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The Cure of Vesico-Vaginal Fistula by the
Free Dissection of the Bladder from its
Vaginal Attachments and Closure
with the Buried Continuous
Tendon Suture.

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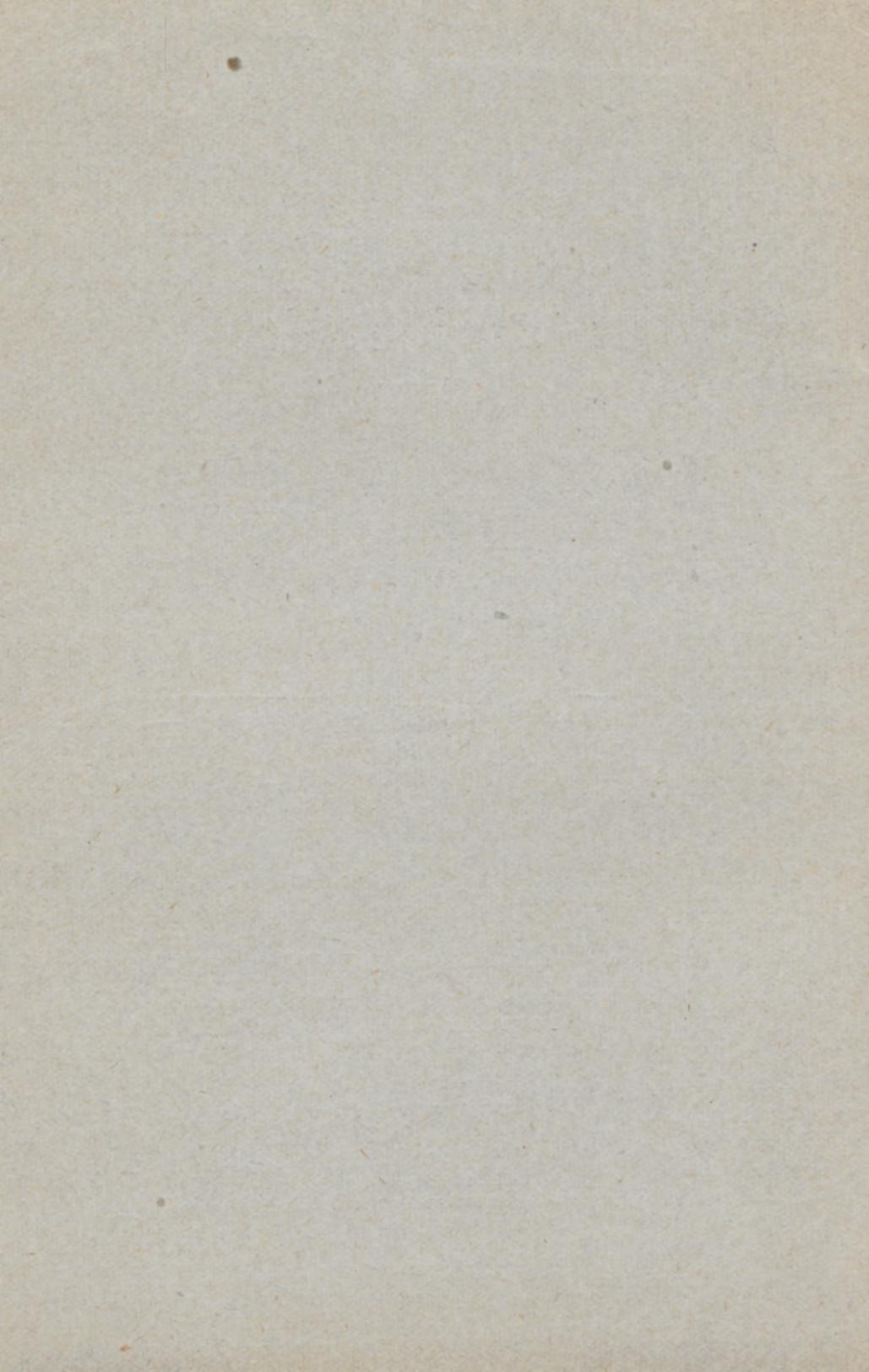
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BY HENRY O. MARCY, A.M., M.D., LL.D.

