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THREE CASES OF OPERATION FOR THE RADICAL CURE OF CON-
GENITAL INGUINAL HERNIA;

WITH ONE SUCCESSFUL, ONE PARTIALLY SUCCESSFUL, AND ONE UNSUCCESSFUL RESULT.

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[Communicated for the Boston Medical and Surgical Journal.]

CASE I.—Daniel S——, a healthy boy, eight years of age, has a congenital inguinal hernia of the right side, producing a tumor in the scrotum as large as a hen's egg. The ring is large enough to admit the fore-finger with ease, and to a considerable depth. The scrotum is not much thickened; the cord and testes are healthy, and there is no varicocele. The intestine is reducible by himself with great facility, and returns into the scrotum as soon as he assumes the erect posture. He has worn a truss, but has latterly been unable to keep the hernia up with it, and has left it off. Bowels regular; otherwise well. The healthy and uncomplicated state of the parts, and the constitution of the boy appearing favorable for an operation, it was decided to attempt a radical cure of this infirmity, which was increasing with his years.

March 21st.—The bowels having been cleared with castor oil, and the bladder emptied, he was etherized, placed on his back, and the hernia reduced, and kept up by the finger of an assistant pressing over the internal ring.

The skin of the scrotum was invaginated into the inguinal canal, and, with the cord lying beneath the back of the finger, the inner pillar of the aponeurosis of the *external oblique* muscle, and the conjoined tendon of the *internal oblique* and *transversalis*, were raised upon the tip of the finger towards the skin, about half an inch above the *pubes*. A curved needle, armed with a silver suture, was now entered over the tip of the finger from above the *pubes*, carried through the inner pillar and invaginated scrotum, and thence, protected by the finger, out just below the *pubes*, where the invaginating finger was first entered. The needle was now detached. Next, armed anew with another silver suture, it was entered from below, passed by the outer side of the finger through Poupart's ligament,

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and thence across the ring, emerging at the same point through the skin, just above the pubes, as the first suture had entered. The four ends of the silver suture were then passed through two holes of a large button, and clamped pretty tightly over it. The boy now vomited and strained violently from the ether, but the hernia did not come down. He was now put to bed on his back; given one teaspoonful of paregoric, to be repeated if necessary. He was ordered gruel; to remain strictly in the horizontal posture, and have his wound constantly wet with cold water.

With the exception of some pain and tenderness over the abdomen, accompanied with but little fever, everything went on well for three days. Some discharge began to appear around the button, and at the point of invagination.

March 24th.—He was given some castor oil. In the night he got up unperceived, walked to the water-closet, and had one large evacuation, and sat and strained, with stomach-ache, as he thinks, nearly an hour. Severe orchitis now supervened, which ran a course of about a week, and then gradually subsided. The testicle was much enlarged during the acute stage, and very painful. It was treated with cold applications, and opium internally. There was a good deal of purulent discharge around the stitches, and a sinus opened above the pubes. But the sutures held on; the bowels and urine were well; there was no descent of the intestine, and the testicle passed out of the acute stage. Three weeks and a half after the operation, the sutures were removed. It was noticeable, that although blackened by contact with pus elsewhere, yet at their points of perforation of the pillars of the ring, the wires were as bright and clean as when first introduced, showing that they had produced very little suppuration at the immediate point of puncture. In one week more the sinuses were closed; the hernia remained up; the scrotum was well invaginated, and everything promising. He was now, one month after the operation, allowed to get up and walk about the room. No truss was applied.

May 23d, *one month* after getting up, and two months after the operation, the scrotum remains firmly invaginated; the testicle painless, and about one third larger than the other; the inguinal canal appears filled with a dense deposit of lymph; the hernia remains up, and there is no bulging. He feels well; has regained his flesh and activity, and plays about with other boys. So far there is no disposition to a return of the hernia; though, of course, the cure cannot be called *radical* until verified by the lapse of many months. No truss was advised.

