

CHAPTER XI.

HYDROCELE.

By the term hydrocele we understand a serous effusion into the cavity of the tunica vaginalis, producing more or less distention of the scrotal sac. Upon examination we find a pear-shaped tumor, having its base at the bottom of the scrotum, and its apex directed towards the external abdominal ring. The size of the tumor of course varies with the amount of effusion; it is firm and elastic, and on its anterior surface fluctuation may be made out, while posteriorly we encounter the hard, firm body of the testicle, which has the characteristic sensation upon pressure. The walls of the scrotum are tense, and the superficial veins are distended. There is absolute dulness on percussion of the tumor. The crucial test in making a diagnosis is the familiar "light test." Looking at the tumor through a cylinder of paper, or shading the eye with the hands, the light being held on the opposite side of the scrotum, distinct translucency may be observed anteriorly, while posteriorly the opaque body of the testis is detected. In chronic cases the "light test" may be inapplicable on account of the thickening of the tunica vaginalis. Owing to the diffusion of the rays of light in the fluid the testicle always seems much smaller than we expect to find it. In somewhat rare cases we find the testis situated anteriorly and at the upper part of the tumor, the tunica vaginalis being placed posteriorly. If any doubt remains as to the character of the tumor, puncture with a hypodermic needle may be resorted to.

The fluid of hydrocele usually has a pale straw color, and is highly albuminous. It has been found of a dark brown, of a greenish color, and even black. It sometimes contains a small quantity of cholesterine, and in a few instances spermatozoa have been found in it. After exposure to the air the fluid sometimes separates into distinct layers, and it has been found to coagulate on the addition of blood.

In recent cases very little change is found in the structure of the tunica vaginalis, although if the effusion takes place rapidly, or in large quantity, the tunica may be much thinned. In old cases, however, the tunica becomes very much thickened, and may interfere with the translucency of the tumor, and in quite rare cases it undergoes calcareous degeneration. The testis is generally unaffected, but in chronic cases may become atrophied. Cysts have been found projecting from its surface into the cavity of the tunica vaginalis. The hydrocele is sometimes divided into compartments by adhesions between the surfaces of the tunica.

The causes of hydrocele are various. It sometimes occurs as a

complication of general dropsy, especially in broken-down subjects. It frequently accompanies varicocele, probably as a result of the impediment to the circulation. The etiology of hydrocele has been carefully studied by Panas and Vétault,¹ who think it is generally due to inflammation of the epididymis. In the latter, the efferent vessels of the testis are often compressed by newly-formed fibrous tissue to such a degree as to produce effusion into the tunica vaginalis. In many cases of acute and of chronic orchitis effusion takes place, which is very often absorbed, but frequently remains. It is stated by some authors that hydrocele is frequent in very warm climates, perhaps owing to the relaxation of the scrotum.

The diagnosis of hydrocele is generally quite easy. Its slow development, its beginning at the bottom of the scrotum, its pyriform shape, and its painless character are presumptive symptoms, while all doubt may be removed by the use of the light-test. Some cases of incarcerated hernia resemble it somewhat, but the following table of diagnostic points, taken from Van Buren and Keyes's valuable work, presents clearly the distinguishing features of the two affections:

HYDROCELE.	INCARCERATED HERNIA.
1. Largest below.	1. Largest above.
2. Commences gradually.	2. Comes on suddenly.
3. Commences at the bottom of the scrotum and grows up.	3. Commences at the external ring and grows down.
4. Is tense and fluctuating.	4. Is usually doughy.
5. Cord can be made out (normal) above tumor.	5. Cord cannot be distinguished, or is felt as a distinct tumor.
6. Testicle cannot be found.	6. Testicle can usually be separated from tumor posteriorly.
7. Dulness on percussion.	7. Resonance on percussion (unless hernia be omental).
8. Tumor heavy, but movable.	8. Tumor unwieldy.
9. Reduction impossible.	9. Reduction impossible.
10. Size usually constant.	10. Size usually varies at short intervals.

The translucency of hydrocele always establishes the diagnosis between it and solid tumors of the testis, resulting from chronic inflammation, syphilis, cancer, or tubercular deposits.

