didymis, very exceptionally in the testicle itself, and should be classified as epididymal cysts. Two classes may be recognised.

1. Small cysts developing (usually) about the epididymis.
2. Large cysts originating within the epididymis.

1. The *small cysts* are rarely encountered before middle age, while they are very common in later life. They usually project more or less distinctly from the head of the epididymis, often into the tunica vaginalis, where their rupture is among the possible causes of hydrocele, and their detachment the origin, perhaps, of calculi (p. 758). They do not attain any notable size; they rarely contain spermatozoa—in short, they have little clinical significance.

2. The *large cysts* are found in the epididymis rather than projecting from it. They usually appear before middle age and commonly contain spermatozoa. They are often multiple and grow between the epididymis and the testicle, separating them and unravelling the former. Thus they form irregular fluid tumours about the top of the gland. Exceptionally, the cysts are pedunculated and grow upward, simulating hydrocele of the cord. They rarely contain more than 4 ounces, though Curling drew off 32 ounces from one individual and 40 ounces from another. Jacobson mentions a case from whose right side 49 ounces were drawn, and 58 from the left. Frost's[1] case yielded 52 ounces. The nature of these large cysts is identified by the fact that the fluid is milky and swarming with spermatozoa.

Pathogenesis.—Since the smaller cysts are met with later in life than the larger, and less frequently contain spermatozoa, many authors attribute the larger cysts to persistent fetal remains, such as the vasa aberrantia, the hydatid of Morgagni, or the paradidymis (Organ of Giraldès), and the smaller cysts to dilatations of the seminal canals. The recent tendency, however, has been to discredit the claims of the fetal elements, and to attribute the earlier and larger cysts to dilatation of the vasa efferentia or of the epididymis itself behind an obstacle more or less impervious,[2] and the later, smaller tumours to a cystic enlargement of the tubules due to senile changes after the organ has passed the height of its activity.

The presence of spermatozoa in the cysts is explained by those who cling to the theory of embryonal rests upon the ground that the

[1] Lancet, 1878, ii, 483.

[2] Griffiths (J. of Anat. and Phys., 1893–94, xxviii, 107) maintains that, like hydronephrosis, these dilatations are caused by partial obstruction due, in this case, to catarrhal inflammation. He also maintains that the hydatid of Morgagni is always a solid body, never cystic, and that there is no evidence that embryonal remains are in any way connected with spermatocele.

cyst has burst into the epididymal canal. *The absence of spermatic elements* is explained by those of the opposite camp on the ground that the cysts become occluded from the main channel and their seminal elements gradually disintegrate. The communication between a cyst and a seminal duct has been observed a number of times.

Symptoms.—The *small cysts* are occasionally met with in older men. They produce no symptoms.

The *large cysts* have peculiar features. Usually a slight uneasy sensation is experienced near the head of the epididymis, not amounting to pain, often entirely unnoticed, or at least forgotten by a patient who may afterward find the little tumour by accident. If seen early, an undefined sense of thickening, with extra resistance, is distinguishable by the finger in the region of the top of the testicle. This goes on increasing, usually at so slow a rate that the patient soothes himself with the idea that it will become no larger. It grows constantly, however, and may attain a large size. There is no pain, except a slight dragging on the cord. The cyst keeps its position at the upper end of the testicle, and becomes gradually heart-shaped, the testicle lying below the cyst which is notched above. The walls are usually thin and tense, so that fluctuation cannot always be distinguished, but translucency is usually present. The fluid may be dark-coloured or very milky, somewhat masking translucency. The patient is prone to become hypochondriacal, and to imagine that his sexual appetite and power are failing.

The cyst tends to increase in size indefinitely. It may coexist with hydrocele and be masked by it. It may be broken into the vaginalis by accident, and, continuing to secrete, form spermatic hydrocele, or it may be punctured when a supposed simple hydrocele is tapped.

Diagnosis.—The heart shape of the cyst, though pathognomonic when present, is not constant. The diagnosis is usually made by the irregular shape and position (above and behind the testicle) of the tumour and the presence of fluctuation over irregular areas. Aspiration usually completes the diagnosis by withdrawing a milky fluid full of spermatozoa. If the fluid is limpid it may be distinguished from hydrocele fluid by its neutral reaction, its low specific gravity (less than 1.010), and its low percentage of albumin (about ½% against 4% to 7% in hydrocele). When hydrocele and spermatocele coexist the latter is not discovered until the former is tapped.

Treatment.—A cure usually results from aspiration and injection of carbolic acid through the same needle. If this fails the cyst should be excised. There is no object in disturbing small cysts.

HEMATOCELE

The term *hematoma* is applied to a tumour caused by the effusion of blood into the tissues, whether of the testis or the scrotum. If the effusion becomes encysted, or if it occurs within a cyst or the serous tunic of testicle or cord, *hematocele* results (Fig. 171).

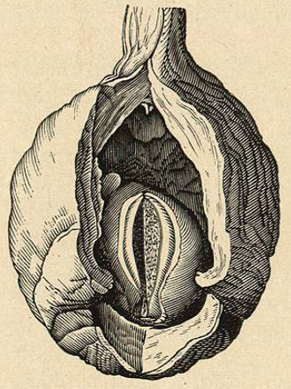

Fig. 171.—Hematocele.

Etiology.—The most common cause is a crushing injury. Any operation upon the testis may result in hematocele.

Scrotal hematocele and testicular hematocele are always traumatic. Vaginal hematocele is usually traumatic but, exceptionally, may have a spontaneous origin from active or passive hyperemia; or, rarely, from a hemorrhagic secretion in scorbutic individuals. Sir Benjamin Brodie mentions as a cause a diseased (calcareous) condition of the arteries of the tunica albuginea, similar to the degeneration of the arteries of the brain which often precedes apoplexy. One of them may rupture into the tunica vaginalis.