CASE II.—William M——, 12 years old, has a congenital inguinal hernia on the right side, of moderate size. The ring, however, is large, admitting the thumb without difficulty. Testicle, cord, and spermatic plexus of veins, healthy; otherwise strong and active. Has worn different trusses, which were made for him, for years,

but cannot keep it up with them. The difficulty is increasing as he grows.

April 13th.—After being etherized, and the hernia reduced and held up as before, an incision about three fourths of an inch long was made through the skin of the scrotum of the right side, at its lower part. The fascia of the scrotum was now dissected subcutaneously from the skin, to which it adheres only by loose cellular tissue, for a space about an inch and a half in diameter all round; or until the fascia could be invaginated into the inguinal canal, without puckering the skin. The forefinger of the right hand being placed over the cord, and invaginating the fascia of the scrotum as high up into the inguinal canal as possible, a needle, with the eye in the point, was next carried up along the finger and made to perforate the conjoined tendon and inner pillar near the internal ring. The skin over the point of the needle was then drawn a little inwards and upwards, and it was made to emerge, when it was threaded with a silver suture and withdrawn, leaving one end of the wire projecting above the *pubes*. Next, the finger was turned downwards and outwards beneath Poupart's ligament, pressing the cord back out of the way. The needle was next made to perforate Poupart's ligament, from within outwards, and as near the central point between the anterior superior spine of the *ilium* and the spine of the *pubes* as possible, and then, by drawing the skin downwards and outwards, the point was brought out, by a little manipulation, at the same hole where the first stitch emerged above the *pubes*. Here a loop of the suture was retained, and the needle again drawn back. The finger being now turned upwards and *inwards*, and the needle following it, it was made to pierce the inner pillar and triangular ligament at the edge of the *rectus*, and again brought out, for the third and last time, through the same puncture, above the *pubes*. The needle was now detached and the finger withdrawn. There were now left out above the *pubes*, two free ends of the wire suture, which had passed through the inner pillar, one near the internal ring, and the other near the edge of the *rectus* muscle; and a loop, whose other end was encircling Poupart's ligament, at a point nearly half way between the *pubes* and *ilium*. The loop and the free ends were now crossed and brought through two holes of a button, and clamped firmly over it. Previous to this, however, it was found, on passing the finger into the inguinal canal, that the fascia of the scrotum was tightly drawn up into this cavity, that the cord and testicle were free, and that on drawing the wires, the sides of the inguinal canal were approximated to each other.

It is, perhaps, right to add, that the instruments with which this operation was done were poor, and not entirely adapted to its difficulties, and that it was feared at the time that it might be but

imperfectly performed. As in the previous case, vomiting now recurred, and failed to bring down the hernia, and the same treatment was adopted as before.

There was no orchitis; very little pain; not a bad symptom; on the contrary, it was feared he was not getting up inflammation enough for a cure. There was a pretty free suppuration around the stitches, and through the incisions in the scrotum. The sutures were removed in two weeks and a half after the operation, and in four days more the wounds had closed. He was now, three weeks after the operation, allowed to sit up, and move about the chamber. The hernia remained up, and there was some induration along the course of the inguinal canal. The skin of the scrotum was not puckered at all.

May 13th.—About one fortnight after getting up, a slight protrusion was noticed at the internal ring, and the hernia slowly came down through the outer ring, towards the scrotum. Examination by the finger revealed the external ring reduced in size about one half, with firm, sharp and defined edges, showing it the result of actual approximation of its walls, and not of soft effused lymph. There was also so much thickening of the scrotal fascia and cellular tissue over the ring, as to preclude the performance of a secondary operation at once. He was therefore advised to wear a truss, with a weak spring and a flat pad, for some weeks, and then, if not entirely relieved, to submit to another operation, which, if it accomplished only so much as the first, afforded good promise of a radical cure.

CASE III.—John A.—, aged 8 years, has a congenital inguinal hernia on the left side. The tumor in the scrotum is enormous for a child, reaching more than one third down the thigh. Considerable taxis is required to reduce the hernia; due more to its size, to a considerable thickening of the scrotal cellular tissue and a varicocele, than to any obstruction about the ring, which is so large as to admit readily the thumb, and to allow the fore-finger to sweep round under the *rectus*, down behind the pubes on to the bladder, upwards over the external iliac artery, and outwards into the femoral canal, beneath Poupart's ligament. The child looks a little lymphatic, and not of so tough a fibre as the former cases; yet his general health is good.

