in 120 operations, operated only once on the right side. I have operated on both sides several times.

Slight turgescence of the veins of the cord does not deserve to be called a disease. The chief factor in its production is ungratified sexual desire, unrelieved erotic fancies, or, less often, the opposite condition, abuse of the sexual powers, by which the veins are kept constantly engorged. Most slight varicoceles are encountered in young unmarried men; the affection rarely commences after twenty-five; it is unusual to find it in a married man whose sexual relations are satisfactory. The slight turgescence of the veins constituting varicocele in a young bachelor and often causing him incessant and needless alarm, disappears after marriage, together with the uneasy sensations which accompanied it.

Old men whose testicles are inactive rarely have varicocele, though their legs show many tortuous veins and their tissues be degenerating. This fact is of the utmost importance, and is dwelt upon thus early in the consideration of the disease in order that attention may be specially directed to it. The idea that slight varicocele is often a sexual derangement, a functional disorder depending upon vicious sexual hygiene, is not emphasized by text-books, and is rarely appreciated by practitioners. In many cases young men distress themselves unceasingly, and importune their surgeons for an operation to cure a disorder which would be more speedily and effectually removed by marriage.

The degree of varicocele alluded to above may be dismissed briefly. It is found upon the left side; the vessels are a little full, the cord loose, feeling like a small bundle of earthworms, no one vessel being exceptionally large; the testicle is perhaps oversensitive (irritable), and there is usually a slight dragging sensation in the groin, but beyond this nothing except the fancied ills and the hypochondriacal complainings of the young man who is cheating Nature or abusing her gifts. The proper treatment of such cases is found in the employment of all hygienic and tonic measures. The patient's mind must be diverted, he must be dissuaded from an operation, told to wear a snugly fitting suspensory bandage, and if possible to forget his sex until marriage affords him an opportunity to get well. The free local application of cold water daily is a very useful adjuvant.

Yet varicocele serious enough to constitute a disease and to demand active surgical measures for its relief does occur. It is an exaggeration of the milder form; it comes on in early manhood, and has no connection with varices of the legs or anus (hemorrhoids). It is found on the left side, rarely on the right.

Pathogenesis.—Any theory to be adequate must explain the prevalence of the disease among the adolescent and its occurrence, almost entirely, upon the left side.

Many authors look for an anatomical predisposing cause. Thus certain French writers invoke a pre-existing phlebitis. Bennett [1] and Spenser [2] suppose a congenital anomaly of the veins. Such predisposing causes are not generally accepted. Sufficient anatomical predisposition is found in the position of the veins, dependent, unsupported, surrounded by the loosest kind of a fascial envelope. To this add the continual congestion set up by the untamed and pampered passions of youth, and no further predisposing cause is necessary.

But why should the varicocele occur upon the left side? To answer this question an infinite variety of theories has been proposed. There is space to enumerate only the more important ones. The left testis hangs lower than the right, and the left renal vein is higher than the opening in the cava which receives the right spermatic vein, hence the left vein is longer than the right. To this add the fact that the left spermatic vein, entering the renal vein at right angles, is not affected by suction as is the right vein which enters the cava at an acute angle. So far we are on safe anatomical ground; beyond all is theory. Perhaps, as has been alleged, right-handed men transmit the force of their exertions to the left foot by means of the abdominal muscles of the left side. But I have seen left-handed men with varicocele, always on the left side. Perhaps the sigmoid flexure, overloaded with feces, presses upon the veins. But this is as rare in youth when varicocele is common, as it is common in old age when varicocele does not occur. Curiously enough the ovarian veins are very rarely varicose, except on the left side.

A violent strain may induce acute varicocele.

Morbid Anatomy.—In mild cases the veins are merely tortuous and dilated. But in a full-formed varicocele the vessels are elongated, their valves broken down, their walls affected by fatty atrophy, and thickened, as is also the surrounding connective tissue. The veins sometimes contain phleboliths.

Symptoms.—I have seen a number of cases of *acute varicocele* resulting from straining, or coming on spontaneously. I have never seen it terminate otherwise than in recovery, under a suspensory bandage, a mild anodyne and a laxative. I have seen it last a number of weeks, and occasionally leave slight permanent enlargement of the veins of the cord.

