Pooley (J.H.)

CLINICAL LECTURES

ON

SURGERY,

DELIVERED AT

STARLING MEDICAL COLLEGE

BY

J. H. POOLEY, M.D.,
Professor of Surgery.

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CLINICAL LECTURES ON SURGERY.

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LECTURE II.

Hydrocele.

The patient before you, Mr. S——, aet. 28, a native of the United States, and a plasterer by occupation, is afflicted with the very common surgical malady known as hydrocele of the tunica vaginalis testis, a disease to which I propose to direct your attention this morning.

But before doing so I will first mention, and briefly comment upon, a somewhat unusual circumstance in this patient's history. It is this:

Four years ago he first noticed this hydrocele, which is on the right side; it grew slowly but steadily, until it hung half way down his thigh, and he had to have allowance made for it in the construction of his pantaloons. Such was his condition, and such had it been for some time, when, on April 18, 1877, he fell from a step-ladder, a distance of about six feet, striking upon his side and shoulder. He is quite sure he did not strike or hurt his scrotum in any way, and he felt no pain there at all.

He went home and lay down, feeling rather bruised and shaken by his fall, and about an hour and a half after the accident, on feeling for his hydrocele, to his surprise it was not to be found, or at least a wonderful change had taken place in it.

The swelling was diminished more than one-half in size, it had lost its definite outline and tension, and instead of the familiar,

hard, globular enlargement of the right side, there was a general, soft, boggy swelling of the scrotum. He was very much alarmed by this state of things, unnecessarily, of course, and sent for his physician, who never having seen or heard of anything of the kind before, and not knowing exactly what to make of it, brought him to me for opinion and advice. I saw him April 20th; the scrotum was then very nearly of the natural size, with its integument very much thickened and corrugated, both testicles plainly felt in their natural situation and free from swelling or tenderness.

There was considerable ecchymosis; indeed, the scrotum was almost as black as a negro's, and this discoloration extended, though in a minor degree, over the penis, and up for a considererable distance on the right inguinal region. He was free from pain or inconvenience of any kind; his anxiety was easily dissipated; all he wanted was an explanation of his curious adventure, and opinion as to the probable result. The explanation was not difficult; there could be no doubt that he had ruptured his tense hydrocele sac by the mere concussion of his fall; its contents had been discharged into the loose meshes of the neighboring connective tissue, and before I saw him, completely absorbed, whereas, the accompanying blood, or its coloring matter at least, had not.

Never having seen a case of this kind before, and not being well prepared to give an opinion, I confidently told him that his hydrocele would not come back; in other words, that he was permanently cured. But the result has not verified my prediction, for in about three months from the time of the accident, the sac began slowly to refill, and now, nine months afterwards, is about as large as ever, and presents all the ordinary characteristics of a hydrocele.

The accidental rupture of the sac of a hydrocele is quite a rare event, and does, in the majority of instances, though not in all, as we have evidence before us, result in a permanent cure of the disease. I mentioned this case soon after it happened, at a meeting of the Columbus Academy of Medicine, when Dr. N. S. Town

shend, of the Ohio Agricultural and Mechanical College, who was present, related the following, as having occurred in his practice many years before :

A man, who had a large hydrocele, was chopping wood, with the handle of the axe between his legs, and while thus engaged, he struck his scrotum a severe blow either with the axe-handle, or his doubled fist; he could not tell which. He suffered severe pain ; the tumor almost instantly lost its defined character, and soon disappeared entirely. There was considerable ecchymosis of the scrotum, penis, and groin, which lasted a long time. The cure in the case was permanent, as the man was under observation ten years afterwards, and there was no return.

Percival Pott records the following case : "A middle-aged man showed me a hydrocele of the vaginal tunic, which had been near two years collecting, but from which the water had never been drawn. I advised him to have it done soon, and he fixed on the next morning. On his way home he got fuddled ; fell down into the area of an empty house, and, in his fall, struck his scrotum against a piece of scaffolding. In the morning, early, he sent for me. I found him in bed, with a great ecchymosis under the skin of the scrotum, which was much swollen and very painful. I would have persuaded him to have permitted me to let the water out (thinking, thereby, to have taken off part of the tension), but he would not consent, and I was obliged to have recourse to fomentation, cataplasm, etc.

