brit. Journ. of Obst. and Gynec., 1905. 8:349.
ROTHSCHILD. Inaug.-Dissertation, Freiburg, 1912.
ROUVIERE. Ann. de gynéc. et d'obst., 1912. 2e Ser., 9:273.
STEIN. Am. Journ. Obst., 1916. 74:577-596.
STOECKEL. Zentralbl. f. Gynäk., 1912.. 34, 1102.
TAUSSIG. Am. Journ. Obst., 1917. 76:794-813.
Interstate Med. Journ., 1912. No. 12, 19.
Arch. of Dermat. and Syph., 1920. 1:621-635.
WARNEKROS. München. med. Wchnschr., 1917. No. 27.
WINCKEL, v. Pathologie d. weibl. Sex. Org., 1881. 275.
WINKLER Fortschr. a. d. Geb. d. Roentgenstrahlen, 1914. 22:ii, 193.

CHAPTER XVII

OTHER MALIGNANT TUMORS OF THE VULVA

By far the most frequent of the malignant tumors of the vulva is carcinoma, but occasionally we find sarcoma, melanoma and certain mixed-cell tumors, best classified as teratoma. Beside these primary forms, there may be metastases, either by the blood or lymph channels or by direct implantation from tumors within the pelvis or other more distant organs. As examples of this form of metastatic tumor, we find carcinoma, sarcoma, hypernephroma, chorioma, and melanoma.

Teratoma of the Vulva.—Teratomata are rarely found upon the vulva. I have grouped them among the malignant tumors, although they are on the border line. A number of the cases reported as myxoma are probably teratomatous in origin. A true teratoma has been described by Duclaux and Herrenschmidt. This tumor was situated in the right labium majus, the size of a goose egg, with a diverticulum from 5 to 6 cm. long which was lined with intestinal mucosa. Elements springing from the three primary layers were found in other parts of the tumor.

Psyrahe saw a teratoma undergoing malignant change in a girl two years old. In Fromme's case, classified as a fibroma of the vulva, there were present glands, connective tissue, myxomatous tissue and fat. Chavannaz saw a dermoid cyst of the vulva. The only report of such tumors in recent literature was made before the Royal Society of Medicine of London in 1919 by G. Ley. This tumor was in an infant and was noticed at birth by the attending midwife. Ley saw the child when five weeks old and at this time the tumor had grown larger and was in part ulcerated. It sprang from the region of the mons veneris, labia majora and urethra and was 5 by 5 by 2 cm. in size. An attempt to remove it showed considerable involvement of the tissues beneath the skin and the operation ended fatally. The tumor, on microscopic section, was found to contain mesoblastic and epiblastic elements. No positive evidence of malignancy was found.

Melanoma of the Vulva.—Melanotic tumors of the vulva are also very rare, although some of them have doubtless been grouped among the sarcomata. In view of the doubt at present existing concerning

their nature, I have preferred to follow Ewing's example, and group them separately. They usually have their origin in the pigmented nevi which are occasionally found upon the vulva. The majority of the cases reported in literature have shown clinically and microscopically a closer resemblance to sarcoma than to carcinoma. Veit, in his review of the literature up to 1910, includes reports of cases of melanotic sarcoma by Balfour, Marshall, Fothergill, Hertel, Hinselmann, Holzapfel, Jahn, P. Meyer, Piollet, Rosenbaum, Schwarzwaeeller, Torggler, and Wiener.

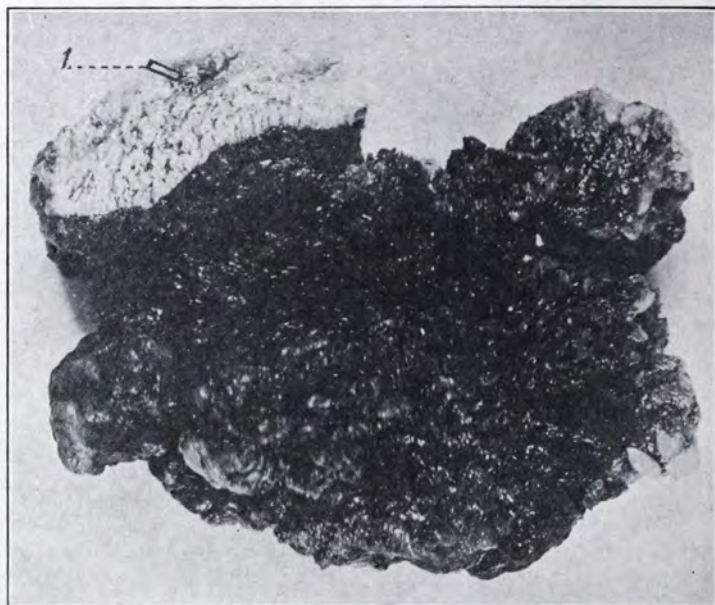


FIG. 98.—MELANOMA OF THE VULVA. Specimen removed at operation showing black masses of the tumor. Operation necessarily incomplete. Section taken from point marked 1, is shown in Fig. 99 (case of Drs. Glasgow and Ives).

Holland, in a review of 52 cases of melanoma, including one which took its origin from about the clitoris, found that 72 per cent appeared in women over fifty years of age and that the favorite site was the labium majus. In 25 out of 31 cases, the inguinal glands were involved. Only 1 case was free from recurrence longer than three years after operation. Recently there have been only a few reports. Labhardt records a melanosarcoma of the vulva developing during pregnancy in the left labium majus. It was removed by wide excision during pregnancy and the child was born at term. One year later there had been no recurrence. In view of the total absence of reports of melanoma of the vulva in American literature, the following case observed by Drs. Glasgow and Ives deserves more detailed mention. I am indebted to Doctor



FIG. 99A.—SECTION THROUGH TUMOR AT EDGE OF NORMAL SKIN. In the right lower part the transition from normal epithelium to tumor is very gradual.

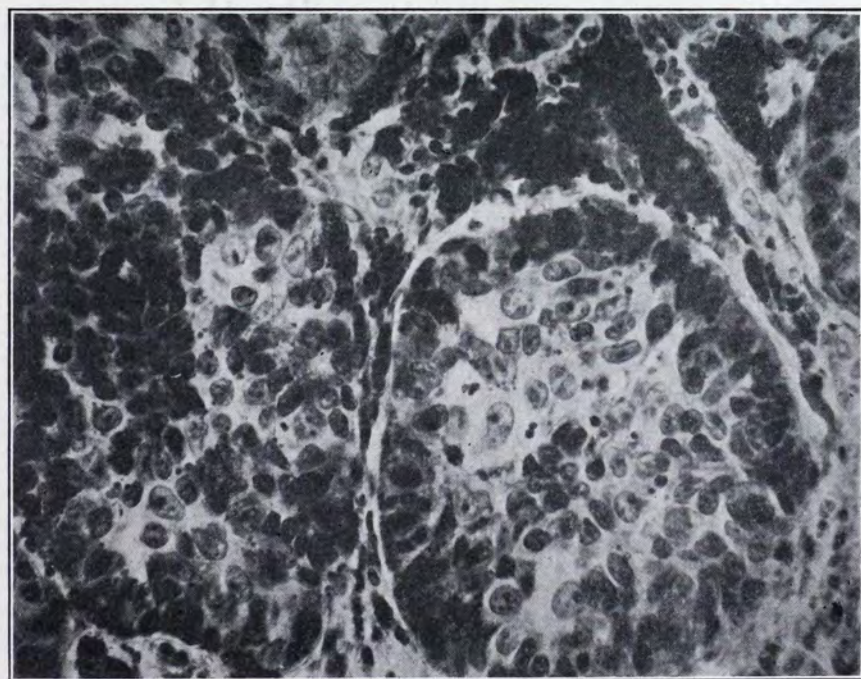


FIG. 99B.—HIGH-POWER PHOTOGRAPH THROUGH SAME SECTION. The epithelial character of the tumor and masses of pigment deposited between the cell nests are shown.

Ives for the privilege of recording this case, and obtaining material for microscopic study.

The patient, a woman of fifty years, had noticed a hard swelling in the region of the labium majus. It was removed but quickly recurred. The recurrent mass was the size of a fist and adherent to surrounding structures. The second operation, consisting of the removal of a piece of overlying skin together with a large mass of the blackish tumor contents, was necessarily incomplete. The patient did not long survive this

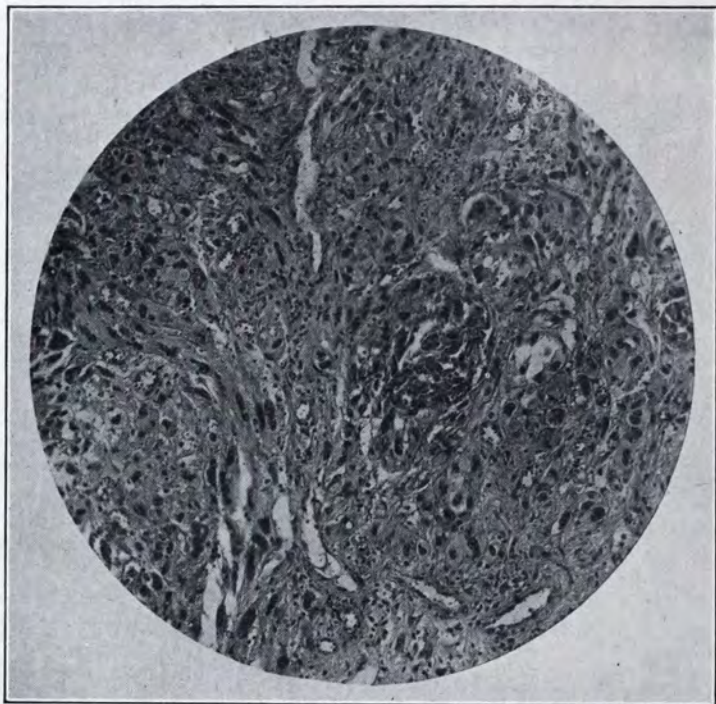


FIG. 100.—SARCOMA OF THE VULVA AFTER RADIUM TREATMENT. (Bailey).

operation. The specimen removed (Fig. 98), consists of a small piece of vulval skin, beneath which lies a blackish, nodular mass, 5 by 5 by 1 cm. in extent. Only over a small area is the skin definitely involved in the growth, but sections taken from this point clearly demonstrate the epithelial character of this tumor. In the low-power microphotograph (Fig. 99), normal skin and melanotic outgrowth are side by side. Under high power, large masses of pigment can be seen lying between the nests of cancer cells.