In 1887 my attention was first called to the ease with which the bladder wall will reunite after injury, under the most adverse circumstances, when the portion involved is free within the peritoneal cavity. The case upon which I operated at this time was that of a child eighteen months old, where an abscess in the vicinity of the appendix had resulted in a vesico-intestinal fistulous opening in the appendiceal region.

Laparotomy disclosed two fistulæ of the small intestine, complicated with an opening into the bladder to the right of the fundus. The intestines were freed from adhesions and drawn out of the wound. The refreshed edges of the openings were closed by double lines of fine continuous tendon sutures, which in turn were intrafolded by a second layer of continuous tendon Lembert sutures. After the intestine had been returned, the bladder wall was freed from its adhesions, the opening into it refreshed and sutured in double lines of continuous tendon sutures, in precisely the same manner as I had closed the intestinal wounds.

The child made an easy and perfect recovery, with primary union of the openings, and is today a strong, vigorous girl. The age of the child rendered drain-

age of the bladder unsuccessful, but from the first the function of the organ seemed little impaired.

The case was instructive in many ways. Perhaps the most important lesson was the primary restoration of the bladder wall without the supposed necessary physiologic rest of the organ. The method of applying the first row of sutures in the approximation of the refreshed edges, held in even support by means of the continuous sutures, inverted the mucous membrane.

The insertion of the suture in both intestinal and bladder walls is in the following manner: The needle is a fine one, curved upon the flat, with eye near the point, and set in a firm handle, made to penetrate the coats of the bladder or the intestine also, but not through the mucous membrane. It emerges about one-quarter of an inch from the line of the opening, and is introduced upon the opposite side at a like distance. The needle is then unthreaded, rethreaded with the opposite end of the suture and withdrawn. This makes the needle a suture carrier like a shuttle, and holds in even coaptation the included structures in a double loop from side to side (shoemaker's stitch). One stitch follows another in an even continuous seam, until the opening is completely closed. By this side to side coaptation, the parts enclosed are held in juxtaposition the *breadth* of the enclosing loop, while the interrupted suture holds only the *width* of the suture material. The submucous penetration of the needle buries the suture in healthy vitalized structures and the line of stitches, taken a quarter of an inch away from the edges of the wound, inverts the mucous membrane into the bladder. The final fixation of the suture is by one knot, a manifest advantage over leaving as many knots as stitches, while the continuous suture permits of an even adjustment of the enclosing force. It must be remembered that no undue force is used in the tightening of the stitches, since readjustment, retention and rest with a minimum of devitalization, are the factors in the relation of the sutured parts as important as in the treatment of a fractured bone.

The exterior line of continuous Lembert sutures intrafolds the peritoneum so as to re-enforce and greatly strengthen the structures over the wound. When taken properly they are themselves buried without puckering of the peritoneum (parallel continuous suture).

From a variety of causes, quite a number of times within the last ten years, I have closed wounds in the bladder from within the peritoneal cavity as above outlined, and in every instance primary restoration has occurred. But in the entire series I have been enabled to drain the bladder for a number of days through the urethra.

During this period, in the larger number of cases of vesico-vaginal fistula, I have closed the wound through the vaginal opening by lines of buried tendon sutures, with varying results. Little by little I have found that both ease of operation and certitude of outcome seemed dependent on the freedom of dissection and the amount of tissue held in fixation. Especially has it appeared dependent, in considerable degree, on the extent of the dissection of the bladder from its vaginal attachments. Then the importance of the lesson taught me by the safe repair of the bladder wounds from within the abdominal cavity became apparent. From this standpoint I reviewed with renewed interest the entire history of surgical operations undertaken for the cure of vesico-vaginal fistula, from the days of Sims and Bozemann in this country and Jobert and Simon of Europe.

The various modifications in technic and detail of these great masters, save the introduction of anti-septic measures, has been that, little by little, without the recognition of the underlying anatomic reason, the successful cure of large vaginal fistulae has been dependent on the greater freedom of dissection by which, the bladder has been separated from its vaginal attachments.