"In about a fortnight, all the ecchymosis was dissipated, and all the swelling from the sound side of the scrotum ; and both the patient and myself thought that the tumor from the hydrocele was considerably less than it was before the accident. By persisting in the same method, for about three weeks more, the whole of it disappeared, nor has it returned since. Nor have I, ever since, seen the same attempt succeed."

In this case the cure was remarkably slow and tedious, the absorption of the fluid after accidental rupture generally taking place in a few days. Mr. Bransby Cooper, in his "Lectures on Surgery,"

mentions the following: "A gentleman consulted me who had been the subject of hydrocele for two years, and had twice submitted to evacuation of the fluid by surgical operation. The fluid had, however, again accumulated; but, on the day before he applied to me, he had run against a post, and struck the scrotum. This had produced considerable inflammation, but no sign of the bursting of the tunica vaginalis. I ordered antiphlogistic remedies, and recommended that he should remain in a recumbent posture. This led not only to the relief of the inflammatory action, but, to my great surprise, the fluid became absorbed, and the hydrocele was permanently cured."

Notwithstanding Mr. Cooper's opinion to the contrary, we can not help thinking there may have been a rupture of the sac in this case.

Sir Astley Cooper, to whom we may confidently look for information on almost any subject connected with surgery, says: "Hydrocele is not always cured by a blow which tears the tunica vaginalis. I once attended a gentleman who consulted me for a hydrocele, and who, while riding in the neighborhood of Gibralter, was thrown upon the pommel of his saddle, and received a severe blow on the scrotum. The hydocele, in a few hours, disappeared; but, in six months, again formed, and was, he thought, as large as before. I injected it about two years after the above accident."

Sir Benjamin Brodie relates a case of a hydrocele ruptured and cured by an accidental blow. Mention is also made, on what authority I know not, of the sac having been ruptured by coughing, with a similar result.

And, finally, several cases are on record in which hydrocele, in the adult, has disappeared spontaneously, without any blow, rupture of the sac, or anything of the kind. This, which, in children, is common enough, as we shall presently see, is very rare in the adult.

But I think the most curious and interesting history on record

of its kind is the following, which I quote from the Ohio Medical Recorder, November, 1877:

"Mr. A. C. T., aged forty-five, a resident of Belmont county, Ohio, gave the following unique history: About five years ago, he observed a swelling which seemed to involve the left testicle. It gradually increased in size until it was as large as the largest cocoanut, and was very hard. One day, in 1873, in the harvest-field, he happened to put his hand to the parts, when this hard mass was gone, and in its place was a soft diffuse swelling, involving the prepuce, the covering of the penis, the walls of the scrotum, etc. It was not attended by any uneasiness whatever, and did not deter him from proceeding with his work. In like manner, in February following; then in September, 1876, and again, in August, 1877, the same occurrence was repeated. Within a few days after each of these ruptures, these soft swellings pretty much disappeared, leaving the parts highly colored for five or six days, and the tunica vaginalis apparently empty. Since the last rupture, the sac has refilled quite slowly. The patient thinks its present size, although it is more than two months, is only about one-third its full size; yet, on tapping, eighteen ounces of fluid of a dark grumous color was removed. The testicle being healthy, two ounces of a fluid, consisting of equal parts of water and tincture of iodine, were thrown into the sac, and allowed to remain a few minutes, and then drained away."

Though we have spent so much time over the subject of rupture of the sac by violence, or otherwise, which our case suggested, we have still some time left to devote to the general subject of hydrocele, to which, accordingly, I now invite your attention.

The word hydrocele is formed by the combination of two Greek words, and means literally a watery tumor, or a tumor containing a watery fluid. Accordingly, we hear and read of hydroceles of the neck, referring to certain peculiar cysts of that region, a use of the word which I deprecate as confusing to the mind, preferring to confine the term to serous collections in the region of the scrotum, testicle, or spermatic cord. Even when thus limited, it

includes numerous species, such as hydrocele of the testis, encysted or diffused hydrocele of the cord, congenital hydrocele, etc. But when the term hydrocele is made use of simply and without any qualifying word, it is understood to mean a collection of serous fluid in the closed sac of the tunica vaginalis testis. To this commonest form of the disease, this hydrocele *par excellence*, so to speak, we shall devote our attention at this time, leaving its varieties and complications for a future occasion. Hydrocele, then, we may define as follows: an accumulation of fluid in the tunica vaginalis testis, producing a pyriform, fluctuating, and generally a translucent swelling in the scrotum.