Sarcoma of the Vulva.—Sarcoma of the vulva is almost as rare as melanoma. It may arise either as a primary growth from the con-

nective tissue of the vulva or by malignant degeneration of a fibroma. In reviewing the literature of sarcoma of the round ligament in 1914, I found record of 2 cases, those of Fuerst and Maly, in which a tumor originating from the pubic end of the round ligament extended into the labium majus and was found on section to be sarcomatous. In both instances, the tumor had remained stationary for many years and then had suddenly grown larger before removal.

In 18 nonpigmental vulval sarcomata collected by Bell, only 1 appeared in a child, 5 in women from eighteen to thirty years, 9 in women from thirty to fifty years and 3 in women over fifty years of age. The usual site of these tumors is the labia. Saenger observed a case originating in the hymen. A sarcoma of the clitoris is reported by Kelly. In 1919, Bevan described the removal of a sarcoma of the labium. Bailey has used radium emanation with good immediate results in a case of sarcoma of the vulva (Fig. 100).

LITERATURE

- BELL. *Journ. Obst. and Gynaec., Brit. Emp.*, 1907. 12:275.
 BEVAN. *Surg. Clin.*, 1919. 3:115.
 CHAVANNAZ. *Journ. de méd. de Bordeaux*, 1897.
 DUCLAUX and HERRENSCHMIDT. *Bull. Soc. anat. de Paris*, May 12, 1905.
 EMANUEL. *Ztschr. f. Geburtsh. u. Gynäk.*, 1903. 48:383.
 EWING. *Neoplastic Diseases*, 1919. 865.
 FISHER. *Ann. Surg.*, 1919. 69:596.
 FROMME. *Monatschr. f. Geburtsh. u. Gynaek.*, 1904. 20:961.
 FUERST. *Arch. f. Gynaek.*, 1886. Part 1, 27.
 HOLLAND. *Journ. Obst. and Gynaec., Brit. Emp.*, 1908. 14:309.
 KELLY. *Operative Gynecology*, 1898. 1:193.
 LABHARDT. *Gynaek. Rundschau*, 1915. 9:380.
 LEY. *Proc. Roy. Soc. Med.*, 1919. Sect. Obst-Gynec., 190.
 LOCKHART. *Journ. Obst. and Gynaec. Brit. Emp.*, 1912. No. 2, 22.
 MALY. *Arch. f. Gynaek.*, 1905. 76:175.
 PSYRACHE. *Thèse de Paris*, 1905. Cited by Veit.
 SAENGER. *Arch. f. Gynaek.*, 1883. 21.
 TAUSSIG. *Surg., Gynec. and Obst.*, 1914. 19:218.
 VEIT. *Handb. d. Gynaekologie*, 1910. 4:724.

CHAPTER XVIII

METASTATIC TUMORS OF THE VULVA

Metastatic tumors are very rarely found on the vulva. They are primarily of two forms:

1. Metastases through the blood or lymph stream.
2. Metastases by implantation.

1. The rarity of blood or lymph-stream metastases in the vulva is to be explained in part by the fact that the tissues of the skin and subcutaneous layer offer poor nourishment for the development of secondary growths. Auburger, in cases of general melanosarcomata of the skin, found no involvement of the vulva. When found upon the vulva, a favorite site for such metastatic nodules is the region surrounding the urethra. In explanation of this, we must bear in mind the free anastomosis existing between the pelvic veins and those situated beneath the pubic arch, near the clitoris and the urethra. Particles from tumors in the left kidney region may be carried by retrograde metastasis through the spermatic vein, which empties directly into the renal vein on that side, and so may be swept down to the pelvic veins surrounding the urethra. Such a form of metastasis seems probable in the case reported by Graefenberg of a hypernephroma situated on the left side of the vestibulum between the clitoris and the urethra. This tumor was the size of a walnut, polypoid, black in color with yellowish spots shimmering through. At autopsy, the primary tumor, the size of a child's head, was found in the left kidney. No other metastasis besides that in the vulva was noted. In Gellhorn's case, the hypernephromatous metastasis was situated just within the introitus under the urethra and, in the other 8 cases reported in literature, the metastases have been vaginal and not vulval.

Metastases in the vulva from chorioma, melanoma and sarcoma have been reported. In a patient on whom I operated for primary sarcoma of the ovary, a metastasis the size of a walnut was found one year later in the periurethral tissues. Semmelink found a metastasis in the vulva following the removal of an ovarian carcinoma, and Graefenberg records

2 cases of multiple metastases about the introitus associated with cancer of the cervix. Since these secondary growths were covered by an intact epithelium, he is inclined to accept for them the interpretation made by Jacobs of subepithelial metastases rather than that of an implantation. In the case reported by Jacobs, the vulval nodules showed an adenocarcinoma similar to the primary growth in the cervix. Hellendahl found several slightly movable nodules surrounding the vestibulum vaginae near the urethra, covered by vulval epithelium that proved on



FIG. 101.—IMPLANTATION METASTASIS IN PERINEUM SECONDARY TO PUDIC NERVE RESECTION. A case of advanced vulval carcinoma.

section to be adenocarcinoma. The primary tumor in this woman lay in the body of the uterus.

2. *Implantation metastases* in the vulva have been occasionally noted, following Schuchardt's paravaginal operation for cancer of the cervix. In this operation, a deep perineotomy is done and secondary nodules have been found to develop in the vulval incision. Jaschke interprets these secondary growths in the vulval incision as direct implantations from the cervical tumor at the time of operation. A beautiful illustration of such an implantation metastasis can be seen in Fig. 101. In this patient, an advanced cancer of the vulva and urethra caused pain in the left vulval region, so severe that I decided to resect the pudic nerve on that side at its point of exit beneath the gluteal muscles. Two months after

this resection, a nodule appeared at the site of this operation that proved, on section at autopsy, to be carcinomatous.

A further instance of implantation metastasis in the vulva followed cervical cancer and is worthy of record. Microscopic sections (Fig. 102) of the two small papillary growths at the introitus show the typical structure of an adenocarcinoma, but, unlike the cases of Jacobs and Hellendahl, the tumors were not covered by surface epithelium so that the more rational interpretation of their origin is a direct implantation,

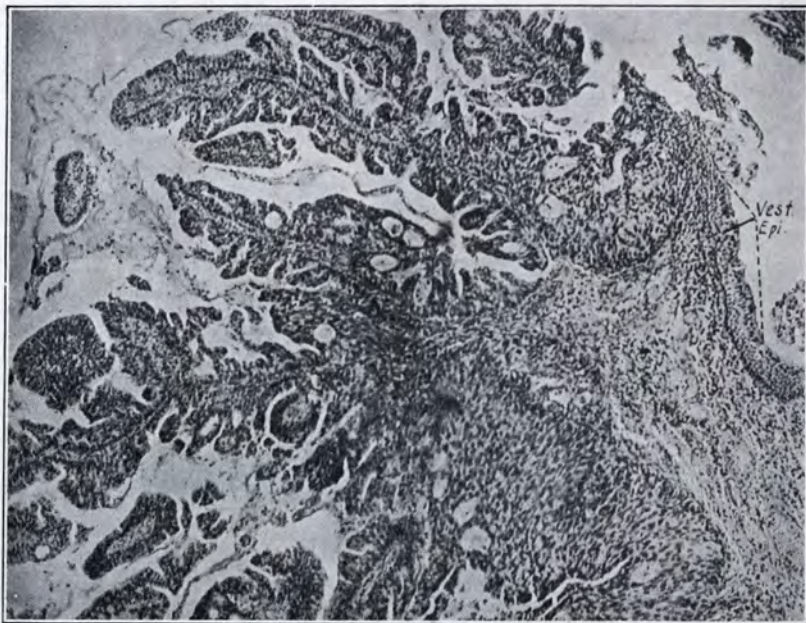


FIG. 102.—SECTION THROUGH IMPLANTATION METASTASIS OF AN ADENOCARCINOMA OF THE CERVIX UPON THE VESTIBULUM ADJOINING TO THE MEATUS OF THE URETHRA. The normal vestibular epithelium can be seen with the papillary adenocarcinoma growing out from its edge. *Vest. Epi.*, Vestibular epithelium.

rather than a lymph-stream metastasis. This patient was a woman fifty-four years old, multipara, with a history of blood-tinged vaginal discharge for six months. Examination showed a cervical crater with indurated edge and infiltrated parametria. Three small red papillary nodules were seen at the vestibulum, below and to the left of the urethra. They were excised with the cautery and radium was applied to the cervix itself.

Direct contact implantations in malignant tumors of the vulva are not at all rare. In several of our cancers a small secondary cancer was found upon the labia on the side directly opposite the primary growth.

LITERATURE

AUBURGER. Cited by Graefenberg.

GRAEFENBERG. Virchow's Arch. f. path. Anat., 1908. 194:17.

GELLHORN. Am. Journ. Med. Sc., 1918. 156:94.

HELLEND AHL. Beitr. z. Geburtsh. u. Gynaek., 1902. 6:422.

JACOBS. Monatschr. f. Geburtsh. u. Gynaek., 1898. 8:238.

JASCHKE. Cited by Graefenberg.

SEMMELINK. Cited by Graefenberg.

STEIN. Am. Journ. Obst., 1916. 74:577.

PART IV
SPECIAL CONSIDERATIONS

CHAPTER XIX

SKIN DISEASES OF THE VULVA

A number of the pathologic conditions described in previous chapters might properly be grouped under this general head of skin diseases. I have preferred, however, to reserve for this chapter only those conditions, usually associated with skin lesions in other parts of the body, that are primarily of dermatologic interest.

Animal Parasitic Diseases.—*Scabies* is only rarely found about the external genitals. This disease is caused by a small parasite that burrows its way deeply into the skin and produces intense itching. Practically always similar lesions will be found in the webs of the fingers, on the palms, the axillae, the flexures of the wrists, and the nipples.

