TECHNIC OF ABDOMINAL SALPINGO-OÖPHORECTOMY WITHOUT PEDICLE.

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FROM

THE MEDICAL NEWS,

August 8, 1896.

[Reprinted from THE MEDICAL NEWS, Aug. 8, 1896.]

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A PAPER upon this subject would have been more acceptable before vaginal hysterectomy, vaginal salpingo-oöphorectomy, and vaginal incision and drainage had become well-established operations. Although these operations have a wide field of usefulness, abdominal salpingo-oöphorectomy is the operation of election in many cases of pelvic disease, and is, therefore, deserving of careful study. I believe that many of the unfavorable results which have followed abdominal salpingo-oöphorectomy have been due to faulty technic. The technic of the operation has been developed by so many surgeons that it is impossible to give each the credit due him, and to attempt to give the development of the operation in detail would unduly lengthen this paper.

I. CURETTAGE OF THE UTERUS.

This procedure should always precede abdominal section for the removal of the uterine appendages, because in these cases the endometrium is usually so diseased as to interfere with the recovery of the patient if this part of the operation is omitted, and because thorough cleansing

[1] Candidate's paper, presented for admission to the Am. Gynec. Soc., May, 1896.

of the uterus, vagina, and vulva, is imperative in case vaginal drainage is required.

The abdomen, vagina, and vulva, having been previously prepared, the vagina and vulva are again thoroughly cleansed under anesthesia. The uterus is then dilated, curetted, irrigated, and, if septic, packed with iodoform gauze. The vagina and vulva are then cleansed again in order to remove any septic material which may have escaped from the uterus during curettage. The pelvic organs are next carefully examined, and if any doubt exists as to the operation of election, an exploratory incision is made through the upper part of the posterior vaginal wall. The index finger is passed through this opening and the uterus and appendages are carefully examined. Great care should be taken to avoid rupture of an abscess into the general peritoneal cavity. If an exudate exists between the vagina and rectum, it is probably extraperitoneal, and should be evacuated through a vaginal incision and the cavity thoroughly cleansed and packed with gauze. If the exudate is not extraperitoneal, the swelling would not extend far below the point at which the peritoneum is reflected from the rectum to the uterus. If positive indications for abdominal incision exist, the vagina is sponged dry and packed with iodoform gauze, and the patient is placed in a moderate Trendelenburg position.

II. ABDOMINAL INCISION.

The abdomen having been thoroughly prepared is washed with ether, iodoform collodion is painted

over the umbilicus, and an incision through the abdominal wall, two or three inches long, is made along the linea alba through the skin and subcutaneous fat down to the aponeurosis. The lower end of the incision should be at about the upper border of the pubes. If the uterine appendages appear to be fixed high in the pelvis, an incision of the same length should be made, but nearer the umbilicus. The aponeurosis is then incised, whereupon the sub-peritoneal fat is exposed, this may be separated with the finger or incised, whereupon the peritoneum will come into view. The hemorrhage is controlled by forci-pressure. The peritoneum at the upper end of the incision is caught on either side superficially by two forceps and elevated. If the fold thus formed is translucent it does not contain omentum, intestine, or bladder, and is incised between the forceps. The opening in the peritoneum is then enlarged, care being taken not to injure other structures. The peritoneal incision should never be carried down as low as the incision through the skin; this does not interfere with freedom of manipulation, and protects against the danger of injury to the bladder.

Should the incision through the aponeurosis enter the sheath of the rectus, as usually occurs, the inner border of the muscle may be found by pushing the handle of the scalpel along the upper border of the sheath on either side of the incision; then by placing the index fingers between the recti muscles, the tissues above the peritoneum may be easily separated the whole length of the

wound. When the peritoneum is much thickened by disease, great care should be exercised in incising it. The incision is enlarged to facilitate the operation, when numerous adhesions or very large appendages are present.

III. SEPARATION OF ADHESIONS.

1. *Adhesions of Omentum.*—If the adhesions are not strong they are separated; if strong, they are not separated, unless the uterus cannot otherwise be reached. Adhesions are separated either by rubbing them between the thumb and index finger, or by pushing the omentum from the organ at the point of attachment with the fingers covered by gauze. None of the omentum is excised unless it is necrotic, or much thickened by inflammatory exudate. All bleeding points are carefully ligated with fine catgut or silk.

2. *Adhesions of the Intestines.* — Intestino-uterine adhesions are separated between the fingers or with gauze as described above. If the adhesions are so firm as to endanger the integrity of the intestinal wall, the peritoneum covering the uterus is incised above the point of adhesions, and the adherent portion of the peritoneum is separated from the uterus and left attached to the intestine. The intestine is not separated at the time from uterine appendages, or from the broad ligaments, because, I believe, less time is required and less danger of injury to the intestine is incurred by immediately proceeding to enucleation of the uterine appendages.