It is a very common disease, more so in tropical countries than elsewhere. If we except the years of infancy and early childhood, when, however, it is generally of the variety known as congenital, not that it exists at birth, but for the same reason that certain herniæ are called congenital, viz., because it exists with an unclosed communication between the tunica vaginalis and the peritoneal cavity—it is more frequent in advanced periods of life.

It occurs, generally, on one side only of the scrotum, and about as often on one side as the other. Sometimes, however, it is found on both sides at once, constituting a double hydrocele.

Ordinarily, the sac of a hydrocele, consisting, as it does, simply of the distended tunica vaginalis, is single and pyriform in shape, gradually diminishing in size from below upwards, and ending at the external ring in a well-marked constriction. Some interesting variations from these characteristics are occasionally noticed; it is sometimes quite globular, sometimes cylindrical, sometimes lobulated by the formation of pouch-like diverticuli from the main sac, sometimes hour-glass in shape from constriction about the middle of the sac, the portions above and below the constricted parts at times completely cut off from each other, so as to constitute really two sacs, but generally communicant by an opening more or less ample. Though, as remarked, the sac of an hydrocele generally terminates abruptly at the external ring, instances have been reported where it has been prolonged upwards

into the abdominal cavity without communicating with the peritonæum; and this occult hydrocele has been found to contain nearly as much fluid as the external one, and sometimes to be separated from it. At times the hydrocele cavity is traversed by bands or trabeculæ, stretching across it from side to side. All these variations in the form of the sac are quite rare, the rule of its pyriform shape, with the base downward, being all but universal.

The sac is generally quite thin, being composed of the distended tunica vaginalis, and this, with the tenuity of the overstretched strotal integument, whose wrinkles are all obliterated, leads to one of its most characteristic features and one extremely valuable for diagnostic purposes, namely, its power of transmitting light. The longer an hydrocele exists, as a rule, the thicker does its sac become, till, in some cases, it is a very tough, fibrinous resisting membrane. Calcareous deposits in isolated plates sometimes take place upon its inner surface; and these have, in some cases, extended by coalescence over the whole sac until it has become a solid, calcareous shell—a sort of earthenware jug.

The testicle is generally situated at the posterior and upper part of the tumor, out of harm's way, but sometimes, for reasons that have never been satisfactorily explained, it is found in front; this fact, as we shall have occasion to remark further on, is one of practical importance. In ordinary hydrocele, the testicle is generally quite healthy, and remains unaffected by its unusual surroundings, being neither larger nor smaller than its fellow.

The fluid of an hydrocele, as you have repeatedly witnessed in this clinic, is a clear, transparent, amber or straw colored fluid, and, as I have demonstrated to you, by heating it in a test-tube in your presence, highly albuminous. Its specific gravity is about 1,025, and it contains, in addition to albumen and ohter organic matters, a small proportion of salts.

I have never witnessed any remarkable variations in this fluid, having never seen anything more unusual than a few curds or flakes

of lymph floating about in it. But it does sometimes vary very widely from its ordinary and well known appearance. It is sometimes dark colored, brown, greenish, blood-stained, and so on; sometimes thick and greasy, or gelatinous; sometimes grumous, or like coffee grounds. At times, and it is said especially in old people, shining scales of cholesterin may be seen sparkling and scintillating in it in great numbers.

There is an account in the American Medical Recorder, for October, 1821, of a case of hydrocele in a boy, aged thirteen, in which a quantity of sabulous matter was discharged along with the fluid.

More rarely, there have been discharged from a hydrocele bodies like the false or movable cartilages sometimes found in large joints, and these have been seen not only loose, but also hanging by long attenuated pedicles to the walls of the sac, showing that they are produced somewhat in the same way here that they are in the articulations.