Pediculosis of the pubis is the most common skin disease of the vulva due to parasites. It is caused by the crab louse. These animals lie close to the skin, clinging to the pubic hairs. They secrete from their salivary glands a peculiar bluish pigment that stains the skin around which they are located, producing a spot known as "macula cerulea." These spots are more noticeable in women with fair, delicate skin. The stains or spots disappear quickly after removal of the pediculi. Intolerable itching is produced by these lice, so that excoriations from scratching are usually found. Where the pediculi are few in number, they may escape detection. In such cases, a search for the typical ova on the hair shafts is usually successful. The best treatment is to wash the parts thoroughly with soap and water and then twice daily apply a 1-500 bichlorid of mercury solution for several minutes.

Oxyuris vermicularis, or pinworms, are often found inhabiting the rectum of little children. At night they come out and invade the vagina, setting up a distinct vulvovaginitis that may at times be taken for a gonorrheal infection of these parts. Pruritus limited to the hours of night in little girls should arouse suspicion of this condition.

The peculiar lesions of the vulva produced by *Filaria sanguinis* in tropical countries have been described under chronic hypertrophic vulvitis.

Vegetable Parasitic Diseases.—*Mycotic vulvitis* is a low-grade inflammatory condition of the vulval skin due to infection with *Oidium albicans*, the "Soor-pilz" of the Germans. Similar infection in the mouth is commonly termed thrush. Littauer found that, of the various fungi about the vulva, the *Oidium albicans* was the most frequent cause of



FIG. 103.—MYCOTIC VULVITIS OF A SOMEWHAT UNUSUAL TYPE. A fungus resembling *oidium albicans* was found in smears and in culture in this case (Engman).

inflammation. Pregnancy seems to predispose to such a vulvitis. The lesions are usually very superficial erosions of the skin covered by a thin membrane that can be lifted off. The vestibular epithelium, on account of its more delicate character, is most frequently the site of these multiple whitish or bluish-white patches. Similar patches are usually found in the vagina. Simple boric acid douches, together with the application of 20 per cent boroglycerin, will usually give prompt

relief. Occasionally we find a somewhat different type of mycotic vulvitis, due also to *Oidium albicans* or a closely related fungus, and at times associated with diabetes. Engman has recently reported a case (Fig. 103) in which the entire vulva, perineum, and peri-anal regions were inflamed. Pruritus was present but not marked. The condition resembled that of *tinea cruris*. The edges of the lesions were undermined and finely papular at the border, while the scaly center seemed to lie below the surface of the normal skin. In this case, similar lesions were found beneath the overhanging breasts. Cultures showed a fungus belonging to the genus *Botrytis*.

In an epidemic of 23 cases of *aphthus epizoötica* of lips and mouth (so-called foot-and-mouth disease), Chmelar found cases in which the vulva was affected. All these cases were in girls ranging from sixteen to nineteen years of age who were engaged in taking care of cattle or horses. On both labia, which were reddened and swollen, were seen numerous vesicles, some of which had burst and secreted profusely. The diagnosis was based on the history of an epidemic and the exclusion of other factors. Lukewarm sitz-baths, followed by application of calomel powder, affected a cure in from three to five days.

Tinea cruris, or ringworm of the groin, is a relatively common disease but is less frequent among women than men. Pusey states that when tinea appears upon the vulva it may spread as an inflammatory lesion to the vestibulum. It begins like ordinary patches of ringworm of the body but, owing to favorable conditions for growth, it is accompanied by acute inflammatory symptoms. An acute, slightly infiltrated, papulovesicular dermatitis results. The sharp circinate, slightly raised borders are characteristic. At times, typical ringed lesions are seen in addition as satellites of the original trouble. It may extend down the thigh, over the abdomen and upon the nates. The fungus producing this special form of ringworm is the *Epidermophyton inguinale* and differs from the ordinary trichophyton of ringworm as shown by Sabouraud. The treatment usually recommended is the free application twice daily of a solution of sodium hyposulphite (1 dram to the ounce).

Actinomycosis of the vulva is a rare disease. Bongaartz, Lieblein and Trapl have reported such cases. Trapl's patient was a nineteen-year-old peasant girl, who had noticed a swelling in the right labium majus for the past year. She was eight months pregnant and examination showed that the labial mass extended from the posterior and lateral vaginal wall to the right tuberosity of the ischium. It showed fluctuation at several points and fistulae had developed from which came

a purulent, yellow, granular discharge. Typical ray-fungi were seen microscopically in this discharge. The vagina was so obstructed by the swelling that only one finger could be introduced. At term a cesarean section was performed, followed by administration of salvarsan. In general, the prognosis of actinomycosis is bad.

Exudative Dermatoses.—*Herpes genitalis*, or herpes sexualis, is occasionally found in women coincident with the onset of menstruation. The blisters are rarely more than three or four in number, situated about the mucous surfaces of the labia, and cause but little discomfort. There may be a burning and itching sensation at the onset. The vesicles quickly rupture as a result of maceration, and leave an abraded surface beneath. If not infected, they heal over in a few days and leave a small red spot for a short time. If infection occurs, a small ulcer forms at the site of the blister and healing is then somewhat delayed. Bettmann finds herpes, occasionally, following operative procedures. Herpes genitalis does not differ essentially from herpes facialis, the ordinary fever blister. There seems to be some predisposition on the part of some individuals to the formation of these blisters. No direct association with venereal diseases has been proved but the blisters are often found after coitus. Where an ulcer forms at the site of the blister, it is superficial, and so can usually be distinguished from venereal lesions such as chancroids. The best treatment for herpes genitalis is the application of a small wet dressing of weak bichlorid or boric acid solution. According to Pusey, the best way to prevent recurrence of these blisters is to wash the genital region daily with some astringent solution such as from 5 to 10 per cent tannic acid solution or from 0.5 to 2 per cent zinc sulphate solution.

Herpes zoster is very rarely found about the vulva. Ugon has recently reported a case of herpes zoster in a child eight years old. The blisters appeared about the buttocks and about the anus and vulva. The lumbar puncture fluid showed a cellular reaction. There was no spontaneous pain. In 1915, I had occasion to observe a case of herpes zoster in a woman seventy-four years old, in which the lesions followed the path of the pudic nerve on the left side, running from the edge of the gluteus muscle parallel to the pubic ramus up to the region of the prepuce. There were six or seven vesicles over this area and they ran the typical course of zoster. The pain was so severe that narcotics were required for several days. The diagnosis of hemorrhage into the corresponding root ganglions with resulting herpes zoster was confirmed by Dr. W. W. Graves. Complete healing did not take place for three weeks,

Pemphigus usually involves large portions of the body and is not limited to the genital region. Occasionally, however, as in the case shown in Fig. 104, the lesions may be most pronounced over this area and convert it into a mass of blisters, bullae and ulcers. Where large areas are involved, the constitutional symptoms are pronounced and death may occur from exhaustion or some intercurrent malady.



FIG. 104.—PEMPHIGUS OF THE VULVA. Extensive lesions elsewhere on the body (Barnard Free Skin and Cancer Hospital).

Dry Scaly Dermatoses.—A few cases of *lichen planus* of the vulva have been described in dermatologic literature. In the cases of Brocq and Balzer, the diagnosis of lichen planus was based on the typical branching lesions with whitish nodular buds, found about the inner surface of the thigh as well as the vulva. In two of these cases, a leukoplakic vulvitis in the stage of kraurosis was also present. Brocq believes that the two conditions were independent of each other, though in both there was a predisposition to form upon an atrophic skin.

Psoriasis is only exceptionally located about the vulva, and I know of no report where lesions elsewhere were not also observed. In the case illustrated in Fig. 105, it will be seen that almost the entire vulva is involved in the psoriasis. Psoriasis comes and goes without apparent reason, running a chronic course for many years. The most common

sites of the lesion are the elbows and knees and along the extensor surfaces of the extremities, as well as over the trunk. The subjective symptoms of psoriasis are slight, the diagnosis based primarily on the distribution, the chronicity and the scaly white, sharply defined, round lesions. Sabouraud states that the treatment of psoriasis about the vulva is especially difficult, owing to the sensitiveness of the surrounding mucous membranes. Engman advises the application of 5 per cent

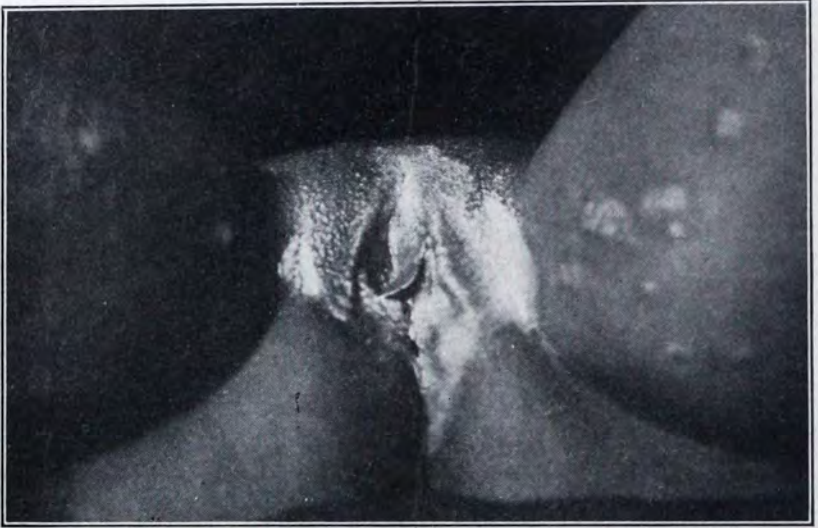


FIG. 105.—PSORIASIS OF THE VULVA. This patient also had typical lesions of psoriasis about the elbows (Barnard Free Skin and Cancer Hospital).

ammoniated mercury and 5 per cent salicylic acid in zinc oxid ointment.

