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The operative treatment  
of inguinal hernia

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# The Operative Treatment of Inguinal Hernia, with a Review of Ninety-seven Cases — Preferable Method of Operation.

BY

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In deciding on a cure for inguinal hernia the problem is to close the breach in the abdominal wall and furnish a canal for the safe transmission of the spermatic cord. Until the more recent methods, the results from operative treatment were failures in a large proportion of cases. Even now few are so successful that failures do not sometimes occur. I believe that in an immense majority of cases the operation is followed a complete and permanent cure; that in the great proportion of those remaining the patients are greatly benefited by the operation; that even the slight disfavor with which the operation is regarded by some is due to the bad results obtained by surgeons whose technique has been imperfect. I would emphasize this point: that the operation<sup>1</sup> should not be performed except by surgeons familiar not only with the surgical principles involved but also with the special anatomical conditions associated with the hernia. In looking over my list of cases in which I performed or assisted in radical operations for herniæ while house surgeon, at the New York Post-Graduate Medical School and Hospital and since I left that institution, I find they have numbered 97. An analysis of these, of the methods employed, of the results obtained, and the description and recommendation of what I consider the preferable method of operation may help to determine the question as to the value and justifiability of operative treatment. Of the 97 operative cases, 79 were inguinal, 5 femoral, 7 umbilical, and 6 ventral. Various methods were used in operating for inguinal hernia—Bassini's, Barker's, Macewen's, and a modification of Championniere's. As I stated at the beginning, an operation to be followed by a cure should fulfil the following conditions:

1. It should cause total obliteration of the hernial sac.
2. It should allow for the safe transmission of the cord, *i. e.*, the cord should not be subject to pressure in any part of its course.
3. It should not result in atrophy or inflammation of the testicle, nor in pain, thickening, or inflammation, nor in any manner interfere with the function of the cord or its structures.
4. Should close the breach in the abdominal wall.

I shall now describe in detail what I consider the preferable operation for the cure of inguinal hernia.

1. The external incision begins nearly on a level with the anterior superior spine, is carried obliquely downward parallel with and about one-half an inch above Poupart's ligament, and ends at the centre of the external ring.
2. The incision divides the structures superficial to the aponeurosis of the external oblique; the latter is well exposed and a director passed through the external ring beneath this layer, which is slit up to about one-half an inch above the internal ring; the cut edges are lifted up and freed from structures beneath, exposing internally the internal oblique and transversalis muscles and sometimes the rectus, externally till the shelving sharp edge of Poupart's ligament is clearly seen.
3. The cord and sac are examined and any adhesions to surrounding structures separated. Next they are separated from each other well up within the internal ring. The sac is examined and carefully opened with a short snip of the scissors; the opening is enlarged with the fingers, and if any adhesions exist internally these are separated. If the contents is omentum and is matted together, thickened or inflamed, or in any other manner changed, it should be tied off; each vessel in the omentum is to be ligated separately, and even the smallest oozing vessel

<sup>1</sup> Championniere: Cure Radical des Hernies.

must be tied. Hold up the sac, after removal of its contents, and where it merges into the general peritoneal cavity close it with a running suture of fine catgut. When released the sutured edge immediately slips back into the abdomen. The cord and its vessels are then examined and any varicose or superfluous veins excised high up within the internal ring. Examine the canal<sup>1</sup> for masses of adipose tissue, which should be removed. 4. Expose the internal ring—an opening in the transversalis fascia—by retracting the internal oblique and transversalis muscles. Any masses of adipose tissue which crowd into the ring from the subserous tissue should be removed; take the cord and place it at the lower angle of the internal ring. Now close the internal ring with a sterilized chromicized tendon suture, commencing at the upper angle; suture from above downward, leaving only sufficient room at the lower angle for the cord and its full vessels to play through. The edges of the aponeurosis of the external oblique are retracted and the edges of the internal oblique and transversalis (sometimes the edge of the rectus on the inner side) and the shelving edge of Poupart's ligament on the outer side are brought together with three or more interrupted chromicized tendon sutures; the cord is situated beneath the above layers of sutured structures; at the lower angle close to the pubic bone only sufficient room is left for the cord and its full vessels to play through. 6. The divided edges of the aponeurosis of the external oblique are brought together with a continuous tendon suture. 7. The skin edges are brought together with a continuous catgut suture, without drainage.