This seems to have been the case with the celebrated John Wesley, who had a hydrocele, of the tapping of which he gives the following quaint account in his Journal: "Mr. Wathen performed the operation, and drew off something more than half a pint of a thin, yellow, transparent water; with this came out (to his no small surprise) a *pearl* of the size of a small shot, which he supposed might be one cause of the disorder by occasioning a conflux of humors to the part."

Hydroceles vary very much in size, which is best expressed and appreciated by the measurement of the contained fluid, the quantity of which is often very extraordinary. One thing has invariably struck me in tapping an hydrocele, and that is that the quantity of fluid has always seemed much greater than might have been expected from the size of the tumor. The average of such hydroceles as I have seen would certainly be as high as ten or twelve ounces, though twice this is not very unusual. It sometimes amounts to several pints. Mr. Butcher, of Dublin, mentions having withdrawn 4½ pints on one occasion. But even this is noth-

ing compared to the enormous collection in the scrotum of Gibbon, the celebrated historian, from which Mr. Cline drew off the astounding quantity of six quarts. This is, I believe, the largest hydrocele on record. A Mr. Davies, practicing, I think, at the time, in Ceylon, mentions, though in somewhat ambiguous terms, a very large one.

He relates, in the British Medical Journal, 1857, page 593, that he tapped an enormous hydrocele, hardly smaller than the body of a robust child, and removed a wash hand-basin full of serous fluid. There is a delightful uncertainty as to the amouut of astonishment one ought to feel at his oriental narrative, for the bodies of children, even robust children, and even robust Ceylonese children may, one should think, differ very considerably in size.

If the case is not unique, certainly the comparison is.

Hydrocele is essentially a chronic disease, which may last for many years, or a whole life-time, without having, as a rule, any tendency to recovery, or to do any harm beyond the growing inconvenience of its slowly increasing bulk. It seems to originate in an accummulation of the natural secretion of the part, determined by loss of balance between the secerning and absorbing functions, generally without any inflammatory complications. Its cause is involved in obscurity, and generally none is known to the patient. Occasionally, it has been attributed to blows or other injuries, but even in cases supposed to have been thus caused, much doubt remains. Prof. Geddings, of South Carolina, says that it is generally caused by inflammation of the urethra, but so far as I know, he is the only author who makes the statement. He brings forward no facts to substantiate it, and, with all due respect to him, I believe it to be utterly without foundation.

The diagnosis of hydrocele is not difficult, and yet mistakes with regard to it are so frequently made, that I need offer no apology for dwelling upon it at considerable length. The affections for which hydrocele is most liable to be mistaken, are hernia, varicocele, hæmatocele, and various enlargements of the testicle. The most common error is that of confounding it with hernia,

and I may mention here, as a matter of curiosity, that the very nomenclature of the disease has been tainted with this confusion, for it is called by many of the common people, and in some of the old surgical treaties, water rupture, and by the Germans, by the exactly equivalent term, *wasser-bruch*. The following are the main diagnostic differences between hydrocele and hernia:

In hydrocele, the swelling begins at the bottom of the scrotum and ascends towards the external ring, and is more or less distinctly pyriform in shape, variations in this respect, as already stated, being very rare. In hernia, the swelling commences above and diminishes as it extends, being smaller at its lower part. The common hydrocele of adults, to which alone this lecture relates, is a permanent swelling, uninfluenced by position or manipulation. Hernia (except when irreducible) recedes when the patient lies down, or may be made to do so by manipulation, or taxis, as it is called, and returns when he assumes the erect position, or the pressure is removed. The tumor of hydrocele is dull on percussion; a hernia is resonant, if not over its entire surface generally, at least in some part thereof, for it generally contains some intestine. In hydrocele, there is more or less sensation of fluctuation, and no impulse communicated to the fingers on the patient's coughing; hernia does not fluctuate, and does give an impulse when the patient coughs. In hernia, the swelling is opaque, and does not transmit light or become translucent, when examined with artificial light, whereas an hydrocele does. This symptom is so important and peculiar that we must dwell on it for a moment. Its presence is proof positive in favor of hydrocele, although its absence is not decisive against it. It may fail to be present from dark color or turbidity of the fluid, or extreme thickness of the sac, but in the immense majority of hydroceles it is present to a more or less marked degree. In seeking to elicit this sign, the patient should be taken into a darkened room, and while the tumor is grasped with the left hand, in such a way as to put the parts upon the stretch, a light is placed behind it, as near as may be without burning the patient, and shading the front of the scrotum