TREATMENT.—The treatment of hydrocele may be palliative or radical; by the former we merely remove the fluid, by the latter we hope to prevent its re-formation. Although it has been claimed that absorption of the fluid may be secured by means of electrolysis, experience has shown this method to be uncertain as well as impracticable. Acupuncture is open to the serious objection that it often fails to completely evacuate the fluid; moreover it does not prevent relapse, and it is often followed by excessive inflammation. This method is used by some in the hydrocele of young children, which

¹ Considérations étiologiques sur l'hydrocèle des adults. Paris, 1872.

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may often be cured merely by external stimulation with tincture of iodine.

Tapping of the tunica vaginalis with a fine trocar is the best way to remove the fluid. The instrument should be inserted slightly upwards as well as forwards, care being taken to avoid large veins of the scrotum. The scrotum should be held tense with the left hand when the instrument is plunged into the tumor, and the canula must fit the trocar perfectly, else it may push the tunica vaginalis before it, rather than pierce it. The operation may end after withdrawal of the fluid; but if we aim at a radical cure, we inject, with a syringe closely fitting the canula, about two drachms of tincture of iodine, which should be brought into contact with all parts of the tunica by manipulating the scrotum. The injection may then be allowed to run out, although usually only a few drops escape. The after treatment consists of rest and the application of a cooling lotion to relieve excessive pain. The reaction is sometimes very slight, while in other cases it is very marked. In the majority of cases this operation produces a radical cure, but it certainly fails in some instances.

Of late years the operation proposed by Volkmann has found favor with many surgeons. It should be performed with great care, and always by the antiseptic method. It consists in opening the scrotum and the tunica vaginalis by an incision throughout its entire length. The incised edge of the scrotum is then stitched to the corresponding edge of the tunica, and the wound is left open exposing the cavity. This seldom fails to give a radical cure. The operation of passing threads of silk through the scrotum is not now looked upon with favor, since it is frequently followed by severe inflammation, and sometimes by sloughing of the scrotum, while it is not always successful. In old men, particularly if they are in poor health, a few days of rest should always be enjoined after tapping a hydrocele. In case the tumor is very large it may be well to draw off only a portion of the fluid at the first operation, which may be repeated in a few days.

CONGENITAL HYDROCELE.

This affection is due to incomplete obliteration of the canal which forms a communication between the tunica vaginalis and the peritoneal cavity.

The shape of the tumor differs from that of a hydrocele in the adult, being oblong rather than pyriform, and extending up into the external abdominal ring. The fluid may by pressure be displaced into the abdominal cavity, where it was probably originally secreted; this may be accomplished with more or less ease according as the opening from the tunica vaginalis is large or small. In a case mentioned by Curling this could not be fully accomplished after manipulating the tumor for fifty minutes. The testicle can be readily felt after the hydrocele has been thus emptied. In this form of hydrocele there is marked impulse on coughing. The tumor is translucent,

and dull on percussion, unless, as is sometimes the case, a hernia coexists.

The treatment of this affection consists in the application of a nicely fitting truss over the neck of the sac, which soon becomes obliterated. Usually the fluid is gradually absorbed at the same time, but the process may be hastened by the local use of tincture of iodine. The injection of iodine into the cavity of the hydrocele has been practiced by some surgeons without bad results, care having been taken to compress the neck of the sac. In other cases, however, fatal peritonitis has followed this operation; it should, therefore, not be employed until communication with the abdominal cavity is entirely cut off.

ENCYSTED HYDROCELE OF THE TESTIS.

There are two varieties of this kind of hydrocele, one arising from the epididymis, and the other from the body of the testicle. Either variety may be complicated by hydrocele of the tunica vaginalis. According to Gosselin, Luschka, and Curling, these cysts are of two kinds, subserous and parenchymatous, or small and large.

The covering or walls of the subserous cysts, which are superficial, are composed simply of stretched serous membrane, while the walls of the parenchymatous, which are developed in the connective tissue, are dense and firm. The subserous cysts are usually multiple, and are found above and around the head of the epididymis; they are generally about the size of a pea. They contain a clear, pellucid fluid, which is sometimes of a milky hue; spermatozoa are never found in the fluid. These cysts sometimes become fused together, and form a single large one, having a pedunculated base; they never have any connection with the efferent tubes of the testis, and rarely cause any uneasiness. Occasionally, when very old, these small cysts have such thick walls as to be mistaken for solid tumors.