The steps of the above operation are simple, easy to follow, and the operation may be quickly performed. In an uncomplicated case it may be completed, depending on the dexterity of the operator, in from fifteen to thirty minutes. It has many advantages and should be followed by better results than the other recent operations. It has all the advantages without the disadvantages of the Bassini operation. It will be observed that the cord is not disturbed, is not displaced, is not subject to pressure, is not transplanted between two layers of buried sutures, and is not on the stretch, as in Bassini's operation. The cord is not transplanted between the edges of the freshly cut muscular layers and thus subject to the liability of pressure from muscular contraction or from adhesions to surrounding structures from its internal to its external ring, as in Halsted's operation. In both the Bassini and Halsted operation the function of the nerves and vessels of the cord and the cord proper may be interfered with by pressure on, abnormal position of, or adhesions to surrounding structures; and subsequent to these operations there may be thickening, swelling, tenderness, or inflammation of the cord, or atrophy, swelling, or inflammation of the testicle.<sup>2</sup> Thickening and swelling of the cord and its structures I have frequently seen follow Bassini's<sup>3</sup> operation. The natural position of the cord is at the lowest part of the internal ring, and in the operation I have described in detail its position has not been changed. As to the formation of a new internal ring this is absolutely unnecessary; the suturing of the enlarged internal ring reduces it to its normal size, nor is it necessary to place the cord superficial to the internal oblique and transversalis as in Bassini's, or superficial to the external oblique as in Halsted's operation for reasons already mentioned and for those following. After closing the internal ring as I have described, this orifice is small; the cord is not on the stretch but hugs its lower angle where it passes down into the pelvic cavity to the base of the bladder, whereas in the Halsted and Bassini operations the cord, from its new position and relations, is on the stretch and, entering the ring less obliquely, the ring with its contents is more like to favor a return of the hernia. The very high removal of the hernia sac,<sup>4</sup> the removal of every altered portion of peritoneum at its neck, the separation of adhesions internally and externally with suturing of the neck of the sac with fine catgut, leave a smooth

1 W. B. DeGarmo: Clinical Lecture, Post Graduate Hospital, New York.

2 W. S. Halsted: John Hopkins Hospital Reports, May 15, 1895. Atrophy of testicle in three of his cases, following his operation.

3 W. B. Coley, in the American Journal of the Medical Sciences, May, 1895, reports case of orchitis which went on to suppuration following Bassini's operation.

4 Championniere: Cure Radical des Hernies.



surface to the peritoneum, whereas if its neck were ligated there would be more or less puckering of the peritoneum which would interfere with the free movement of the bowels over its surface. In ligating omentum it is necessary to remove those portions that are abnormal; altered omentum must not be returned to the abdomen, as it acts as a foreign body and has at times set up peritonitis.<sup>1</sup> I would not advise the pulling down of healthy omentum and its removal, as trouble may follow. Several cases are recorded of local peritonitis. In one case the result was fatal from internal hemorrhage, death occurring from slipping of the ligatures from the omental stumps. Even the smallest omental blood-vessels must be ligated before the stumps are returned to abdomen, for the reason that there is diminution of the muscular cells in their walls; consequently, if a small oozing vessel is returned, its walls do not contract and retract like those of other arteries, and an internal hemorrhage will result. Halsted lays great stress on excision of superfluous veins to reduce the size of the cord, and reports three cases of atrophy of the testicle following his operation. It is advisable where there is a varicose condition of the veins to excise them high up within the internal ring, otherwise no immediate and little or no remote benefit will be derived. It is obvious that if the excision is performed in the inguinal canal the bulk of the cord is not materially reduced at the internal ring. I have frequently met with slightly enlarged veins due to pressure of the sac and its contents; after removal of the sac the veins resume their normal size. It is highly important to remove all particles of fat from the inguinal canal, internal ring, and subperitoneal tissue, especially if the masses from the latter bulge into the ring. The closure of the internal ring is the most important step of the operation; most of the success depends upon the suture of this opening in the transversalis fascia. In closing this opening lift up its edges with forceps thus avoiding injury to the surrounding and subjacent structures, especially the epigastric artery which runs along the inner side of the ring, and keep the immediate work well in view in the centre of the field of operation; suture the ring from above downward, commencing at the upper and leaving only enough room at the lower angle for the cord and its full vessels to play through. In the above step and for suturing the internal oblique and transversalis to Poupart's ligament a blunt-pointed hernia needle it to be preferred for passing the sutures. The cord and its structures are located beneath the sutured edges of the above-mentioned structures. The character of the suture material is very important. Sterilized chromicized kangaroo tendon is the most suitable material for a buried suture. Great credit is due Dr. Marcy, of Boston, for bringing to notice the merits of this suture material. Tendon is the most suitable, it is non-irritating, and it is not absorbed for two or three months. Busse<sup>2</sup> in his experiments showed that perfect tendinous union does not occur under ten weeks, or just about the period for the absorption of the kangaroo tendon.