with the right hand, the light may be seen shining through. Sometimes we may assist ourselves by looking through some tube, such, for instance, as a piece of stiff paper, rolled up into a hollow cylinder. Another plan is to have the patient lying upon a table, in a convenient position, and while making the examination, the head of the examiner may be covered with a shawl, or screen of dark cloth, after the fashion of the photographer when looking through his camera, at his waiting victim.

Finally, in cases of doubt, it is allowable to puncture the swelling with a fine exploring needle or trocar, which will settle the question.

The diagnosis from varicocele, can not be difficult when we remember the following points in which it differs from hydrocele. Varicocele presents an irregular surface, and feels like a coil of earth-worms under the skin ; it slowly disappears when the patient maintains for some time a recumbent position, and is generally the seat of a dull, dragging pain, at least when of a considerable size.

Hæmatocele follows immediately upon an injury, and soon attains its maximum development ; the fluid effused is dark colored, hence the tumor is without translucency, and there is frequently superficial ecchymosis about the scrotum.

Enlargement of the testicle will often occasion great perplexity, and demand great care in the examination. Common orchitis, with its hard, heavy, painful tumor, can scarcely do so, but encephaloid, sarcomatous, and other growths may be very difficult of discrimination. For their proper appreciation we have only to remember and carefully apply the distinctive symptoms of hydrocele, and, in cases of doubt, resort to the exploring needle. This is all the more necessary and proper from the fact that these diseases are often complicated, with the effusion of more or less fluid into the tunica vaginalis. The prognosis of hydrocele, as already intimated, presents nothing of importance for our consideration ; it does not threaten life, it does not cause severe pain ;

it simply remains as a permanent inconvenience, liable to increase indefinitely, and with greater or less rapidity.

We come, now, to the most important part of our subject, viz., the treatment. Having diagnosticated and prognosticated, like wise and learned men, what can we do to cure our patient?

The treatment of hydrocele is divided into the palliative and the radical. By the first, we simply alleviate, for a time, our patient's condition; by the latter, we remove the disease and prevent its return. The palliative treatment consists in evacuating the contents of the tumor, from time to time, as may be necessary, and thus keeping our patient in a condition of tolerable comfort. The operation of tapping an hydrocele may be done with a lancet or bistoury, but is very seldom so performed, a trocar or canula being generally used as most suitable and convenient. A medium sized or rather small instrument should be made use of.

Some surgeons prefer to make a little preliminary incision through the integument, but this is unnecessary unless you are aware, from previous experience, or otherwise, that you have to do with a very thick or tough sac. Ordinarily, the trocar may be used without the preliminary incision, and in the following manner: The scrotum is grasped and put upon the stretch by the left hand, and the trocar, its point having been dipped into sweet oil, is thrust perpendicularly through the various coverings of the hydrocele at its lower and anterior part, avoiding any superficial veins that may be present, and the testicle, whose situation has previously been made out, and as soon as the instrument is felt to have entered, its direction is changed, and it is passed on obliquely upward, the trocar withdrawn, and the fluid evacuated through the canula.

After tapping, the hydrocele sometimes, though rarely, does not refill, but is permanently cured.

Much more frequently, however, indeed as a general rule, it fills up again in the course of a few months, and must be again emptied, and the operation has to be repeated at varying and uncertain intervals as long as the patient lives.

Such is what is called the palliative treatment or tapping of hydrocele, and I think you will find quite a number of persons who will prefer it to any more radical treatment; indeed, in the aged, feeble, excessively timid, especially those who are in easy circumstances, I do not think it worth while to recommend any other. Dr. John Mason Warren said: "As a general rule, I have found that the wealthier classes in life prefer the palliative operation of tapping. The laboring classes, who are more inconvenienced by it in their vocations, prefer the radical cure." And in this, according to my experience, he was quite correct.