I can not myself question that the primary cause of failure, the surgical technic having been satisfactory, lies in the anatomic conditions, the importance

of which, a study of the physiologic functions of these different organs makes easily apparent. The contraction of the circular fibers of the vaginal muscle tends constantly to pull upon the base of the bladder, and these muscular contractions are necessarily called into special activity following the irritation incident to the repair of a vesico-vaginal fistula. When both the bladder wall and the vaginal muscle are united by sutures, holding them in approximation, the contraction of the vaginal muscle not alone pulls upon the suture, causing it to cut through its own structure, but at the same time acts with equally destructive force upon the enclosed bladder wall. I believe that it is on this account that the great majority of failures to cure vesico-vaginal fistulæ ensue.

Reflection on the diverse physiologic relationship of the parts involved must lead to the conclusion that, at least, this is an hitherto overlooked important factor for surgical consideration, and I now invite the profession to give it due consideration in order to profit, as far as possible, from its better understanding, by the adaptation of improved surgical methods.

Every one who is familiar with anterior colporrhaphy for cystocele knows the comparative ease and safety with which a large portion of the vaginal muscle may be dissected from the dependent posterior bladder wall, and the almost sure complete primary union which ensues upon its fixation and closure.

It is safe, and not very difficult, having split the edges of a refreshed vesico-vaginal fistula, to separate widely the bladder from the vagina. When this has been effected, but not until the dissection is complete, the opening in the bladder wall is refreshed and closed by a double line of continuous sutures, as already described, carefully avoiding penetration of the mucous membrane, using for suture material a fine tendon.

By the use of a needle with the eye near the point, the suture is carried back and forth through the same stitch opening, precisely as the shoemaker sews leather.

The opening in the viscus is then closed by an even,

uniform support, coaptating but not unduly compressing the enclosed structures. A single knot fixes the suture, a fact of considerable importance when the material used is to be left buried. The free dissection makes the union of the bladder wall a comparatively easy operation, and even when a large portion of the vaginal vault has been lost, there is little difficulty in effecting an easy uniform closure without tension of the bladder wall. As every operator knows, in large fistulæ, when the vaginal structures are enclosed with the bladder wall, this part of the operation is exceedingly difficult, and the tension upon the parts which follows is the usual cause of failure.

Therefore, again I emphasize the necessity of free dissection which, to the timid operator, at the outset seems at least to border on the verge of rashness.

The bladder wall having been closed, we have remaining an operation not unlike that ordinarily undertaken for the cure of cystocele, with the exception that oftentimes the remaining vaginal structures are unduly minimized. How these structures shall be closed, so far as the cure of the fistula is concerned, is comparatively of minor importance. It is wise, however, to restore them as nearly as possible to their primal condition. I think that this is best effected in a general way, a method which for many years I have continuously practiced, by the use of a single tendon suture applied with an Hagedorn needle, using a lacing stitch, the sutures being deeply imbedded from side to side. In this way the vaginal wall is coaptated in two or three layers and the mucous surfaces of the vagina are carefully approximated. This results in an entirely closed wound, the antero-posterior diameter of which has been considerably increased; in the first place, by the inversion of the mucous membrane of the bladder; in the second place, the approximation of the widely denuded structures upon the median line; and in the third place, by the inversion of the approximated vaginal surfaces of the wound.

Fistula in which the cervical portion of the uterus is involved comes easily under the same general plan

of operative measures. The organ must be freely separated from its attachments.

Recto-vaginal fistulæ are operated upon by essentially the same method. From below through the perineum the vagina is freely separated from the bowel. The opening in each is closed precisely as the opening in the bladder wall; then the perineum is restored by layers of buried tendon sutures. I have long practiced this method almost without failure, a description of which in careful detail published years ago.

Suprapubic cystotomy in the male furnishes its corroborative testimony of importance in this direction. Here a large wound of the bladder is made with seeming impunity for a variety of reasons, the bladder wall independently closed, the superadjacent structures united in layers, the skin rejoined by a buried suture and the wound sealed without drainage. The suprapubic attachment of the bladder is by loose elastic structures which furnish the conditions favorable for easy retention at rest of the rejoined bladder wall. This is the factor usually wanting in vesico-vaginal fistula, and it is on this account that the wide dissection which I have before advocated is advised. I advocated this method of operation in a paper published in 1893.¹

Dittel,² apparently without the recognition of the conditions which I have emphasized, in 1893 attempted a new operation for the closure of vesico-vaginal fistula, based probably on the experiences in suprapubic cystotomy. He opened the abdomen, freed the uterus and the vagina, sutured the fistula and then closed the peritoneal incision through the vesico-uterine space. This operation has its merit, in that it accomplishes the purpose above outlined. If for any other reason a laparotomy is necessary this method of closure of the vesico-vaginal fistula might be adopted, but hardly otherwise.