Infectious Dermatoses.—*Impetigo contagiosa* frequently starts about the genital creases among infants, especially in hot weather, if the child is kept covered with too much clothing. It may start on the basis of an intertrigous vulvitis. There may be only a few discrete pustules over the pubic region, but more often we also find pustules due to auto-inoculation scattered over other parts of the body. In extensive cases, especially in newborn babies, the toxemia may be considerable and, in a few instances, has led to death. Since the pustules are due to either streptococcus or staphylococcus infection, impetigo contagiosa may become a serious menace in the care of maternity cases. It occasionally spreads like wildfire through the nurseries of maternity institutions. About 75 per cent of impetigo occurs in young children. The treatment consists in an application of 5 per cent silver nitrate solu-

tion to the open pustule, associated with the frequent use of weak alcohol solution applied to the surrounding skin. In babies, special care is necessary to prevent undue perspiration with its attendant maceration of delicate skin.

Molluscum contagiosum of the genitals has been described by J. R. Goodall. His patient, a woman twenty-five years of age, was five months pregnant when her husband showed typical molluscous growths upon the penis. She was warned against sexual contact. Two months postpartum she came to the doctor with nineteen distinct molluscous ulcers upon the left labium majus. No lesion appeared either upon the vagina or the cervix. Later the child also contracted the disease. Occasionally molluscum contagiosum produces marked changes about the vulva, as in the twelve-year-old girl demonstrated by Petit. Pusey states that the genitals are a common site for this disease. The disease is only mildly contagious and the incubation period may be from two weeks to several months. Molluscs resemble tumors of the sebaceous glands. Typical molluscum bodies are always found on microscopic section. They form lobulated epithelial tumors with a constriction at the neck. The tumors have a central opening from which a cheesy mass can be expressed without entirely emptying the nodule. The treatment consists in scarification of the molluscum lesions to permit the thorough inundation of the lesion with fresh blood.

Other Skin Diseases.—*Eczema* in various forms has been described as appearing upon the external genitals in women and is often associated with diabetes (see Chapter VII). Fat women are especially subject to this disease. *Seborrhea* may be so pronounced in some women as to coat the entire labial surfaces with a smeary, almost colorless, nonpurulent, discharge. Onanism is said to be the main factor in the production of such excessive activity of the sebaceous glands.

LITERATURE

- BETTMANN. Deutsche Arch. f. klin. Med., 1906. Part 3, 88.
BONGARTZ. Deutsche med. Wchnschr., 1902. No. 41.
CHMELAR. Časop. lék. česk., 1921. No. 1.
ENGMAN. Arch. of Dermat. and Syph., 1920. 1: 370-374.
FISCHER. Wien. klin. Wchnschr., 1907. No. 15.
GOLLINER. Deutsche med. Wchnschr., 1916. No. 50.
GOODALL. Am. Journ. Obst., 1908. 58:453.

- LITTAUER. Zentralbl. f. Gynäk., 1905. 29:871.
MANN. Am. System Gynecology, 1887. 1:501-507.
TRAPL. Zentralbl. f. Gynäk., 1913. 37:1898.
UGON. Abstr. Journ. Am. Med. Assoc., 1921. 76:1865.
VEIT. Handb. d. Gynaekologie, 1910. 4:588.

CHAPTER XX

NERVOUS AFFECTIONS OF THE VULVA

Under nervous affections of the vulva may be grouped certain diseases that give rise to little pathologic changes and are primarily associated with irritation of the nerves and nerve endings in the vulval skin. Three of these deserve special consideration :

1. Pruritus vulvae.
2. Vaginismus.
3. Clitoris crises.

Pruritus Vulvae.—In the preceding chapters, pruritus has frequently been mentioned as a predominant symptom of certain vulval diseases. If we now take up the subject of pruritus as a disease in itself, this will require some explanation. There are many instances in which pruritus has existed for so long a time that, even where definite cause for the itching has been found and corrected by appropriate treatment, the itching habit, so to speak, still persists. In another group of patients, the most careful search fails to reveal any explanation for the pruritus. Here we may assume, following Veit, that the primary cause of the pruritus has been spontaneously cured, but that the skin changes resulting from pruritus, together with the increased nervous irritability, have led to a persistence of the affection. In a third group, we must assume a definite neurosis or psychoneurosis. In this last-named group we usually find itching in other parts of the body. Whether, therefore, the cause is to be found in local sources of irritation or in some derangement of the nervous system, the essential factors in the disease are the changes produced by the itching itself in the vulval skin, together with the undermining of the nervous stability of the individual by the prolonged irritation of the nerve endings in the vulva.

There has been much confusion in gynecological literature because this differentiation between pruritus the *symptom* and pruritus the *disease* has not been emphasized. In the present chapter, therefore, I shall not include any further consideration of diabetic vulvitis, of my-

cotic vulvitis, or of leukoplakic vulvitis. In all three of these diseases, a pathologic condition is present that, when removed, leads to complete relief from symptoms. Neither do I feel justified in including the milder forms of pruritus of the vulva that may be found associated with cervical catarrh, cancer of the cervix, a cystitic urine or chronic constipation. The essential point, no matter what may be the particular cause, is that the pruritus shall have existed for a considerable period of time. To illustrate my point: We find commonly associated with a cervical catarrh, a considerable amount of itching. If douches are taken and local treatment given, the pruritus disappears. If, however, no such treatment is given, the continued scratching resulting from this pruritus leads, in the course of time, to definite lesions in the skin of the vulva and increased nervous irritability of the patient. At this stage, treatment of the cervical catarrh will fail to result in a cessation of the pruritus. From being merely a symptom, the pruritus has become a disease and now requires special treatment directed to the healing of the irritated skin and to a lowering of the hypersensibility of the patient. It is, therefore, the chronic form of pruritus that produces the disease which we term "pruritus vulvae."

Among the etiological factors in the production of pruritus of the vulva that have not as yet been mentioned is persistent jaundice. The cause of the itching here lies primarily in the condition of the blood, and the pruritus in these cases is usually limited to the vulval regions. *Trichomonas vaginalis* produces an acute vesicular vaginitis with profuse, irritating discharge that, according to Littauer, usually causes marked pruritus of the vulva. Masturbation and unsatisfied attempts at coitus have also been mentioned by some as a cause of pruritus. Jaschke, in a few instances, found pruritus due to a retroflexed pregnant uterus. I doubt, however, whether in these cases the skin and nerve lesions are sufficiently pronounced to justify their inclusion as true pruritus vulvae.

Pathology.—The skin of the vulva in this disease has usually a typical leaden gray color. In some individuals, however, the color may be more of a grayish-white. Even more characteristic is the consistence of the affected skin. It is flabby and resembles a piece of thin leather. On picking it up, folds are formed that remain unchanged for a short time. Excoriations are invariably present, even where patients have tried to avoid scratching themselves. These have the typical parallel streaks resulting from injury by the finger nail. Two areas are most frequently involved in pruritus: (1) the perineal skin together with the

margins of the anus; (2) the region of the clitoris and inner surface of the labia minora.

Microscopically we find, as seen in Fig. 106, the picture of an inflammatory parakeratosis. The following changes will be noted passing



FIG. 106.—SECTION THROUGH SKIN IN A CASE OF PRURITUS OF THE VULVA. The histologic characteristics are the parakeratosis, increased eleidin layer, the acanthosis, and the inflammatory changes in the dermis. The elastic tissue is normal (Weigert stain).

from without inward: (1) an increase in the size of the keratin layer, with numerous nuclei still present in the cells of this layer; (2) an increase in the number and size of the eleidin cells; (3) a marked irregularity in the malpighian layer, due to hypertrophy of the papillary layer of the corium; (4) infiltration with lymphocytes and a few polymorphonuclear leukocytes in the corium directly beneath the epithelium.

Symptoms.—The predominant symptom is, of course, the persistent itching. This is most pronounced at night. At first the sensation is more one of burning, but, as the disease advances, the itching sensation predominates. The itching leads to scratching, and the scratch wounds lead to increased itching. Thus a vicious circle is produced that steadily increases the severity of the symptoms. Loss of sleep inevitably results and with it necessarily comes an increase in the nervous irritability of the patient leading to increased desire to scratch and a lowered resistance to control this desire. So pronounced an effect does this produce in time on the mental equilibrium of the sufferer that instances have been reported where it has led to suicide and to permanent mental derangement in the form of melancholia. Such patients naturally avoid associating with their fellow beings because of the fear that they may offend the laws of decency in the presence of others. These poor creatures are indeed to be pitied, since hardly a moment of their lives is free from the torture of this itching.

Treatment.—The multiplicity of remedies that have been suggested for the relief of pruritus vulvae is sufficient indication of the difficulty of accomplishing a cure. The first thing to do in all cases is to search for the cause of the irritation. Sometimes this can be eliminated by medicine and diet as in the case of jaundice, diabetes, pinworms or cystitis; at times it will require surgery as in leukorrhea, or hemorrhoids. But even when the cause of the pruritus has been discovered and healed, some degree of itching remains in all instances of this disease.

The treatment resolves itself then into: (1) antipruritic salves and lotions; (2) medicinal and hygienic measures; (3) surgical procedures; (4) radiotherapy.

1. Innumerable combinations of lotions and salves have been suggested for the relief of the itching, but usually the effect is only temporary. Cocain, carbolic acid, and menthol in various combinations have been suggested. Liquor carbonis detergens is recommended by dermatologists. Painting the surface of the affected skin with 10 per cent tincture of iodine and repeating this in four days is the treatment adopted by Heusler Edenhuizen with success. If the skin is abraded, however, the application of iodine must be very painful. Eyraud Dechaux strongly recommends cotton soaked in hot acetic acid solution placed against the vulva for several moments to relieve the itching. Jaschke has had success with 3 per cent carbolated petrolatum applied to the skin after it has been thoroughly washed with soap and water. I have found the following ointment gives relief:

R Anesthesin	3
Ung. zinci oxid	15
Petrolatum q.s. ad	30

2. *Internal medication* in the form of bromids, or some of the hypnotics such as sulphonal, veronal or trional, is usually necessary to combat the insomnia and lower the nervous irritability. Where the pruritus comes on at the menopause, hypodermics of corpus luteum extract occasionally give relief. In the milder cases, sitz-baths are soothing. Since even the slightest amount of vaginal discharge increases the pruritus, douches of .25 per cent lysol solution are helpful. Diet has but little influence except that it is well to eliminate spiced food, coffee and tea. Since itching is worse in stout women, it is better to reduce weight as much as practicable. By wearing cotton gloves at night and trimming the finger nails as short as possible, the patient can prevent injury from scratching and so hasten the healing of the irritated skin.