Simple as is the operation of tapping a hydrocele, there are one or two points about it worthy of attention. First, always, if possible, ascertain the exact position of the testicle before proceeding. As already said, this is generally at the upper and back part of the sac, but it may be in front. A slight prick of the testicle will not do any serious harm, but it gives unnecessary pain, which is always unsurgical and to be avoided. Should it be in front, however, and unrecognized, you might thrust your trocar quite through it, or, wounding it deeply, still fail to reach the fluid, much to your patient's disadvantage, and your own disgrace.

Above all, never tap an hydrocele when in a state of active irritation or inflammation; to do so is very dangerous, and may result most disastrously. I could cite several cases where tapping, under such circumstances, has led to a fatal result.

The radical cure of hydrocele has for its object either the obliteration of the sac, or such a change in its lining membrane as shall prevent a re-accumulation of the fluid. For this purpose there have been quite a number of operations proposed and practiced from time to time.

Before proceeding to speak of these, I will just mention, as mere curiosity, and for your delectation, one or two old ideas on the subject of the treatment of hydrocele. Dr. James, an English writer of 1745, and very old-fashioned, even for that time, says that the best remedy in new-born infants is for a man in good

health and fasting, to chew some nutmeg, and breathe often, every day for some time, upon the affected scrotum.

He adds, "I the more readily recommend this, as I have frequently seen the good effect of it. In the meantime, we do not despise the holding spirit of wine in the mouth, and at the same time breathing upon the scrotum."

Marini, an Italian surgeon, forbids any operation to be performed while the sun is in scorpio, which he says will protract the cure.

Among the operations for the radical cure of hydrocele, we may mention incision, excision, caustic, seton, suture, and injections of various kinds. The operation by incision is an old one. It consists in laying the sac freely open, by a large anterior incision, after which the older surgeons introduced into the cavity some irritant material, such as the red oxide of mercury. This part of the proceeding is now omitted, the sac being simply filled with dry lint, and allowed to fill up with granulations.

This mode of treatment is unnecessarily severe, and should be reserved for such cases as prove rebellious to milder methods, which, however, will not be very numerous. There are two cases on record, in old numbers of the Lancet, of the cure of hydrocele by the accidental incision of the sac, which, I think, are interesting enough to be worth recital:

A French naval surgeon says: "On board of our ship, while in Toulon Roads, was one Napoleon Agostini, a Corsican by birth, who had on the left side an enormous hydrocele, which he refused to have operated on. He had been allowed to go ashore, where, with some of his shipmates, he entered a cabaret, where he stayed drinking for some hours. Having all got intoxicated, they quarreled and fought, and one of the men made a blow at Agostini with a knife, by which his trousers were cut from below the waistband, half-way down the thigh. An incision, about an inch and a quarter in length, had been made in the scrotum, which not only suffered the fluid but the testicle also to escape. Next day, before the effects of his drunkenness had disappeared, the man

was brought on board. The testicle was cleaned, returned into its proper situation, and retained there by four sutures. Moderate adhesive inflammation was set up, and the wound had healed by the fourteenth day. Three months have elapsed, and the hydrocele has not returned."

The other case is given in the following words, by P. Ingram, surgeon: "The account of the cure of a hydrocele by a stab, in the Lancet, of last week, reminded me of a similar occurrence, which took place when I was in Calcutta, in 1835. A Sepoy, in a state of intoxication, repaired to the Soba Bazaar to purchase a pumulo, a species of fruit similar to an orange, but generally about six times larger. The Hindoo, who kept the shop, very quietly informed the Sepoy that he had sold all his fruit of that description, and, of course, could not, at that time, supply him with one.

"The Sepoy became quarrelsome, and the Hindoo, in his turn, quarreled with the Sepoy, stoutly denying that he had any pumulos in his possession.

"The enraged Sepoy then made a thrust with his bayonet at the Hindoo's langooty, (a handkerchief used for the purpose of concealing and supporting the scrotum, similar to a suspensory bandage), swearing that he had one concealed there; when, to the surprise of all present, the shop of the Hindoo was immediately inundated with water. The bayonet had perforated a very large hydrocele. The Sepoy was immediately taken into custody, and after he became sober, expected nothing less than hanging for murder, but he was only slightly punished, and the Hindoo had the happiness, sometime afterwards, of thanking the Sepoy for removing his pumulo, alias curing his hydrocele."