3. *Adhesions of the Uterine Appendages.*—If pus

is present, the intestines are systematically walled off from the pelvis by the free use of gauze pads. In case of rupture of the abscess during the process of enucleation, a basin of strips of gauze should be ready to take up the pus as fast as it escapes. With the uterus as a landmark, the appendages are examined, and enucleation is commenced at the place where adhesions are least firm and fibrous.

If a large abscess with extensive firm adhesions exists, the pus is removed by aspiration, and the punctured wound closed by forceps, ligated, or protected with gauze. If during enucleation adhesions, which seem to be formed by a solid exudate, are encountered, great danger of rupture exists, because this condition always indicates points at which leakage of pus has occurred. Adhesions of this character should always be left until all fibrous adhesions have been separated, and if the abscess is large, should not be separated until the pus has been removed by aspiration. In severe cases, time can be saved and the danger of rupturing the abscess lessened by commencing the enucleation low down posterior to the uterus, or on the uterine side of the appendage. This is preferable to making the enucleation along the tube on the upper surface from the uterus as is still frequently recommended.

It should be remembered in this connection that tubo-ovarian abscesses are frequently posterior to the broad ligaments, and that they should be entirely rolled out from this location before attempting to bring them into the

abdominal wound. When the appendages are free from adhesions to the uterus, broad ligaments, and pelvic wall, any intestinal adhesions which may be present, can usually be separated with surprising facility and safety. If adhesions of the intestines to the broad ligament exist, and are so firm that their separation will result in serious injury to the intestine, they should be left undisturbed. This method of enucleation, which must be accomplished largely by touch, is, I believe, far preferable to the separation of all adhesions under sight, which necessitates working from above downward. Some surgeons advocate the separation of all adhesions, and others believe in separating as few as possible, consistent with thorough removal of the diseased appendages. It would seem good surgery to break up all friable adhesions and to disturb the very firm adhesions as little as possible. The separation of firm adhesions frequently results in serious injury to the intestine, and the raw surfaces thus made are certain to become adherent, and the new adhesions may do more damage than the original ones. In a recent operation, after I had enucleated one appendage, it seemed impossible to enucleate the other on account of extensive and firm intestinal adhesions. After removal of the uterus, however, it was easily enucleated.

IV. EXCISION OF THE APPENDAGES AND SUTURE OF THE BROAD LIGAMENTS.

After all adhesions have been carefully separated, one of the appendages is raised into the

wound, and the abdominal wall is retracted with a Simon speculum, or a broad, short retractor placed anterior to the broad ligament. A medium-sized catgut suture about eighteen inches long, armed with a blunt pointed needle about 1½ inches long, is then carried under the infundibulo-pelvic ligament just deep enough to include the ovarian artery. This suture is tied, the short end is cut off near the knot and the long end is left to suture the broad ligament. The tube and ovary are next separated from the broad ligament by dividing the latter close to the tube from a point just external to the tube and ovary, and by continuing the division until the uterus is reached. All bleeding points are caught with forceps, and the uterine artery is clamped immediately underneath the tube before it is severed (see figure). The tube is excised flush with the uterus, or if its uterine portion is diseased, the dissection is carried into the horn of the uterus to a point beyond the affected portion.

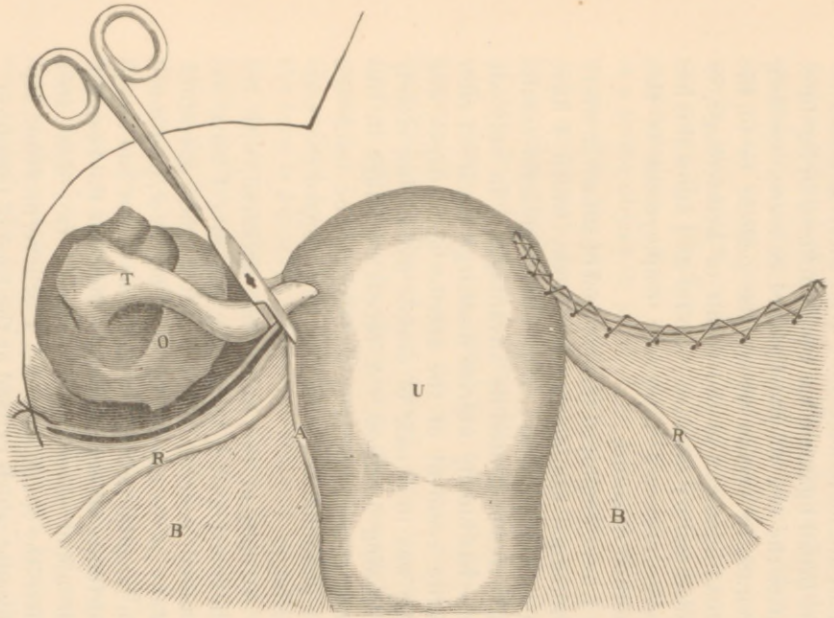
The wound is then closed with the long end of the suture just mentioned, which was used to ligate the ovarian artery, by the glover's stitch, an assistant holding the end of the suture constantly taut. The stitches are inserted about one quarter of an inch apart, and care is taken to bring the edges of the wound in as close apposition as possible, so as to leave little or no raw surface. If the broad ligament is friable, care should be taken not to make so much traction on the suture as to cause laceration of the tissues. The uterine tissue may also be lacerated by excessive traction on the