May 2d.—He was etherized, and operated on as in the second case, by a subcutaneous dissection of the scrotal fascia, two stitches through the inner pillar and one through the outer. The only points of difference in this operation were, that the common silk ligature was used instead of the silver suture, as being more easily manipulated, and that the stitches were passed by an instrument resembling a rather sharp aneurism needle. Very complete closure of the inguinal canal and external abdominal ring were obtained,

by drawing the stitches tight over a pad of soft wood, placed over the canal. Water dressing, paregoric and gruel, as in the former cases.

May 3d.—A little feverish; doing well.

4th and 5th.—Considerable swelling of scrotum, but not of testis. The point of suture inflamed and suppurating. No serious symptoms.

6th.—Free suppuration.

7th.—“Something gave way,” probably the stitch through the outer pillar, and the intestine came partly down. There was a good deal of pus forming around the wound. No appearance of severe inflammation. As the stitches were doing no good, and only increasing the ulcerative action, they were removed on May 10th. The wounds then shortly closed, and the bowel resumed its normal situation before the operation. Nothing farther can be done at present.

I am disposed to ascribe the entire failure in the third case to several causes; as, first, want of sufficient constitutional vigor in the patient to get up a good adhesive inflammation, which degenerated at once into ulceration; the presence of thickened cellular tissue, and of a considerable varicocele in and about the canal, and, possibly, increased irritation and suppuration set up by the silk ligatures, over the silver wire used before. So far as the mere performance of the operation went, and the mechanical occlusion of the opening, it was more perfect than either of the others; both from practice, and also from my having a more suitable instrument.

The first case was operated on after Gerdy's method, one of the earliest of those attempted for the radical cure of hernia. The other two were done by the method recently introduced and recommended by Mr. John Wood, of London, Assistant Surgeon and Demonstrator of Anatomy at the King's College Hospital and School. A very minute description of his method, with illustrations, may be found in the *Medico-Chirurgical Transactions*, Vol. 43, 1860. And we propose, while speaking of the operation in general, to refer to some of the more prominent points and advantages which he claims as his own.

In Gerdy's method, the skin and fascia covering the sac are invaginated, and held in that position by a ligature thrust through the inter-columnar fascia and skin of the groin, till adhesion takes place at the point of ligature. The method proposed by Wurzer substitutes for the finger of the operator a wooden plug, variously modified, with the intent to fill the canal and openings, and to stretch them so much as to set up adhesive inflammation all round the invaginated sac. The danger of peritonitis, which is regarded by many as a serious objection to any operation of this kind, may be considered as pretty nearly equal in all. But the results of numerous cases operated on seem to prove that the danger is by

no means great, nor sufficient to deter the surgeon from endeavoring to perfect our means of cure of this common deformity. "A much more awkward objection," says Mr. Wood,* "is drawn from the inefficiency of these methods. In all the cases of Wurzer's operation which have come under my observation, the result has been entirely unsatisfactory; the rupture re-descending on leaving off a truss. And this, I believe, is a very general impression among the surgeons of this country, France and Germany." He goes on to say that the causes of failure are as follows:

The inefficiency of the steps taken to cause adhesion of the surfaces of the posterior fold of the invaginated sac together, and to the posterior wall of the canal. Into this fold, forming thus a secondary sac, the descent of a knuckle of intestine is imminent.

The action of the plug is to dilate the opening and the canal, instead of contracting them; the external ring and canal being left very patulous after Wurzer's operation.

The elastic reaction of the skin, and the weight of the testis and scrotum tend, consequently, always to drag down the invaginated tissues. In cases, again, with narrow canals, failure is owing to the impossibility of invaginating the skin as far up as the internal ring. And much of the mass of inflammatory thickening and exudation, obtained by these operations, is temporary only, being sooner or later absorbed.