In the operation by excision, not only is the sac laid open, but a portion of it, more or less extensive, laid hold of by forceps, and dissected away. As far as I know, this operation is never performed at present. The cure by caustic consists simply in removing a portion of the anterior wall of the scrotum and sac, by the application of caustic potash, or some other powerful

estharcotic; it must be both a painful and tedious process, and is justly abandoned.

The seton was first mentioned as a means of curing hydrocele by Guido di Cauliaco, in 1498.

In modern times the celebrated English surgeon, Mr. Percival Pott, preferred it to every other means, until the latter part of his career, when he adopted the method by injection, which he had previously spoken of in terms of strong disapprobation. I shall not stop to describe the method of introducing the seton, as it is now seldom, if ever, used. Various forms and substances have been recommended, among others a loop of silver or iron wire left in the scrotum for a certain time, but this does not seem to possess any real advantage over the more ordinary materials. The objection to the seton is that it often produces a very high and unmanageable degree of inflammation, and death has even taken place from this cause. Dr. J. Mason Warren reports that in one case where he employed the seton, it led to a very severe hemorrhage. The celebrated Ricord, of Paris, at one time used a plan, which I have called suture, but which may, perhaps, be looked upon as a modification of the seton. He passed double threads, or ligatures, through the scrotum antero posteriorly, and tied the ends before and behind over pieces of bougle, after the manner of the so-called quill suture. Ricord, as far as I know, has never had any imitators in this mode of practice.

Of late years, the treatment by injections of various kinds has almost entirely superseded every other plan. The first use of injections for the radical cure of hydrocele is attributed to a British army surgeon named Monro, who employed spirits of wine. The method was first brought extensively into notice by Sir James Earl, who published a work on the subject in 1791, and recommended for the purpose wine diluted with one-third part of water. Earl, and those who followed him, injected a sufficient quantity of the irritating fluid to distend the sac to nearly the dimensions it had before the hydrocele was drawn off. It was allowed to remain in a few minutes, or until decided pain was produced; it was then

allowed to flow out through the trocar; the patient was put to bed, and the resulting inflammation, though quite manageable, was generally sufficient to lead to the desired cure; and the method must be allowed to be an improvement on all that had gone before it. A great variety of fluids were made use of, such as alcohol, wine, cold water, lime water, solutions of alum, tannin, corrosive sublimate, iodine, sulphate of zinc, and so on. A case is mentioned by Sir Astley Cooper in which milk was injected on the supposition of its being a mild, unirritating fluid; however, very severe inflammation followed, and an abscess in the tunica vaginalis. When an opening was made the milk came out in curds. Spirits of turpentine has also been used, with what result I do not know. Of all the substances recommended for injection by this method, a solution of sulphate of zinc, ʒi. to the pint of water, is, in my opinion, decidedly the best. I have used it on several occasions with complete success. Care is necessary in making these injections that the trocar is kept well in the sac of the tunica vaginalis, and that the fluid is all withdrawn before the trocar is removed. If this be not done, some of the irritating fluid may find its way into the loose areolar tissue of the scrotum, and produce inflammation, or sloughing. I remember a case of the kind in my early practice, which gave me a good deal of uneasiness. From some unlucky movement of the patient, some of the solution of zinc found its way into the scrotal tissues, and a circumscribed slough, about as large as a quarter, took place. This did no harm, but rather made the cure more complete. But it is a disagreeable accident, and might have very serious consequences.

In a paper published in the Transactions of the Medical and Physical Society of Calcutta in 1834, and subsequently in a paper read before the London Medico-Chirurgical Society, November, 1841, published in the Lancet November 20th, 1841; and in another paper in the Lancet for April 30th, 1842, Dr. J. R. Martin, of India, recommended the injection of a small syringeful of a mixture of tincture of iodine ʒi and water ʒiii, which was thrown in and allowed to remain.