[1] On Varicocele, London, 1891.

[2] St. Barthol. Hosp Rep., 1887, p. 137.

Except in acute cases, such as those just detailed, *varicocele comes on gradually*, and is discovered by accident. The amount of *pain* complained of varies greatly; a very large varicocele is often attended by absolutely no pain, while a very slight enlargement of the veins may give rise to considerable uneasiness extending up the back and down the thigh, perhaps amounting to neuralgia of the testis. Landouzy has noticed that the symptoms are markedly relieved during and immediately after coition, but become worse on the following day.

The only *general symptoms* in varicocele besides pain are those of hypochondria and defective *morale*, so common in all affections of the genital organs. The impotence often alleged by gentlemen of an incredible "years' experience" to result from varicocele is the veriest fiction. When impotence and varicocele coexist they are due to the same causes; but neither is the impotence due to the varicocele nor the varicocele to the impotence.

The *local conditions* are typical. The left testicle hangs considerably lower than the right, borne down, and perhaps completely surrounded by the mass of dilated veins. The mass feels soft, like a bunch of earthworms. In bad cases the testicular scrotal veins may be similarly affected. The scrotum is thin and relaxed, the dartos powerless. In long-standing cases of severe varicocele the testis gradually atrophies because of the interference to its circulation. This result is in no way due to the weight of the mass of veins.

The course of the disease is not progressive. Of the many men who have slight varicocele, only the smallest percentage fails to get well under the regulated sexual exercise of married life. Exceptionally, however, the veins do grow and enlarge indefinitely.

Diagnosis.—There are few diseases more readily recognisable than varicocele; the peculiar appearance and wormy feel of large tortuous veins can scarcely be confounded with anything else, except, possibly, omental hernia. However, a simple test will remove all doubt. If the patient lies down the swelling may be readily reduced. The fingers are now placed at the abdominal ring, and the patient told to rise; hernia will be retained, the swelling of varicocele will return, the vessels filling from below. If the pressure be sufficiently strong to occlude the arteries as well as the veins the tumour will not reappear. Varicocele, complicated by large hydrocele or by hernia, is more difficult of diagnosis.

Treatment.—If the varicocele be small and its symptoms inconsiderable, the palliative treatment already recommended for simple cases will suffice. Varicocele never compromises life, rarely deteriorates health, and, when it only causes moderate inconvenience,

may be overcome by mechanical means. If these fail, or if the patient insists upon more radical measures, surgical treatment must be employed. The operations for the cure of varicocele are three: injection, subcutaneous ligature, and the open operation; this last including ligature, excision of the veins, and ablation of the scrotum. I consider subcutaneous ligature the operation of choice in almost every case.

Injection.—Englisch [1] has recently revived the injection treatment of varicocele. He employs from 2 to 6 hypodermic injections of alcohol into the bundle of veins. His statement that the treatment requires one or two months and is available only in the mildest cases is quite sufficient to condemn the method.

Subcutaneous Ligature.—Though the open operation for varicocele, as well as for hydrocele and stone in the bladder, will always appeal to the general surgeon, I can now heartily reiterate my opinion announced in presenting this as a perfected operation to the profession fifteen years ago [2]—time and experience having but fortified my belief—that subcutaneous ligature of varicocele is a simple operation, and, if properly done, perfectly safe and absolutely curative.

Fig. 172.—Needle for Subcutaneous Ligature of Varicocele.

The instruments required are: (1) a rather large straight needle in a solid handle, the eye of which is closed on the Reverdin principle, and kept closed by a spring in the handle (Fig. 172), and (2) a spool of heavy (No. 12) twisted white silk. The patient is prepared in the usual manner. The surgeon's hands and instruments are sterilized. By means of a 1% solution of cocain an area 1 cm. in diameter is anesthetized in a place selected in the upper part of the front of the scrotum, and a similar area in the back. The needle is then armed with a strand of silk 25 cm. long; its eye keeps closed by the automatic action of the spring. With the patient standing beside the bed and the surgeon seated on a low stool facing him, the operation now begins.