I shall now proceed to analyze my cases. Chromicized kangaroo tendon was used as a buried suture in 82 cases, chromicized catgut in 5, silk in 5, silkworm gut in 4, silver wire in 1. In the cases where tendon was used all the wounds healed by primary union except 2. In these suppuration was slight and located superficial to the aponeurosis of the external oblique. In those in which catgut was used all healed by primary union, but in one case three weeks after the operation two sinuses formed; one closed, but at the last report the other was still discharging slightly. In those in which silk was used one was followed by suppuration with a subsequent discharging sinus. In those in which silkworm gut was used two of the wounds supplicated and cicatrization was not complete for weeks. During the healing some of the worm gut was thrown off. In the case in which silver wire was used catgut was used to ligate the blood-vessels, this wound supplicated very badly and took weeks for complete cicatrization.

Final results.—Most of the operations analyzed were performed during 1893 and 1894, so that in many sufficient time has elapsed to enable us

<sup>1</sup> W. B. DeGarmo: Clinical Lecture, Post Graduate Hospital, New York.

<sup>2</sup> Busse: Deutsche Zeitschrift für Chirurgie, 1891-92, xxxi.

to judge of the results. In the 82 cases in which tendon was used there has not been a single relapse, nor has there been any in the cases in which chronicized catgut was used. In those in which silk was used there have been no relapses, but in one case in which a sinus formed the discharge continues and this will keep up, I think, until the silk is thrown off or removed by a second operation. In those cases in which worm gut was used there were no recurrences, but in the two cases in which suppuration occurred the resulting scars were not strong and as soon as cicatrization was complete, light, well-fitting trusses were at once supplied. In the case in which silver wire was used there was no recurrence. The resulting scar was not strong and here, too, a light-fitting truss was at once supplied as soon as cicatrization was complete.

Mortality.—In the 97 cases operated upon the mortality was *nil*. There was one case not included in my list, a neglected strangulated inguinal hernia. The patient was admitted to the Post Graduate Hospital and was at once taken to the operating room. Anæsthesia with ether was commenced, but he had scarcely taken five breaths before respiration ceased.

I shall now refer briefly to the results obtained by Dr. William B. Coley, who operates at the New York Post Graduate Hospital. Dr. Coley reports <sup>1</sup> 133 cases of operations for various kinds of hernia; 124 were for inguinal hernia. In 117 cases kangaroo tendon was used as a buried suture. All but 3 were traced. There were no relapses. The only case Dr. Coley reports in which recurrence took place after the use of the tendon was one umbilical hernia. In 2 cases silk was used. Both relapsed inside of three months. Chronicized catgut was used in 5 cases with no relapses. Dr. Coley's mortality was one death from pneumonia in a child, who died on the fifth day after operation. There was no abdominal complication nor suppuration in the wound. Dr. W. B. De Garmo, <sup>2</sup> in a paper on surgical treatment of hernia, strongly advocates the use of tendon as a buried suture.

Dressings and after treatment.—In many cases aristol was dusted on wound. Over this bichloride gauze was held in place by strips of rubber plaster; finally cotton and a spica bandage were applied. The scrotum was left exposed and the testicles were supported. Unless there were indications for interference, the dressings were not disturbed till the eighth day. By this time the catgut was usually absorbed. Firm dressings were reapplied and the patients were kept in bed two weeks, or longer if possible. If the bandages became loose they were reapplied and were not removed till one month after the operation. None of the patients wore trusses after the operations except those whose wounds suppurred badly and who had commencing relapse. The operation I have described in detail is to my mind the ideal one, has all the advantages with none of the disadvantages of the other recent operations, and I think has the additional advantages which I have endeavored to sum up in my paper.

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<sup>1</sup> Coley: American Journal of the Medical Sciences, May, 1895.

<sup>2</sup> Medical Record, June 1, 1895.