3. Surgical measures have as their primary object the lowering of pain sense in the nerves leading to the vulva. Stoeckel used epidural sacral injections of cocain or its derivatives and obtained relief in a few cases. Holland also reported success with this treatment. His technic was as follows: epidural injection of 20 c.c. of normal salt solution containing 0.15 gr. novocain and one drop of suprarenin; nine days later, injection of 40 c.c. of 1-100 novocain solution, and in another nine days a second injection of the same 1-100 solution. He had reasonable success in 6 cases. Schubert is not very enthusiastic over this method of treatment; it gave only temporary relief in his hands.

Resection of the pudic nerves has been employed by Mauclaire, in France, and by Kelly, in this country, for the relief of obstinate cases of pruritus. Mauclaire's technic was to resect the internal pudic nerve at the point where it emerges from the pelvis. A second incision along the ascending branch of the ischium exposed the superior perineal branch of the pudic nerve which was also resected. The procedure was done on both sides and resulted in a cessation of the pruritus. He did not obtain complete anesthesia of the vulva by this procedure. Siebourg, fearing trophic disturbances and paralysis of the sphincter by resecting nerve trunks, directed his attention to lowering the sensibility of the nerve endings in the skin. The technic of this method is practically the same as that employed in producing local anesthesia. At first he used weak solutions of cocain but later found that physiological salt solution to the amount of one third of a liter produced better results. Wederhake employed a sterilized solution of human fat for such subcutaneous

injections. In many instances, the excision of the entire area of irritated skin has given permanent relief. Where the pruritus is limited to a relatively small area, such a partial vulvectomy is attended with a high percentage of success. However, the cases thus far reported, treated by these surgical measures, are too few in number to justify any definite conclusion.

4. Radiotherapy has given relief in a greater percentage of cases than any other form of treatment. X-ray has been more extensively employed than radium for this disease and, owing to the greater diffusion of rays, is probably more effective. Violet rays were used by Rotschuh, and Vandeveld reports cures in a few cases by the use of the Kromayer quartz lamp.

The beneficial effect of X-ray therapy is probably due to the destruction or deadening of sensibility in the nerve endings and those special centers of sensation, the Vater-Paccini bodies.

The technic employed by Schlein consists of the use of X-ray tubes, approximately 10 to 12 Wehnelt in hardness, filtered through 3 mm. of aluminum. Twice a week one half an erythema dose is given until a total of from 10 to 15 treatments have been reached. After a pause of from two or three weeks, this course of treatment is repeated, if necessary. He reports 11 cases in which cure was effected, but emphasizes the necessity of persistent treatment in obstinate cases. One of his patients required thirty treatments with X-ray before relief was obtained. It is of some importance that the labia be properly retracted when the X-ray is applied. Freund has recently devised a special retractor for this purpose. Although X-ray therapy is the best method of treatment in severe pruritus vulvae, it is far from specific for this disease and it remains for further investigation to determine how permanent are the results produced.

Vaginismus.—There occurs at times a peculiar spasm of the muscles of the pelvic floor, termed vaginismus, associated with abnormal conditions about the introitus. This spasm usually comes on when intercourse is attempted and will, in such cases, prevent normal sexual relations. While this spasm is often found in high-strung nervous women, the nervous condition of the individual is not the only cause. Usually the patient gives a history of severe pain at the first attempt at intercourse. The hymen may or may not have been ruptured. At the next attempt, the fear of pain on the part of the wife leads to rigidity of the vaginal muscles, thus preventing entrance of the penis into the vagina and so tending to further injury of the external genitals. Such

repeated injuries result in the formation of sensitive granulomata about the vestibulum. Another occasional factor in the production of this nervous spasm is the incomplete performance of the sexual act by the husband. Cases of vaginismus must not be confused with those in which a thick fleshy hymen obstructs intercourse. In the latter case, an incision of the hymen will suffice to give complete relief, since the condition is usually not associated with any nervous spasm.

Vaginismus is an occasional cause of sterility. On examining a patient for this condition, we ordinarily find small abrasions about the external genitals. Occasionally we may find a caruncle of the urethra as the chief cause of painful intercourse. It is almost impossible to examine such patients without an anesthetic, either local or general. Merely the introduction of one finger into the vagina will produce a tetanic contraction of the pelvic floor muscles, giving rise to severe pain.

The *treatment* of vaginismus is usually surgical. In some cases, however, after cocainizing the external genitals, a small speculum can be introduced and, in succeeding treatments, larger instruments can be employed until a dilator, approximately 4 cm. in diameter, can be introduced without causing any spasm. It is well to allow the patient to use this dilator once or twice herself so as to gain the necessary confidence. Only after this course of treatment has been completed, a period requiring from three to four weeks, should an attempt at intercourse be permitted. Preceding such an attempt, 10 per cent novocain ointment should be freely applied to the vulva and sufficient time allowed (from ten to fifteen minutes) for anesthesia to take place. The patient should take from 30 to 40 grains of bromids, two hours before retiring, to promote relaxation.

More certain and quicker in its results is operative treatment. This consists of a sagittal incision through the perineal body, with an extension to either side, forming the letter "Y." The deeper structures are now sutured transversely and the posterior vaginal wall, after being freed from the underlying tissues, is drawn over the edge of the perineum and sutured to the base of the perineal cut (Fig. 107). We thus have formed artificially a condition somewhat resembling a perineal tear at labor. It is well at the same time to dilate manually the entire vaginal tube, so as to stretch the attachments of the levator muscle and thus reduce its power of contraction. In the majority of cases, this operation will be sufficient to prevent further vaginismus. Occasionally we deal with highly neurotic women. Here some form of psychotherapy as suggested by Walthard must be employed. Where the vaginismus is in

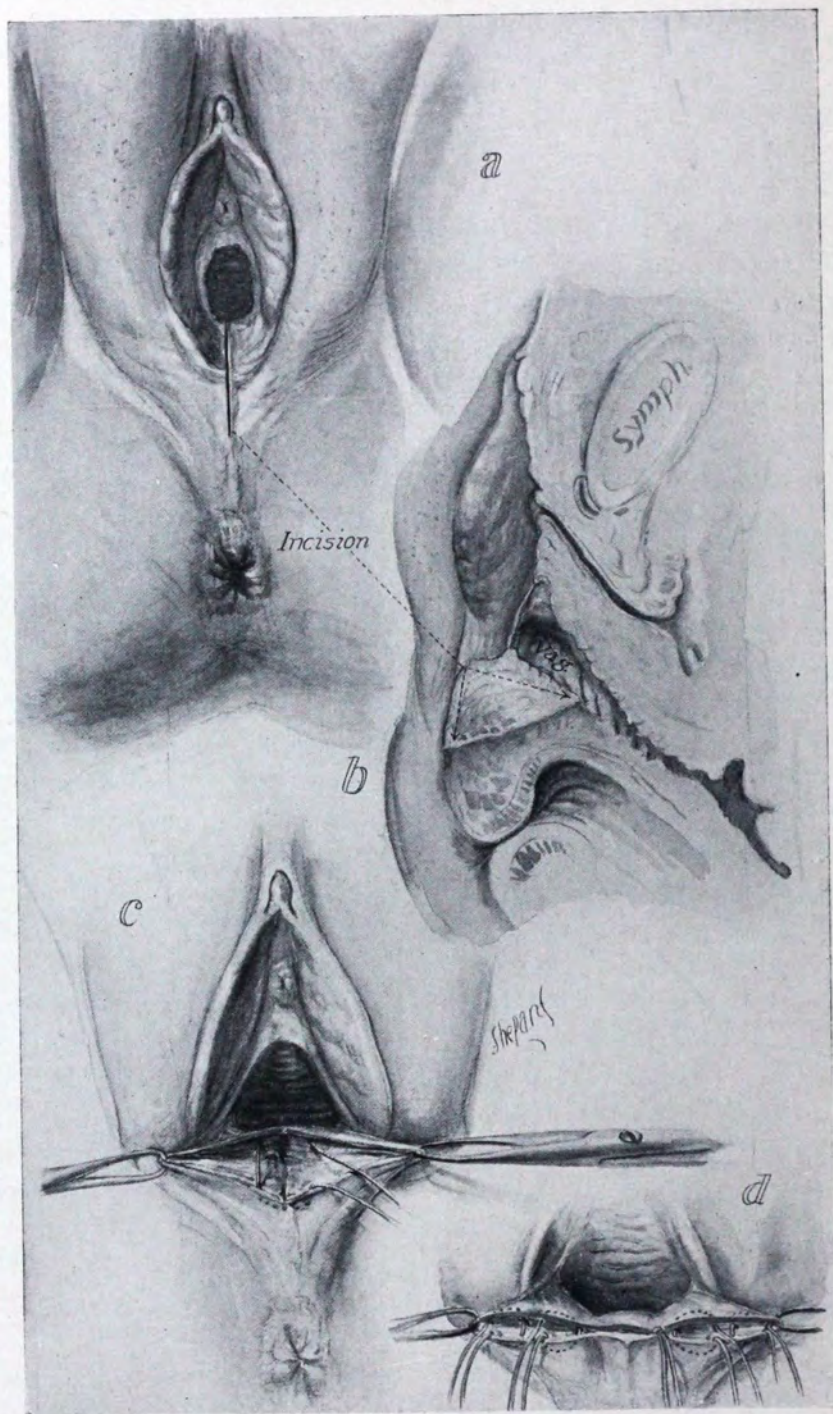


FIG. 107.—OPERATION FOR VAGINISMUS. It will be seen that by making a sagittal incision deep through the perineal body and then sewing it up in a transverse direction, the vaginal outlet is considerably widened (Watkins, *Surgical Clinics of Chicago*).

large part due to an incomplete erection or a premature discharge of semen on the part of the husband, appropriate treatment must be given to him for this condition.