The large cysts, according to Curling, are usually found "below the head of the epididymis, close to the anterior extremity of its lower border. They are formed in the connective tissue beneath the investing membrane of the epididymis and in close contact with the efferent tubes." These have received the name of *encysted hydrocele* of the epididymis. The epididymis is flattened and displaced laterally, while the testis is found below, in front of, or at the side of the cyst, very rarely behind it. Mr. Curling gives an illustration of a striking case of this form of cyst, which was distinctly sacculated. The contained fluid is slightly albuminous, colorless, and sometimes contains an abundance of molecules. Curling states that this form of cyst is liable to inflammation, when the fluid becomes albuminous and of a straw color; the cysts may even become lined with a false membrane. Spermatozoa are not infrequently found in the fluid. Regarding the doubtful origin of these bodies, Mr. Paget says "that certain cysts seated near the organ, which naturally secretes

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the material for semen, may possess the power of secreting a similar fluid." Curling, however, does not accept this view. In his opinion, the thin walls of the sac being in close proximity with the efferent tubes, which are likewise of slight texture, a rupture occurs allowing the spermatozoa to pass into the cyst. Being merely an accident, he thinks the term *spermatic* hydrocele is improperly applied to this condition.

Cysts springing only from the body of the testis are quite rare. They are due to effusion between the tunica albuginea and the deeper layer of the tunica vaginalis. Occasionally a cyst is seated partly upon the epididymis and partly upon the testicle. The walls of a recent cyst are thin and translucent; as the cyst grows older, its walls become thick, dense and fibrous, sometimes even containing spiculae of bone, and becoming lined with false membrane. The fluid is at first pellucid, but after a time it assumes a yellow or even a deep brown color.

DIAGNOSIS.—Encysted hydrocele of the epididymis is usually recognized from the position and number of the cysts. In cases of doubt, especially when the cysts are hard and firm, the introduction of a hypodermic needle will determine whether they contain fluid. The difference in shape between these large cysts and hydrocele of the tunica vaginalis is an important point, while the position of the testicle at the bottom of the tumor confirms the suspicion of large encysted hydrocele.

In some cases, however, on account of abnormalities in position, a positive diagnosis can only be made by drawing off some of the fluid, which is generally pellucid or milky, rather than straw-colored. Translucency and fluctuation are additional points in the diagnosis.

TREATMENT.—The small encysted hydrocele seldom requires any attention, unless it tends to increase in size or become painful, when the fluid may be drawn off with a hypodermic needle or by acupuncture. This operation sometimes gives permanent relief, but may need to be repeated. Large cysts should be tapped separately, and injected. Sometimes the tapping and injection of a single cyst causes subsidence of all the rest. Although the seton has been used with success, it sometimes causes violent inflammation and abscess. Volkmann's operation may be employed after failure of tapping.

HYDROCELE OF THE SPERMATIC CORD.

There are two varieties of hydrocele of the cord, the diffused and the encysted.

The *diffused* form is merely a serous infiltration into the loose and abundant connective tissue of the cord. The first clear description of the lesion was given by Pott. "In general, while it is of moderate size, the state of it is as follows: the scrotal bag is free from all appearance of disease, except that when the skin is not congested it seems rather fuller, and hangs rather lower on that side than on the

other; and, if suspended lightly in the palm of the hand, feels heavier; the testicle with its epididymis is to be felt perfectly distinct below this fulness, neither enlarged nor in any manner altered from its natural state; the spermatic process is considerably larger than it ought to be, and feels like a varix or like an omental hernia, according to the different sizes of the tumor; it has a pyramidal kind of form, broader at the bottom than at the top; by gentle and continued pressure it seems gradually to recede or go up, but drops down again immediately upon removing the pressure, and that as freely in a supine as in an erect posture. It is attended with a very small degree of pain or uneasiness, which uneasiness is not felt where the tumefaction is, but in the loins. If the extravasation be confined to what is called the spermatic process, the opening in the tendon of the abdominal muscle is not at all dilated, and the process passing through it may be very distinctly felt; but if the cellular membrane, which invests the spermatic vessels within the abdomen, be affected, the tendinous aperture is enlarged, and the increased size of the distended membrane passing through it produces to the touch a sensation not very unlike that of an omental rupture." Curling says that the tumor is at first cylindrical, and becomes pyramidal as it enlarges. The penis, in this affection, is never retracted, as it may be in vaginal hydrocele.