The surgeon grasps the scrotum with the thumb and index finger of his left hand. By drawing the fingers slowly towards the patient's

[1] Allgem. Wien. med. Zeitung, 1897, xlii, 233, 243, 255, 267.

[2] N. Y. Med. Record, February 20, 1886, September 18, 1886, and November 26, 1887.

right side the spermatic cord is allowed to slip piecemeal from the grasp. First the flabby veins of the plexus slip through in a worm-like bundle, then, after a slight interval, the solitary thick vas, followed perhaps by one or two more veins. This maneuvre is repeated once or twice until the surgeon is absolutely sure that he has identified the interval between the vas and the plexus. Then, holding the veins well to the outer side, and pinching the scrotum tightly to be sure that no veins elude his grasp, the needle is plunged into the anesthetized area close to the tip of the thumb. If the skin in front and behind has been anesthetized this maneuvre is quite painless. When the needle emerges from the back of the scrotum (Fig. 173), its eye is opened by retracting the button in the handle, the silk loop disengaged from it, and *one end* of the silk pulled through and out of the scrotum posteriorly. Now the scrotum is traversed independently by the needle and a single strand of silk.

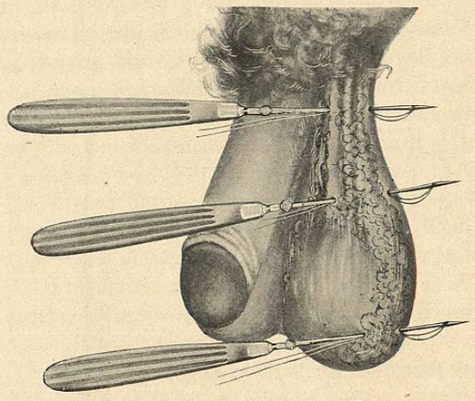

Fig. 173.—Subcutaneous Ligature of Varicocele.

At this juncture the patient usually feels faint, and he may be allowed to lie upon the bed. The remainder of the operation may be performed under general anesthesia if the patient so elects.

The needle, with its eye tightly closed but empty of thread, is now withdrawn partly, but not from the point of anterior puncture, and the veins are allowed to slip back towards the vas. As soon as this occurs the needle, which has not been withdrawn entirely, is again advanced outside of the veins close under the dartos and carefully made to emerge behind at the exact point from which the silk is protruding. The bundle of veins now lies between the strand of silk and the needle. The eye of the latter is again opened, the silk engaged in it and drawn through the scrotum and out of the anterior opening. A little piece of dartos will always be included in the silk at the point of posterior puncture. This is torn away by pulling the scrotum backward while making strong traction upon the loop of silk. The veins only are thus caught in a loop of silk, which is tied firmly and tightly in a triple knot. The ends are cut short and the

knot allowed to recede into the scrotum. A drop of collodion upon each puncture completes the operation.

This single ligature suffices for most cases. I also often tie the veins just above and, exceptionally, below the testis, and, in a few cases, I have applied the ligature to dilated veins on the inner as well as on the outer side of the vas. I have never introduced more than 3 ligatures in any one case. Like the first, each ligature must be introduced on a separate needle before the patient is permitted to lie down; after which the second puncture may be made for each needle and then the strands of silk tied consecutively. The veins below the testicle are especially hard to separate from that gland.

In a few recent instances I have performed the entire operation with the patient anesthetized and recumbent; but, although the cases have all progressed satisfactorily, I am not yet prepared to sanction this method, since the possibility of puncturing a vein is far greater with the patient recumbent than when he is standing and the veins are dilated.

For *after-treatment* the patient is kept in bed with the testicle supported for forty-eight hours. The pain is insignificant and may be soothed by a hot-water bag. A certain amount of edema persists for two weeks, during which time perfect comfort is insured by a suspensory bandage. After this edema disappears the ligature may be distinctly felt, and usually remains unabsorbed for years. I have found it in place six and seven years after the operation. Rarely the ligature works its way out at the end of several months. This does not incapacitate the patient since it is accompanied by no active suppuration.