In order to avoid these sources of failure, Mr. Wood thought better to proceed upon a principle directly opposite to that of dilatation, namely, *that of drawing together and compressing by ligature the abdominal opening and inguinal canal, so as to cause their sides to adhere together.* And he also thought best to *give the operation a sub-cutaneous character*, so as to reach to a higher point within the canal, and to lessen the bulk of the transplanted tissue. These two principles combined he claims to be new in the cure of hernia.

After describing his operation at length, which we think it unnecessary to advert to again, and stating that he uses a strong, smooth hempen thread, waxed and soaped, for his sutures, he goes on to say, that the advantages of the double ligature are—

1st, That of additional security against immediate protrusion.

2d, That of producing action in the whole extent of the canal, by obtaining two tracks, and a broad intervening surface of adhesive effusion.

3d, The more effectual occlusion of the external ring, upon which the lower ligature directly acts. By tightening the string, the surgeon may obtain direct evidence of the effect of the ligatures in closing the canal, on placing his finger therein. If the stitches are properly placed, the canal will be found completely occluded.

The results intended to be obtained by this operation, Mr. Wood briefly recapitulates, as follows:—

* *Medico-Chirurgical Transactions*, 1860, pp. 73-4.

The posterior and superior boundaries of the dilated canal are drawn forwards and downwards towards Poupart's ligament, and become united by inflammatory effusion, in the area of pressure exercised by the ligatures, to the anterior and inferior boundaries. By the use of the two ligatures, this takes place from the internal opening above, to the external ring below. The effect of this adhesion is to make the posterior wall act like a valve, excluding the bowel by closing against the anterior wall. This action is aided by the contraction of the cicatrized tissues, and increased by the subsequent downward traction of the testis and scrotum. In this way we have an assurance, that the older the cure and the more the pressure, the greater the mechanical resistance and security against the return of the protrusion. The spermatic cord is embraced by the contracting tissues in the groove behind Poupart's ligament, which protects it from undue pressure.

The consolidation and contraction of the tendinous boundaries of the canal, in the track of the ligatures, render them more capable of resisting pressure from within, and so increase the strength of the parts. It must be noticed that the primary dilatation of the canal in the formation of oblique inguinal hernia, is chiefly produced by the yielding of the superior and posterior walls at the upper part of the canal. In most patients who have a tendency to hernial protrusion, a bulging is apparent at the internal ring, from a deficiency in the development of the lower fibres of the internal oblique, which cover that opening in front. In muscular subjects, this is rendered much more prominent during the contractions of the *recti* muscles, which, by virtue of their compressing action upon the bowels, draw backwards with them their sheath, formed by the conjoined tendon above the point of splitting of the internal oblique portion of it. In these subjects there exists a disproportion between the muscular contracting force of the *recti*, and the tendinous and muscular resisting forces of the internal ring; and the upper part of the canal is opened, as it were, by the backward traction of the *recti* muscles upon the conjoined tendon, as well as by the yielding of the anterior wall. This action, associated with deficient development of the lower part of the internal oblique, appears to me to be the main cause of inguinal hernia in muscular subjects. It will be seen that the two internal ligature tracks of adhesion directly counteract the effects of this action, by drawing the cicatrix of the skin and anterior wall of the canal backward with the conjoined tendon, as may be seen upon patients cured by this operation, by a depression of the cicatrix during the action of the *recti* muscles.

The invaginated and transplanted fascia adheres on its opposing raw surfaces by means of a cord-like connective tissue, which is formed in front of and is adherent to the spermatic cord; by similar fibrous tissue, formed in the tracks of the ligatures, the fascia is further held firmly within the canal, and connected with the skin at

the upper cicatrix. To obtain this result, as well as to gain a more distinct perception of the parts within the canal, is an object clearly worth an incision half an inch long in the skin of the scrotum, and a separation of the fascia. Without the incision it is impossible to get a hold with the needle upon the conjoined tendon. But by passing the skin itself through the external ring, the borders of the ring are separated, and prevented from adhering together; while the closure or obliteration of the external ring by the lateral traction of the lower ligature drawing together the pillars, may be remarked as one of the original features of the operation, and as contributing much to its success.