Dr. Martin supports his recommendation by the experience of over two thousand cases, with less than one per cent. of failures.

Since these publications, the iodine injection has been very generally adopted, and is in favor with a majority of practical surgeons. You have seen it done repeatedly in this clinic, and will, therefore, be the better able to follow the description of the operation. After the evacuation of the contained fluid, taking care that the canula remains in the sac, so that the fluid is not delivered into the meshes of the areolar tissue, you take a small syringe, the nozzle of which has been previously ascertained to fit closely into your canula, and load it with two or three drachms of the fluid you intend to inject, (I always use the common officinal tincture of iodine, full strength, and see no reason to dilute it, or mix it with any other ingredients,) then slowly throw it in through the canula, having withdrawn which you shake the scrotum or rub its sides together, so as to bring the fluid as thoroughly in contact with its interior as possible. Sometimes pretty smart pain is at once occasioned; occasionally it does not come on until some hours later, and now and then, as in the last case we had before us, scarcely any pain is felt, and I have known it to be entirely absent, without compromising the result, which was a perfect cure.

The amount of reaction produced by the injection varies considerably, but seldom requires treatment. If it should do so, rest in the horizontal position, elevation of the scrotum, with the application of warm fomentation, generally suffices. Sometimes the swelling and inflammation subsides very slowly, requiring even weeks for their complete disappearance, but this is unusual. The iodine has been detected in the urine of the patient an hour and a half after the injection.

In cases which resist the iodine treatment, Butcher recommends the introduction, by means of a probe passed through the canula, of a few grains of red oxide of mercury into the sac. Another

writer, whose name I have forgotten, speaks of the same application, and says that one of his patients was salivated by it.

Unless the circumstances of the patient make it imperative or highly desirable, the hydrocele should be tapped at least once before resorting to the injection for radical cure; for sometimes, as already said, a simple tapping proves curative, though this is a rare event. It has often been taught that injections cure by producing adhesive inflammation and obliteration of the sac, but numerous dissections have proved that so far from being the rule, this very seldom occurs. Exactly how the curative influence is produced is by no means easy to say. Billroth, speaking of iodine injections in hydrarthrosis, says:

"The iodine is deposited in the surface of the membrane and in the endothelium; it remains here for months, at least, and by its presence appears to prevent further secretion. At first there is a strong fluxion with serous exudation, but the serum is again absorbed by the still distended vessels, and subsequently the membrane shrinks to the normal volume by condensation of the connective tissue, which subsequently remains more dense." He goes on to remark as follows: "So we may consider the process of cure as analogous to the similar process in the tunica vaginalis testis in the cure of hydrocele; after injections of iodine in hydrocele, there has been an opportunity of making many examinations, from which the course of cure appears to be as above stated; the shrinkage of the serous membrane, with new formation of endothelium, seems to me to be the final cause of the arrest of the secretion."

When the hydrocele is very large, it is not safe to inject it after the first tapping; it should be tapped and allowed to partially refill before the injection is made. By this course of procedure a smaller surface is exposed to the irritant action of the remedy, and the effects are correspondingly less severe.

I may mention here that I once cured an hydrocele merely by moving the trocar about rather roughly in the sac after evacuating it, but I can not recommend the plan for your imitation, for the

reaction was much more severe than I have ever seen it after iodine injection, indeed, quite unpleasantly so.

Several times I have seen hydocele cured by puncturing the sac in numerous places with a common exploring needle, and allowing the fluid to drain slowly away and to infiltrate the areolar tissues, but this plan is unreliable.

Lately I have seen accounts in the journals of hydroceles almost instantly cured by electrolysis, but we need more experience on this point before we can speak definitely about it. Many years ago, Dr. Deblois, of Tournay, was in the habit of curing hydrocele by distending the sac with chlorine gas. Whether he ever found any imitators, I am unable to say.

To sum up under the head of treatment, I would say to you, after a preliminary tapping, and this is imperative if the hydrocele be a large one, inject iodine; if this fail, which will be very seldom, then resort to incision.

But remember that every case of hydrocele does not demand radical treatment. If the patient for any reason prefers the simple palliation of occasional tapping, he should by all means be allowed to have his own way.