This form of hydrocele may be mistaken for a hernia. The latter often passes into the abdomen when the patient lies down, while the former is but slightly if at all displaced. The swelling of hydrocele is firmer, though doughy, and fluctuating; a hernia, moreover, unless it be omental, is resonant on percussion. The impulse on coughing in hernia is quite different from the very slight downward movement of the enlarged cord in hydrocele. In hernia the cord can always be traced of normal size from the testis to the ring. Scarpa calls attention to the resemblance of this form of hydrocele to an irreducible epiplocele, and to the necessity of caution in operating.

The treatment consists in making small punctures at the most dependent part of the tumor, and in subsequently maintaining pressure. Large incisions are dangerous and unnecessary.

Encysted hydrocele of the cord occurs most commonly in infants. It forms slowly and without pain, and may reach the size of an egg before being seen by the surgeon. It is distinctly circumscribed, round or oval, translucent, firmly attached to the spermatic cord, movable upon firm traction, and not involving the overlying skin. It is firm in consistence, and but slightly fluctuating.

There is seldom more than one tumor, but we sometimes find a series of tumors extending from the testis to the external abdominal ring. When occurring in infancy, the lesion may result from imprisonment of a congenital hydrocele; in adults, however, it originates in the same manner as do the hydroceles of the epididymis. The cyst-wall is usually thin and fibrous, but in chronic cases it becomes very

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thick and tough. The fluid contents of the cyst are colorless, or have a pale straw color, and sometimes spermatozoa are found.

These cysts may be seated at any part of the cord; those of the epididymis are sometimes wrongly considered cysts of the cord. When the latter are seated near the external abdominal ring, the diagnosis may be very difficult, otherwise it is generally easy. The character and situation of the tumor, and its mobility with the cord and testis, are usually distinctive. The danger of mistaking hernia for encysted hydrocele may be avoided by observing the uniform size of the latter, its circumscribed condition, its translucency, and the absence of impulse on coughing, and of the gurgling characteristic of rupture.

In children this affection usually disappears spontaneously. The process of absorption may be hastened, if desirable, by counter-irritation with tincture of iodine. Withdrawal of the fluid and subsequent pressure sometimes produces a perfect cure. Acupuncture has been found of service, while incisions and the seton are liable to cause excessive inflammation. In very obstinate cases, injection of the tincture of iodine may be resorted to.

CHAPTER XII.

HEMATOCELE.

THE term hematocele is applied to swellings of the testis or of the cord, caused by effusion of blood. We shall adopt Curling's division of its varieties as the best.

HEMATOCELE OF THE TESTIS.—Hematocele of the testis may be either *vaginal*, in which the effusion takes place into the tunica vaginalis, or *encysted*, when blood is effused into cysts of the testis. Either of these forms may have been preceded by hydrocele. Although some authors have doubted the occurrence of vaginal hematocele, independent of other disease of the parts, others are convinced that it does take place as a result of puncture, blows, or any injury. Under such conditions it may be called *traumatic* hematocele in distinction from the *spontaneous* form, which occurs in cases of blood dyscrasia and vascular degeneration inducing rupture of the vessels.

Traumatic hematocele is usually developed very rapidly; the testis becomes enlarged, hard, and painful, and the scrotum may be œdematous or the seat of blood effusion. There is usually more or less constitutional disturbance and pain from the tension of the parts. The effused blood often acts as a foreign body, causing suppurative inflammation. Again, the blood may coagulate as it does in aneurism. Thus the course of the affection is sometimes severe and, on the contrary, when the effusion is moderate, very little trouble is experienced.

The development of spontaneous hematocele is slow and unattended with severe symptoms.

The shape of the tumor in vaginal hematocele is similar to that of vaginal hydrocele, while that of encysted hematocele varies, the testicle in the latter being found below the tumor. Translucency is not found in any form of hematocele.

The *diagnosis* of traumatic hematocele is generally clear, the history of the case and the local condition indicating its nature. The spontaneous variety is often mistaken for a solid tumor, and frequently the diagnosis can be reached only by making an exploring puncture.

Treatment.—The patient must be placed upon his back, the scrotum elevated and bathed with cooling lotions. Free purgation is often beneficial, and anodynes may be required to relieve the pain. In mild cases improvement begins in a few days, and but little suffering is experienced. In many cases the effusion continues, and the tension must finally be relieved by puncture. The contents of the

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