¹ "The Reconstruction of the Pelvic Structures in Woman. The Advantage Derived from the Use of the Buried Tendon Suture." Reprint from the Transactions of the AMERICAN MEDICAL ASSOCIATION, Section of Obstetrics and Gynecology, 1892.

² "Abdom. Blasenscheidenfistel Operation," Wien. Woch., 1893.

Mackenrodt of Berlin, in 1894, advocated a free dissection not unlike that which I have above described, after which he united the wound in the bladder with fine silkworm gut sutures. Then he closed the vaginal wound by drawing the body of the uterus forward so as to give the parts as far as possible a support from this organ.

Schauta³ in adherent vesico-vaginal fistula advises a vertical incision, lateral to the left labium majus, dissecting down to the descending ramus of the pubes. Separation of the cicatricial tissue, walls of the vagina and fistula from the bowel by means of a periosteal elevation as far as the obturator foramen.

Ferguson⁴ advocates the following method of closure: The fistulous opening being exposed, an incision is made through the mucosa of the vagina at the distance of a full eighth of an inch from the opening of the margin of the fistula. This incision is extended until it completely encircles the opening. The line of the incision is carefully deepened until the lining membrane of the bladder is reached, and great caution is exercised in retaining the integrity of that membrane. In this manner a circumfrontal flap, hinged by the mucosa of the bladder, is obtained. This flap is inverted into the bladder and held in position by a continuous catgut suture. There is no loss of tissue and a very broad raw surface is obtained for apposition.

Walcher advocated cutting away all tissue and, without making it quite apparent as to the purpose, he evidently frees the bladder freely from its vaginal attachments and unites the bladder wound with catgut sutures taken one-fourth of an inch from the edge of the fistula. After these have all been inserted they are tied. The bladder having been thus closed, the vaginal flaps are united by a line of silk sutures.

Howard A. Kelly, M.D. of Baltimore, has made a valuable contribution on this subject,⁵ in which he

³ *Monatsch. f. Geburtsh. u. Gynäk.*, Bd. 1, No. 6, 1895.

⁴ *British Medical Journal*, Feb. 24, 1896.

⁵ "The Treatment of Large Vesico-vaginal Fistulæ," *Johns Hopkins Hospital Bulletin*, February and March, 1896.

reverses in large measure this very process, by dissecting the bladder, from behind forward, from its uterine attachments quite beneath the reflected peritoneal fold, and in this way is enabled to draw the posterior wall of the bladder downward by a layer of fine interrupted silkworm gut sutures, taken inferiorly through the bladder wall and its vaginal attachment. In the illustrated case, Dr. Kelly thought this measure advisable, because of the relation which the ureteral openings had to the bladder wound. The result seems to have justified the novel measure employed, and yet I am very sure the conditions will be rarely found which render this method of procedure advised. We are deeply indebted to Dr. Kelly for bringing to the attention of American surgeons and emphasizing the importance of the catheterization of the ureters prior to operation upon large vesico-vaginal fistulæ.

He claims for his method the advantage, in that the ureters are not involved, that he does not in any case include the uterus as a factor of repair, and that his method is easier to apply where the destruction of the tissue is so great as to include the upper part of the urethra. This I believe to be important, but it does not seem to me that the union of the posterior bladder wall with the anterior vaginal wall is ever to be advised when lateral approximation upon the median line can be effected.

The advantages I claim for my method are apparent. It is based: 1, on the anatomic and physiologic relationship of the approximated organs; 2, on the comparative ease of operation made possible by a free dissection; 3, the far greater probability of cure of large vesico-vaginal fistulæ, where a considerable portion of the vaginal tract has been lost; 4, the great advantage obtained from the lateral approximation of the structures on the median line; 5, by the use of aseptically buried tendon sutures the parts are held at rest in easy apposition and primary union follows, with no subsequent care of the wound and no removal of sutures.