Clitoris Crises.—Just as we have crises in the stomach and various other parts of the body, associated with *tabes dorsalis*, we may also have what is termed a clitoris crisis. This condition was noted by Koester in a patient suffering from *tabes*, who was unable to walk and had girdle pains and crises in the larynx and stomach. This patient, upon retiring, was seized with a feeling of sexual desire, with erection of the clitoris and expulsion of a large quantity of vulvovaginal secretion. The phenomenon was only to a slight degree controllable and was associated with a partial incontinence of urine. It was at times repeated and left the patient exhausted. Besides Koester's description of this condition, I find no mention of it in literature.

LITERATURE

- EYRAND-DECHAUX. Morgagni, February 5, 1915.
 HEUSLER-EDENHUIZEN. München. med. Wchnschr., 1916. No. 16.
 HOLLAND. Dermat. Wchnschr., 1916. 63:870.
 JASCHKE. Gynaekologie. Cited by Menge-Opitz.
 KELLY. Operative Gynecology, 1:198.
 KOESTER. München. med. Wchnschr., 1901. No. 5.
 LITTAUER. Zentralbl. f. Gynäk., 1923. 47:25.
 MAUCLAIRE. Abstracted in Intern. Abstr. Surg., June, 1918. 369.
 ROTSCHUH. Deutsche med. Wchnschr., 1906. No. 40.
 SCHLEIN. Zentralbl. f. Gynäk., 1921. 1607-1617.
 SIEBOURG. Cited by Schlein, 1613.
 STOECKEL. Zentralbl. f. Gynäk., 1909. 33:1.
 VAN DE VELDE. Zentralbl. f. Gynäk., 1915. No. 19.
 VEIT. Handb. d. Gynaekologie, 4:ii, 593.
 WALTHARD. Cited by Schlein.
 WATKINS. Surg. Clin., 1919. 3:295.
 WEDERHAKE. Berl. klin. Wchnschr., 1918. No. 3.

CHAPTER XXI

HERNIA INTO THE VULVA

Although hernia in general cannot properly be said to belong to the domain of gynecology, certain forms make their appearance in the region of the vulva and hence demand a brief consideration in this monograph. The only types I shall consider are:

1. Labial hernia.
2. Perineal hernia.

1. **Labial Hernia.**—This is an extension of the usual form of hernia through the inguinal ring. A large proportion of inguinal hernias in women present themselves as a swelling at one side of the mons veneris or upper part of the labium majus. Hernias are far less common in women than in men. Judd reported that 119 out of 1,429 persons operated on in the Mayo Clinic for inguinal hernia were women. Coley reported 617 inguinal hernias in women as compared to 2,470 in men. Femoral hernias are relatively more frequent in women.

Certain of these inguinal hernias are congenital in origin due to a persistence of the canal of Nuck. The formation of the so-called "hydrocele of the round ligament" from such peritoneal invaginations has been amplified in the chapter dealing with cystic tumors of the vulva. It occasionally happens that the canal remains open and that omentum, intestines or even some of the pelvic viscera are pushed out through the inguinal ring into the labium majus of the same side. The relative frequency of such hernias during infancy is evidence of the significance of this congenital factor in their production.

Kelly states that childbearing is not a factor in the formation of inguinal hernias, since the pregnant uterus holds the intestines away from the inguinal ring. This conclusion is justified in so far as it applies to an increased tendency to hernia resulting from straining during labor. On the other hand, Heineck showed that inguinal hernia was relatively more common among women who had borne children. Out of 978 women with inguinal hernia, 772 were mothers and more than 600 of these had borne two or more children. It would seem, therefore, that childbearing is a factor, even though it offers a certain

protection during pregnancy and labor. The most plausible explanation would seem to be that the overstretching of the abdominal walls by repeated pregnancies does weaken them and predisposes to hernia and that the constipation so frequently following from loss of tone with the resulting straining at stool is the main agent in the production of the hernia.

The contents of the hernial sac are usually omentum. This is at times adherent to the sac walls, so that it cannot be replaced. A loop of intestine is also present, especially in the larger hernias. Special gynecologic interest is attached to the hernias of tubes, ovaries and uterus through the inguinal canal.

Such a *hernia* of the *internal generative* organs is by no means uncommon. Carmichael states that, in over 60 per cent of cases of inguinal hernia in young babies, we may expect to find the uterine adnexa in the sac. Andrews analyzed 366 such hernial inclusions as follows: hernia of the tube alone, 46; hernia of the ovary alone, 167; hernia of the ovary and tube, 82; hernia of the uterus, 76. From Heineck's studies it would seem, however, that most of the hernias of tube and ovary are combined and that where only one of these organs is found in the sac, the other would in process of time have been pulled down also. Hernias of the uterus are almost invariably accompanied by the adnexa of the side on which the hernia appears. This form of inguinal hernia may be either unilateral or bilateral. They are relatively frequent in the first year of life, 69 out of 221 cases collected by Heineck occurring during that period. In some of these cases, the possibility must be kept in mind that the contents of the hernial sac may prove to be testicle rather than an ovary, even though the sexual development in other ways corresponds to the female type.

Such hernial inclusions of tube and ovary not infrequently show marked pathologic changes due to circulatory disturbances and slight traumatisms. Strangulation is not uncommon and under such circumstances the tube and ovary become swollen, black and even gangrenous. Torsion was found present in 5 ovarian hernias and 18 tubo-ovarian hernias according to Heineck. Morf reported a case of pyosalpinx in such a hernial sac following upon ascent of a gonorrheal vaginitis through the uterus into the tube. Two cases of tubal pregnancy in an inguinal hernia have been reported. In Jordan's case, the ovum and blood-clots lay among loops of intestine in the hernial sac. Andrews found, in hernia of the uterus, that almost without exception there was some congenital anomaly of development; frequently it was a rudi-

mentary horn of the uterus or the one half of a bicornate uterus that was found in the hernial sac. In some of the remaining, normal uteri, pregnancy occurred complicating the hernia. In 11 out of Kuestner's 23 cases of inguinal hernia, the uterus was pregnant. This proved a serious complication. Out of 4 cesarean sections for this condition, 3 died.

Symptoms of Inguinal Hernia.—There is usually a feeling of discomfort, dragging sensation and fullness when the hernia makes its appearance. Often we have a history of some strain or fall as the direct cause of this condition. Gradually the swelling grows larger and the discomfort greater, unless measures are taken to support the structures that have become prolapsed into the hernial sac. When the hernia becomes strangulated, there is marked pain. The patient is usually able to state the exact time of onset and cause of the strangulation, usually a severe strain or cough or hearty laugh. The obstruction of the bowel resulting from the strangulation leads to reverse peristalsis, nausea, eructation, and, later, vomiting. Occasionally there is a diarrhea if the obstruction is only partial. If the inflammation extends to the abdominal cavity, septic peritonitis and death usually result. The pain increases with the onset of peritoneal infection, but later it may disappear; the temperature may rise or become subnormal; the pulse is usually rapid and of small volume. Berger states that, in proportion to the total number of cases, strangulation is about twice as frequent in the female as in the male. Inguinal hernias are not attended by this complication as often as femoral hernias.

The treatment of inguinal hernias is essentially surgical, but in children the application of a truss should be considered. Hunner states that a truss can ordinarily be applied when the child is three or four months old, and that operation had better be postponed until the second year when it can be done with greater exactitude and with more efficient after-care. The technic of operative closure in inguinal hernia can be found in surgical textbooks.

Perineal Hernia.—The ordinary protrusions and prolapse of the pelvic organs, such as cystocele, rectocele and uterine procidentia, are not, of course, to be considered as perineal hernias. This term should be limited to those rare cases in which a cleft occurs in the pelvic floor muscles of such size as to permit the pelvic or abdominal contents to be pushed down into the ischiorectal fossa and appear as a swelling at one side or the other of the vaginal orifice. The pelvic floor is composed primarily of two groups of muscles, the levator ani and the pubococcy-

geus. The rupture may occur between these two muscles or between some of the muscle bundles into the ischiorectal fossa. The place of protrusion may be either anterior or posterior, depending upon the direction along which the hernial mass works its way downward.

Of the causes of this form of hernia, abnormal muscular defects in the pelvic floor and peculiarities in the arrangement of the pelvic peritoneum, probably congenital in origin, have been suggested by Ebner and Zuckerkandl. In nearly all the cases found in women—and the condition is relatively more common in the female—the hernial opening occurred posterior to the broad ligament at the base of Douglas' culdesac. Predisposing factors in the formation of perineal hernia are slackness of the pelvic floor, ruptured perineum and tearing of the levator ani muscle at parturition. In certain cases, there may be other specific factors. Thus the growth of a lipoma in the ischiorectal fossa tends to a separation of the pelvic floor muscle above it, so that upon its removal a perineal hernia occasionally results. Two such cases have been reported by Bakay. Exner also records an interesting case in which a congenital atrophy of the pelvic floor muscles associated with spina bifida led to a perineal hernia. It has been recognized that congenital uterine prolapse is usually due to this condition.

The impossibility of applying any palliative measures in perineal hernia makes operation the only treatment in these cases. Hunner uses the combined perineal and abdominal method to effect a closure in this form of hernia. The perineal incision should be made outside of and parallel to the constrictor vaginae muscle and the dissection carried up bluntly into the ischiorectal fossa until the hernial sac is exposed and ligated.

Recently Chase has described a levator hernia occurring in the service of Dr. George Gray Ward at the Woman's Hospital in which the protrusion occurred in the region of the right labium and perineum. The patient had complained of a bearing-down sensation, a feeling of tension on urination and defecation and pain in the right lower abdomen. She had had six children and gave a history of temporary bowel obstruction during her last pregnancy. At labor a swelling was noticed in the labial region that had to be replaced before delivery with forceps could be effected.

Seventeen months later when the patient came for operation the labial mass was found to be the size of a man's fist, easily reducible with an impulse on coughing. A two-stage operation was done. The first operation consisted of a closure of the culdesac peritoneum by interrupted

stitches drawing together the rectum and posterior wall of the uterus, especially on the affected side. In the second vaginal operation, a labial incision was made exposing the hernial sac. It was about the size and shape of a pear and, since the abdominal operation had closed the upper end, it was empty. After opening, tying off and excising the sac, its stump was fastened behind the white line. A repair of the overstretched levator muscle was then done and the wound closed. There was no recurrence for at least a year after operation during which time the patient was kept under observation.