In noticing the objections that have been made to the operation, it has been urged that the peritoneum, the spermatic cord, the epigastric vessels, and even the iliac vessels and the bowels, are endangered by the passage of the needle. But the invaginating finger is so placed as to fill up the internal opening, and keep out the bowel, and also to intervene between the spermatic cord, and the *fascia transversalis* covering the epigastric vessels and peritoneum, on the one hand, and the needle at the point of puncture, on the other. The best answer as to the danger of peritonitis is to be drawn from the total results of my (Wood's) cases, fifteen in number—all inguinal herniæ—in addition to the great number of cases in which Wurzur's plan, which interferes more with the peritoneum than mine, has been followed without bad results. The severity of an operation may be best judged by the duration of the after treatment. In only one case was the patient kept in bed more than a month—one was up on the ninth day, one on the eleventh, two on the twelfth, two on the fourteenth, four on the eighteenth; one, three weeks after; another, one month.

We may add to Mr. Wood's statements, that the three cases which head this article prove still more the immunity from serious danger of peritonitis, since all of them being congenital cases, and having no proper *sac*, the sutures necessarily traversed the unclosed peritoneal pouch, through which the testis originally descended; while in hernia, supervening later in life, the peritoneum may be pushed back out of the way, together with the intestine.

As to the efficacy of the operation, Mr. Wood presents in his report to the Medico-Chirurgical Society in 1860, six cases of cure; and many others are to be found in the British medical journals, since that date.

These six cases of cure vary in duration from the time of the operation, from eight months to nearly two years. One only is congenital; several are adults, who have worked regularly as laborers, harvesting, in dock-yards, &c., since the operation. Four of them have worn no truss from the moment of leaving their beds; the others have worn a truss temporarily. He advises no truss to be worn constantly, as it tends to promote absorption of the effused lymph by

pressure, in his opinion. If, however, the abdominal parietes be weak and bulging at the internal ring after the operation, he advises the use of a truss with a weak spring, when the patient is at work. Mr. Wood thinks the most likely cause of failure in this operation consists in the operator placing his ligatures too low, and closing the external ring only, whereby he fails to obtain a hold on the posterior wall of the canal.

Neither of the three children whose cases are reported in this paper, were able to keep up their herniæ with a truss, or were benefited by one when worn, although the instruments were made and fitted by the best manufacturers. It is extremely difficult to keep a truss well fitted on a young, restless and growing child, and we are inclined to think that the cases in which a hernia with a large ring, or a congenital one, is benefited permanently, much more cured, by a truss, are few in number, and the exception rather than the rule.

The opportunity which a subcutaneous dissection of the fascia over a large ring affords for the anatomical study of the internal parts, is not the least interesting feature of this method of operating. Many things become very plain and palpable, which cannot be felt through the skin; such are the conjoined tendon, of which a new and more accurate idea may be obtained than in the dissecting-room; the iliac artery, Poupart's ligament, the crural canal, &c.

The question as to the relative merits of a silver, or a silk or hempen suture in these operations, must be considered as yet undetermined. If the former excites less irritation, it is also much more difficult to manipulate with gentleness and certainty.

Two of the cases reported must be held to be *adhuc sub judice*. But we have thought best to make them public at this early day for the purpose of calling attention to an operation which has been lately much and successfully done in England; which seems so much more rational than those formerly proposed, and which is free, so far as the results prove anything, from any great risk of peritonitis, or of any evil more grave than orchitis, and the usual dangers of any form of suppuration.

After a sufficient time shall have elapsed to afford a definite determination, we hope to give the ultimate result in the first case, and the consequences of a secondary operation, should one be done, in the others.

CASE OF RESECTION OF THE UPPER THIRD OF THE HUMERUS.

[Read before the Boston Society for Medical Improvement, and communicated for the Boston Medical and Surgical Journal.]

NEWBURN, N. C., May 3, 1863.

To W. J. DALE, M.D., Surgeon-General, State of Mass.

DEAR SIR,—I send you, for the "Medical Improvement Society," a photograph of a patient on whom I operated, Sept. 18th, 1862,
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