To insure the success of this little operation several points must be insisted upon:

1. Cleanliness, to prevent suppuration.
2. Careful exclusion of the vas deferens from the ligatures.
3. Careful inclusion of all the varicose veins. If all are not included the varicocele may not be cured, or a vein may be punctured.
4. Tying the first knot tightly. If the first knot is not tied with all the surgeon's strength he cannot feel assured that all the veins are obliterated. The tying of this first knot causes considerable pain and faintness.
5. Tying the veins internal to the side of the vas if they are varicose.

If precautions 3, 4, and 5 are observed there can be no recurrence so long as non-absorbable ligatures are employed. With catgut relapse is certain, with silk practically impossible. I have seen re-

lapses and once atrophy of the testis after operations by others, but have not known either of these accidents to occur in any of my cases since I began to use silk fourteen years ago. An abscess formed about the ligature after one of my first operations, when the eye of the needle caught in the fascia and tore the tissues considerably. The patient left the hospital as usual on the third day, but returned a week later with an abscess, which was opened and continued to discharge until the fourth week, when the suture came away and the wound promptly healed. During this time the patient was able to continue his work without any inconvenience beyond wearing a suspensory bandage and keeping the wound dressed and clean. At the end of the fifth week after operation he was entirely well, and the cure has been permanent. This case is in striking contrast to the bad results so often seen from the open operation, after which I have known a case to drag along for two months and a half, with recurring abscesses.

The Open Operation.—The open operation for varicocele is calculated to appeal to the general surgeon. Excellent results may be obtained by this method at the cost of a little extra trouble, a little more time in bed, and a little more danger of prolonged suppuration. Yet the ultimate results are quite as good as those obtained by the subcutaneous method, and there is no danger to life in either case. I have seen complete atrophy of the testicle from an open operation performed by one of New York's best surgeons.

It is best to make the incision where the scrotum joins the groin, so that the veins are exposed just below the external inguinal ring. By operating in this region the danger of scrotal hematoma is materially lessened and the veins are encountered above their point of varicosity and tortuosity and can be conveniently handled. The vas, with its accompanying vessels, is separated from the bundle of veins and drawn to one side. The veins are then divided between two ligatures, or else the bundle of veins is drawn up out of the scrotum, an inch or so excised between ligatures, and the ends of the ligatures left long and tied together. By this means the cord is shortened and the testicle hoisted to its proper position alongside of its partner. Oozing is then checked and the wound closed. The operation may be performed under local anesthesia.

Ablation of the scrotum may be employed when it has been greatly stretched, but I do not believe the distensible scrotal skin can ever be depended upon to support the testicle so as to cure varicocele, and therefore I see no purpose in reefing the scrotum, except to remove redundant tissue. To elevate the testicle the veins must be shortened. Ablation of the scrotum may be performed

with a curved scissors. Special clamps have been devised for the purpose, but a long, springy, curved pedicle clamp, such as the older gynecologists used, is as good an instrument as any to mark off the quantity of tissue to be excised.

Choice of Operation.—I employ the subcutaneous operation for all varicoceles except those enormous ones in which the scrotum is much distended and elongated. For these incision and resection of the veins is the operation of choice.

TUMOURS OF THE CORD

Cystic Tumours.—See Hydrocele of the Cord (p. 766).

Solid Tumours.—Solid tumours of the cord are rare. Fibroma, fibro-myoma, and sarcoma, all of the vas deferens, have been observed in isolated instances. Gumma is very rare (Goldenberg).[1] The only tumour of clinical importance is lipoma of the cord. The frequency of lipoma of a hernial sac lends colour to the theory that lipoma of the cord is secondary to hernial lipoma. In structure the tumour may be a pure lipoma, a fibro-lipoma, or a myxo-lipoma.

These tumours are usually small and reducible into the inguinal canal, stimulating epiplocele, from which they are only differentiated by operation, unless they can be drawn entirely out of the canal. Exceptionally, however, they attain an extraordinary size. Nové-Josserand [2] reports a specimen weighing 6½ kilos, and cites two others weighing respectively 20 and 15 pounds.

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[1] J. of Cut. and Gen.-Urin. Diseases, 1901, xix, 113.
[2] Lyon méd., 1897, lxxxiv, 237.