LITERATURE

- ANDREWS. Tr. Am. Gynec. Soc., 1906. 31:407.
 BAKAY. Cited by Exner.
 BERGER. Resultats de l'examins de dix mille observations de hernie, Paris, 1896.
 CARMICHAEL. Journ. Obst. and Gynaec., Brit. Emp., 1906. 10:16.
 CHASE. Surg., Gynec. and Obst., 1922. 35:717.
 COLEY. Keen's Surgery, 1919. 6.
 EBNER. Deutsche Ztschr. f. Chir., 1887. 26:48.
 EXNER. Arch. f. klin. Chir., 1912. 98:897.
 HEINECK. Surg., Gynec. and Obst., 1912. 15:63.
 HOLLAND. Eden-Lockyer. System of Gynecology, 1917. 3:205-243.
 HUNNER. Kelly-Noble Gynecology and Abdominal Surgery, 1910. 2:656-711.
 JORDAN. München. med. Wchnschr., 1897. 44:7.
 JUDD. See Royston. Am. Journ. Obst., 1911. 64:472.
 KELLY. Operative Gynecology, 1898. 2:467.
 KUESTNER. Veit's Handb. d. Gynaekologie, 1907. 1.
 MORF. Ann. Surg., 1901. 33:247.
 ZUCKERANDL. Deutsche Ztschr. f. Chir., 1891. 31:590

CHAPTER XXII

THE HYMEN

From an embryological viewpoint, the hymen is essentially a vaginal structure. Its anatomical situation projecting outward between the labia, and its pathology, however, justify its consideration in the present monograph. In the chapter on embryology, some mention has been made of the various theories concerning the development of the hymen. The fact that in lower animals the hymen is either absent or that there is visible at this point only a circular constriction, such as we find at any point of junction between two coalescing tracts in the body, has led me to the view that its special development as a proliferating, almost occluding, membrane in the human race may bear some special relationship to our past history. The theory seems plausible that this membrane developed as a protection to the vagina during the period when man changed from a four-footed to a two-footed being and was compelled to rest for long periods of time in the squatting posture.

Probably no structure has such variety of form as the hymen. There is the semilunar, the annular, the fimbriate, the cribriform and the septate types with all manner of gradations between them. This irregularity of contour is due to the marked connective-tissue proliferation in the lower third of the vagina during the last half of intra-uterine fetal development, resulting in extensive formation of folds and papillae and a beaklike projection of the hymen outward, as shown in Fig. 5. Occasionally this outgrowth of connective tissue, which is usually more pronounced on the dorsal side of the vagina, results in complete occlusion of the vaginal outlet and we then speak of a hymen occlusivus or imperforate hymen. It is this form of hymen that, together with congenital and acquired atresias of the lower part of the vagina, are responsible for the retention of menstrual blood at puberty resulting in hematocolpos, hematometra and hematosalpinx.

Histology.—The hymen is covered on both sides by delicate squamous epithelium. At the fifth month of fetal life, when this membrane can first be distinguished, the epithelium is definitely vaginal in type on both sides. At birth and in early infancy, however, the external surface of the membrane shows a lowering and crowding of epithelial cells, so that it has more the aspects of vulval epithelium.

The connective tissue underlying this epithelium has many proliferating papillae resulting in partial or complete inclusions of epithelium. Elastic tissue is abundantly present, as Gellhorn has demonstrated, but nerve filaments and sensory buds are almost wholly lacking. Sebaceous glands have been found at the vestibular margin, but they are very rare.

Injuries.—Lacerations of the hymen occur physiologically with the onset of sexual relations and are usually multiple in character, extending radially to the vaginal wall. Ordinarily these tears do not cause severe pain and, unless the hymen is very fleshy, the bleeding that results is inconsiderable. Where the sexual act is not fully carried out, there may be abrasions without rupture and the resulting infection may lead to sensitive granulations that eventually produce vaginismus. The remnants of the torn hymen undergo considerable atrophy and retraction, so that after a few months they are merely polypoid tags and are then called “carunculae myrtiformes.” In a few instances, there is such elasticity in the hymen that even after childbirth it remains unruptured but, as a rule, the stretching of the vaginal outlet during labor causes an obliteration of this membrane so that only a few excrescences are visible. The deeper injuries of the vulva at intercourse and labor have been considered in a previous chapter.

Inflammations.—Infectious processes originating in the vulva or vagina may, by extension, involve the tissues of the hymen, but only in rare instances originate in the tissues of this membrane. Gonorrheal vulvovaginitis in children will cause some reddening and erosion of the hymen in the acute stage, but in the later stages of the disease gives rise to no visible lesions. If agglutinations of the vaginal walls occur as a result of this infection, I have never noticed them in the vicinity of the hymen so that I am skeptical as to the possibility of hymenal atresia resulting from this disease. Nagel and Veit have in the past maintained that such atresia is due primarily to gonorrheal vulvovaginitis. Occasionally, if a syphilitic infection occurs simultaneously with the rupture of the hymen, the primary sore or chancre may start at the edge of the tear (Veit). Lagane has described a case of tuberculosis of the hymen surrounding the vestibulum in a girl of six. The ulcer was gray, covered with purulent exudate and did not bleed. The diagnosis of tuberculosis secondary to a urinary infection was confirmed by microscopic examination at autopsy. Carrière has observed impetigo contagiosa affecting the hymen. In the three cases observed, the labia were also the seat of numerous vesicles which afterwards opened and gave rise to ulcerations. Staphylococci were present in the secretions.

Cysts of the Hymen.—It is very unusual to find a neoplasm developing from this little structure. Saenger describes a case of sarcoma of the hymen in a child three years old. Apparently the tumor was a secondary polypoid implantation, following upon a large primary growth in the vagina. On the other hand, retention cysts are not so very rare and may originate in four ways:

1. They may result from invaginations of hymenal epithelium that later become separated from the surface.

2. Dilated lymph vessels may give rise to accumulations of fluid in the form of cysts.

3. From the remnants of the wolffian ducts, which both Meyer and Klein found in a large number of embryos running along the vagina down into the tissue of the hymen, there may come about retention cysts, as in the case of Stroganowa.

4. By the coalescence of the converging vaginal folds directly back of the hymen, there may result pockets of considerable extent. Occasionally cysts arise from liquefaction products in such inclosed pockets.

These cysts vary in size from 1 cm. in diameter (Ziegenspeck) to 8 cm. (Palm). The cysts are usually congenital but may at times be acquired. In one of Ziegenspeck's cases, the cyst was apparently the result of an epithelial inclusion following a tear along the hymenal edge. Excision of these cysts is readily accomplished, but in the absence of symptoms there is no special indication for their excision, since there is no tendency to malignant degeneration.

LITERATURE

CARRIÈRE. *Bull. Med.*, December 27, 1902.

GELLHORN. *Am. Journ. Obst.*, 1904. 50:145-177 (complete literature).

KLEIN. *Verhandl. d. deutsch. Gesellsch. f. Gynäk.*, 1897. 9:163.

LAGANE. *Bull. Soc. anat. de Paris*, 1910. 665.

MEYER. *Arch. f. mikr. Anat. u. Entwickel.*, 1909. 73:751.

NAGEL. *Veit's Handb. d. Gynaekologie*, 1897. 1.

PALM. *Arch. f. Gynaek.*, Part 3, vol. 52.

SAENGER. Cited by Gellhorn.

STROGANOWA. *Monatschr. f. Geburtsh. u. Gynaek.*, 2:269.

TAUSSIG. *Am. Journ. Gynec. and Obst.*, 1921. 2:471.

VEIT. *Handb. d. Gynaekologie*, 1910. 5:637.

ZIEGENSPECK. *Arch. f. Gynaek.*, 1902. 67:103.

CHAPTER XXIII

DIFFERENTIAL DIAGNOSIS

To avoid needless repetition, I have reserved for the present chapter the discussion of the significant points in differential diagnosis of diseases of the vulva and classified them first in accordance with the chief symptoms and then in accordance with physical signs.

DIFFERENTIAL DIAGNOSIS ACCORDING TO SYMPTOMS

The chief symptoms of diseases of the vulva are: (1) discharge; (2) bleeding; (3) pruritus; (4) pain; (5) urinary discomfort.

Discharge.—If present in large quantity, it usually comes from the vagina but we may have excessive purulent, seropurulent or serous discharge from the vulva itself or the glands or ducts that empty into it. If the discharge is creamy, yellowish in color and comes from the urethra, Skene's ducts or Bartholin's glands, there is a strong likelihood of a gonorrheal infection of these structures. In such an acute stage, gonococci are usually plentiful and typically intracellular, rendering the diagnosis easy. In the chronic stages of the disease, the discharge becomes whitish, and, if it arises from Bartholin's glands, is mixed with mucus. Often the discharge has just been washed away by the act of urination. In such cases, we find marked redness about the meatus of the urethra and redness of Bartholin's glands. In the diffuse forms of vulvitis produced by intertrigo, diabetes, and eczema, the secretion is usually more serous and has a whitish color. If the infecting agent is a fungus, as in mycotic vulvitis, the discharge assumes a more crumbly appearance, is white in color, and shows here and there a few patches of thin white material clinging to the skin. Such particles show numerous mycelia and spores. Occasionally the vulval discharge has a pasty white character. This is due to the presence of excessive sebaceous secretion. If associated with hypertrophy of the labia minora, this may justify the suspicion of masturbation.

Bleeding.—Bleeding also is frequently of vaginal origin and the first thing to do is to determine the source. Coming from the meatus of the urethra or from Bartholin's glands, it may indicate an acute infection of these structures. In such instances, there is an admixture of pus and the infection is apt to be of gonorrheal origin. A tinge of blood is present in practically all venereal or simple ulcers, whether due to syphilis, chancroids, or other infecting agents. Occasionally, where tertiary luetic lesions have produced papillary excrescences, the bleeding may become more pronounced, resembling in character and amount that found in carcinoma. In carcinoma, however, the bleeding is more constant and the discharge more profuse and offensive. We do not, however, except in far-advanced cases, get so much hemorrhage as is present in vaginal or cervical cancer. The most profuse bleeding from the vulva attends actual traumatism or postoperative sloughing of vulval wounds. The diagnosis in such instances is not difficult unless the skin is intact and the hematoma thus produced extends upward into the pelvis. Increased pallor with a boggy swelling in the labia and paravaginal tissues on one side will usually establish the diagnosis of internal bleeding.