Symptoms.—There are consequently two varieties. The one comes on rapidly after injury and is attended by scrotal hematocele. If there has been a pre-existing cyst or hydrocele this becomes suddenly larger, more tense, and painful. There is more or less fever, and suppuration may ensue.

In the other, or spontaneous variety, the tumour increases slowly in size and simulates hydrocele, except in regard to translucency.

The blood in hematocele may be found red and fluid, but is usually black or brown, and it may be mixed with pus if severe inflammation has followed its effusion. The walls of the cyst may be coated with layers of fibrin as in aneurysm, and they tend to thicken and become adherent to the surrounding connective tissue, while the inner surface becomes rough and uneven, resembling anything but a serous surface.

Diagnosis.—The diagnosis of hematocele of the second or spontaneous variety presents many difficulties. Here there is no guide in the history nor any local signs of injury. The records of surgery possess many cases where perfectly healthy testes, surrounded by a hematocele inside of a thickened tunica vaginalis, have been extirpated as cancerous. Often the diagnosis cannot be made without an exploratory incision. There are, however, characteristics of hematocele which may serve to distinguish it from hydrocele and from malignant growths.

The pyriform shape of hydrocele exists, but the tumour is not translucent. This, however, would also be the case in an old hydrocele with thickened walls. If it has been attentively watched, it will be found to have decreased a little in size at some period of its growth, which does not occur in malignant disease. The peculiar sensation produced by pressure on the testicle can often be evoked by pressing upon the mass behind at about the middle portion. In a doubtful case an exploratory aspiration or incision is demanded.

In the traumatic variety, the diagnosis is made at once from the history. It is unimportant, often impossible to distinguish between traumatic hematocele of testis, vaginalis, and scrotum.

Treatment.—For *hematoma* all that can be done is to keep the patient upon his back, with the testicle supported and covered with cold lotions, administering perhaps an occasional laxative and an anodyne if the pain be severe. If the quantity of blood effused is not too great, the pain will soon begin to subside, and the patient may be allowed to go about with a suspensory bandage. The blood will gradually be absorbed.

If, in spite of these means, *which will rarely be found to fail*, blood continues to be poured out into the cavity of the vaginalis so that the pain becomes excessive, and the tension of the parts very great, a trocar may be introduced to draw off the blood, and cold and pressure applied to prevent refilling of the sac. If it fills again, a second tapping, delayed as long as possible, will probably afford a more serous fluid than the first, and a third, a fluid still less tinged, after which the cyst will probably disappear.

Incision is required when inflammation is imminent or when the blood is so clotted that it will not flow through the needle. The cavity should be freely opened, irrigated, and drained.

Long-standing *hematocele* requires treatment by the knife. The sac must be opened, its contents evacuated, and as much as possible of the thickened wall cut away.

If the testicle is disorganized it should be removed. When the disease is spontaneous the possibility of hemophilia must be borne in mind.

CHYLOCELE

Chylocele (fatty, milky, chylous hydrocele, galactocele) is an accumulation in the tunica vaginalis of chyle or fatty lymph. It is

a common feature of lymph scrotum (p. 698) and is caused by the rupture of a dilated lymph vessel into the tunica vaginalis. Filarial embryos have been seen in the fluid by Martin [1] and Davies.[2] Chylocele may also be due to traumatic rupture of a lymphatic into the tunica vaginalis. False chylocele is due to a fat- or cholesterin-producing degeneration in the fluid or in the epithelium of a hydrocele.

Chylocele when occurring without lymph scrotum resembles hematocele. The treatment is the same.

[1] Annals of Surgery, 1888, viii, 321. [2] Brit. Med. J., 1885, i, 1245.

CHAPTER XIII

DISEASES OF THE VAS DEFERENS AND SPERMATIC CORD

ANATOMY

The *cord* is made up of the vas deferens, the habenula or remains of the funicular process of the peritoneum, and certain vessels and nerves, all held together by meshes of connective tissue containing unstriped muscular fibre (internal cremaster of Henle). Surrounding these is a continuous layer of connective tissue (tunica vaginalis communis) adherent to the tunica vaginalis below and continuous with the fascia transversalis above. Outside of this the cremaster muscle lies in loops, some of them embracing the testicle in a fan shape, others extending only a short distance down the cord.

The *arteries* are, the spermatic from the aorta, the deferential from the superior vesical, and the cremasteric from the epigastric. The *veins* from the testicle and epididymis unite in the *pampiniform plexus* which constitutes the bulk of the cord. The larger veins have valves; they usually unite to form one large trunk, which empties, on the left side into the renal vein, on the right side into the ascending cava. The spermatic plexus of *nerves* is derived from the renal, the aortic, the superior mesenteric, the hypogastric, and the lumbar plexuses of the sympathetic, the genital branch of genito-crural nerve supplying the cremaster and the inguinal branch of ilio-inguinal.

The *cremaster* muscle varies in size and power in different subjects; it is a voluntary muscle; most persons can exercise it on both sides simultaneously, drawing up and holding the testicles against the abdomen; occasionally the muscles can be exercised separately, one testicle being elevated while the other is lowered. The function of the muscle is to assist in sustaining the testicle by its tonic contraction, and to compress the organ during the sexual orgasm. The muscle is subject to painful spasmodic contraction in kidney colic, in neuralgia of the testicle, and sometimes in connection with prostatic or urethral irritation. The *cremasteric reflex* is the retraction of the testicle caused by irritation of the adjoining portion of the thigh.