Pruritus.—Under the head of pruritus vulvae, some discussion of this symptom has already been made. In general, we may divide pruritus in accordance with etiology as follows:

Pruritus Due to Skin Diseases and Limited to the Area of Skin Involved.—Tinea, scabies and pediculosis are the three most common diseases producing it. This form of pruritus is usually not so severe and is more apt to be localized in the pubic region. The skin lesions are characteristic and their description can be found in textbooks on dermatology.

Pruritus Due to Rectal Conditions.—In children pinworms may produce itching pronounced only at night and diagnosed by the finding of the worms at such times about the perineum. Hemorrhoids will also produce itching, but this is not pronounced except in some nervous individuals.

Pruritus Due to Urinary Conditions.—While occasionally there is slight burning and itching in cases of concentrated or highly acid urine, the most common cause is glycosuria. Where the glycosuria persists, as in diabetes mellitus, the attendant desquamation and swelling of the vestibular epithelium makes the pruritus and burning more pronounced. If the patient is placed on a diet so that the urine becomes free from sugar, the itching promptly disappears and the vulva heals rapidly.

Pruritus Due to Systemic Diseases.—Jaundice is an occasional factor,

easily recognized, in pruritus of a mild type. Pruritus not limited to the vulva, but very intense and persisting for years, may precede or accompany a lymphatic leukemia. Where the blood changes are found, the diagnosis is simple but in their absence it is often difficult or impossible to establish the cause of pruritus. In some instances, we may assume a neuropathic constitution, but this conclusion should only be accepted after all other causes have been excluded.

Pruritus Due to Vulvitis.—Pruritus may be due to the various infectious agents mentioned in the chapters on vulvitis and the various forms can be differentiated by identifying the specific microorganisms. The fungus or mycotic type should especially be kept in mind. Most important in this group is the pruritus associated with leukoplakic vulvitis, the etiology of which is still obscure. Here we have either a local patch or a diffuse involvement of the vulva characterized by a whitish parchmentlike skin with abrasions due to the scratching.

Pain.—Pain is not a frequent attendant of vulval lesions. It is limited to acute infectious processes (abscess, cellulitis); to acute open sores, such as chancroids; to acute traumatic conditions (tears, hematoma); and to the deeper subpubic infiltrations of malignant tumors.

Urinary Symptoms.—These symptoms attend destructive processes in and about the urethra, such as syphilis and carcinoma, and in such cases usually interfere with the passage of urine, either producing incontinence, or, in case of deeper infiltration, leading to retention. Pendulous tumors attached near to the urethra may cause, by traction, partial loss of control. Gonorrheal urethritis is characterized by frequency, burning and tenesmus. Burning on urination also attends diabetes and erosive conditions about the vestibulum and labia minora.

DIFFERENTIAL DIAGNOSIS ACCORDING TO SIGNS

One-sided Mass in the Region of the Labium Majus.—By the word "mass" is meant any swelling larger than a walnut in size. Smaller ones are classified in the paragraph on small lumps. If the mass is *hard*, one should think of *fibroma* (rounded outline, mobility, absence of tenderness, not attached to skin); or of *hypertrophic vulvitis* (attached to skin which is often ulcerated or the seat of old scars, irregular ovoid shape, slightly tender, history of syphilis); or of *carcinoma of Bartholin's gland* (rapid growth, multinodular shape, fixation of skin,

age, often bleeding at some small point of ulceration); or of *actinomycosis* (numerous sinuses with granular discharge showing ray fungus, irregular shape, adherent skin). If the mass is *soft* but *not fluctuating*, one must think of *hernia* (impulse on coughing, open inguinal ring, possible replacement, sudden onset); or of *lipoma* (long duration, absence of symptoms, lobulated shape); or of *varicose veins* (bluish color, strand-like feel, spindle-formed swelling, increase in pregnancy). If the mass is *fluctuating*, our attention is directed to *abscess* of Bartholin's gland (acute process, pain, redness, edema of skin, purulent discharge from urethra and, at times from Bartholin's gland); or to *cyst* of Bartholin's gland (labium minus over-riding it, spherical shape, discomfort rather than pain, history of gonorrheal infection); or to *hydrocele muliebris* (slow development, situated high near external inguinal opening in outer labium majus, elongated shape, associated with small hernia).

Central Mass in Region of Clitoris and Labia Minora.—If the mass is *solid*, it may be due to *hypertrophic vulvitis* (negro race, pendulous nodular shape, tendency to ulcerate); or to *simple hypertrophy* (symmetric enlargement, history of self-abuse, seborrhea); or to *male type of clitoris* (cylindrical enlargement like penis, erectile tissue, urethral groove along the base); or to *fibroma of clitoris* (spherical shape, pendulous, smooth, absence of inflammatory changes). If the mass is *fluctuating*, one must think of *retention cyst* of clitoris, labia minora or hymen (thin walls, clear contents, mobility, attachments); or of *cystocele* (relaxed pelvic floor, increased size on straining, location beneath the urethra, cystic only when bladder is full); or *rectocele* (soft rather than fluctuating, location above anus, disappearance on pushing inward).

Mass Involving Both Sides and Center.—This may be due to *edema* (history of circulatory disturbances, boggy, symmetry, intact but leathery skin); or to *hypertrophic vulvitis* (diffuse type, usually presenting large, partly healed, chronic ulcerations, irregular shape, tags, fibrous consistence, discharge); or to *condyloma acuminata* (cauliflower shape, numerous pendulous tags, history of gonorrhea, superficial involvement); or to *tertiary syphilis* (large indolent ulcers, hard sclerosed, non-sensitive, irregularly nodular swelling, lues elsewhere).

Small Lumps or Nodules in Vulva.—These lumps (less than a walnut in size) result from *boils* (red, painful, follicular type, sudden onset, later purulent discharge); from *sebaceous cyst* (yellow color, smooth, long duration, spherical, fluctuating); from *metastatic tumors* (subepithelial swelling, presence of primary growth elsewhere, rapid

development); from *hidradenoma* (subepithelial, primary growth slow in development, firm, spherical); from *molluscum contagiosum* (tendency to ulceration, typical mollusc plug extruded on pressure); from *condyloma lata* (plateaulike, hard, flat, whitish color, history of lues); from *condyloma acuminata* (pedicled cauliflower shape, profuse discharge, usually gonorrheal, intact epithelium).

Small Ulcers of the Vulva.—These ulcers (less than 2 cm. in diameter) may be due to a *chancre* (usually single, indurated edge, shallow, sloping sides, shotlike tributary lymph-nodes, history of sexual exposure); to *chancroid* (multiple lesions, soft undermined edges, painful, tendency to bubo in groins); to *diphtheria* (thick gray adherent membrane, fever, typical bacilli, history of similar infection in throat); to "*acute ulcer of the vulva*" (sudden onset, thin gray membrane over base, presence of bacillus vaginalis in secretions, tendency to appear in crops); to *mucous patches* (multiplicity, superficial excoriations, dirty base, presence of *Spirochaeta pallida*, indurated inguinal lymph glands, history of eruption); to *follicular vulvitis* (location over hairy region at base of hair stalks, multiplicity, diffuse redness); to *early carcinoma* (hard elevated border, friability, tendency to bleed, papillary base, frequency of surrounding leukoplakia, advanced age of patient).

Large Ulcers of the Vulva.—These ulcers (over 2 cm. in diameter) can be differentiated as due to *gumma* (history of lues, chronicity, surrounding scar tissue and fistulous tracts, indurated edge and base); to *carcinoma* (hard elevated edge, friability, tendency to bleed, papillary base, surrounding leukoplakia, advanced age of patient); to *tuberculosis* (evidence of similar infection in other organs, shotlike feel in base of ulcer, slow growth); to *granuloma inguinale* (extent and chronicity of ulcers, limitation to colored races and tropical countries, presence of Donovan's bacillus, disappearance on administration of tartar emetic); to *ulcerative type of chronic vulvitis* (chronicity, frequency among prostitutes, especially negroes, tendency to partial healing and perforating sinuses, association with hypertrophy of surrounding tissue); to *gangrene of vulva* (history of severe infection, greenish base, acute onset and course, pain).

Vesicles about the Vulva.—These are relatively infrequent. They may be due to *burns* (history of trauma, shape and extent corresponding to agent employed, pain); to *vesicular vulvitis* (history of infection, multiplicity and general distribution, diffuse redness); to *impetigo* (contagiousness, tendency to pustules, limited to children); to *herpes genitalis* (coincidence with menses, scanty number, location on

labia minora, tendency to recurrence); to *herpes zoster* (one-sided, distribution along pudic nerve, severe pain, limited course).

Redness about the Vulva.—If diffuse, this may be the result of *intertrigo* (usually in stout persons, history of irritating discharges or secretions, limitation to folds or body creases); of *crysipelas* (infiltrated elevated edges, fever, rapid extension, definite course of infection); of *diabetes* (dusky red color, pruritis, limited to mucous and nonhairy portions, burning urination).

White Patches on the Vulva.—These vary greatly in extent and cause. We must differentiate between *vitaligo* (smooth skin, large areas usually symmetrically involved, history of ovarian dysfunction, absence of irritation); *psoriasis* (scaly, smaller patches, lesions elsewhere, especially on elbows and abdomen, tendency to come and go independent of treatment); *scar* (history of injury, fixation of skin, irregular shape, usually located about the vestibular ring); *leprosy* (evidence of disease elsewhere, anesthesia, or whitish spots); *alopecia areata* (association with falling out of hair, similar patches on scalp); *leukoplakic vulvitis* (pruritus usually intense, often symmetrical involvement, parchmentlike skin, glistening white color, tendency to carcinoma); *lichen planus* (similar patches elsewhere on body, branching nodular lesions, localized area involved); *lichenifications* due to scratching (grayish-white color, wrinkled skin, presence of some irritation leading to pruritus, limitation to area subjected to irritation).

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