suture. All or part of the ovary may be left if not diseased. The appendage of the other side is treated in like manner.

The suture above described has controlled the hemorrhage perfectly in every case in my experience. If the uterus is so diseased as to be likely to interfere with perfect recovery, it is amputated through the cervix, after the uterine arteries have been ligated, and the stump is closed by continuing the glover's suture from one broad ligament to the other. The only objection to suture of the broad ligaments is that it takes more time than is required for ligation of the pedicles, but this does not obtain in cases where the pedicles are very broad, or where the broad ligaments are friable.

The advantages of suturing the broad ligament are: (1) No pedicle is made. It is well known that the pedicle is liable to retract and cause hemorrhage, to become adherent to intestines, to remain painful, and to be a focus for infection and suppuration. (2) The entire tube and ovary can be excised. (3) Very little tissue is included in the suture and very little tension is made on the broad ligaments. (4) Little or no raw surface remains to form adhesions or cicatrices. (5) Absorbable sutures may be used without fear of hemorrhage. (6) Blood-vessels are ligated while in normal location, which protects against retraction and hemorrhage.[1] (7) When the broad ligaments are friable hemorrhage can be more easily controlled by suture than by ligature *en masse*. (8) Bleeding

[1] C. B. Penrose, *American Journal of Obstetrics*, August, 1895.



SALPINGO-OÖPHORECTOMY WITHOUT PEDICLE.

Left ovary and tube have been excised and wound closed by suture. Right ovary and tube separated from broad ligament, long end of suture left for closure of wound.

points in the posterior surface of the broad ligament are more accessible after suturing than after the broad ligament has been puckered by ligature. After the use of the ligature *en masse*, swelling frequently occurs about the pedicle or in the broad ligament, as the result of hemorrhage, or inflammatory exudate. So far as I know this has never occurred after the employment of this method of suture.

I have employed this method of suture in every abdominal salpingo-oöphorectomy which I have made since January, 1895, and I think the results have demonstrated its advantages. In only one case has bloody uterine discharge occurred after entire removal of the uterine appendages, and this was in a case of double pyosalpinx closely following abortion. A recent curettage in this case showed the endometrium to be thickened by glandular inflammation and stopped the hemorrhage.

Atrophy of the uterus has occurred, with the above exception, in all the patients I have examined several months after the operation. Many of the operations were, however, performed on hospital patients whom I have not had an opportunity to examine after they left the hospital. Of about seventy-five patients, two died soon after the operation from, I believe, profound septicemia, which existed at the time of operation.

Polk and Penrose advocate an operation similar in principle to the one described, though somewhat different in technic. Polk says:[1] "Using

[1] "Clinical Gynecology," 1895, p. 579.

silk or catgut, as one may elect, the ovarian vessels are ligated *en masse* just outside the ovary and the fimbriated end of the tube. The tube is then dissected out as far as the cornu of the uterus, bleeding points being caught up and ligated as one proceeds, with catgut or fine silk. The ovary is next cut away, the bleeding points being treated in the same manner. As in all abdominal operations it is a prime object to present as few raw surfaces as possible, the raw surface left by removal of the tube and ovary should be covered up, if possible, by stitching back the round ligament to the line of the broad ligament, immediately below that just occupied by the tube; the tube should be amputated at the cornu by an oblique incision from behind, forward and inward, thus leaving a surface which can be apposed to the round ligament. . . . It will have been noticed that even in the radical removal of the appendages ligation of the tube is avoided. This is a measure to which the writer attaches great importance, because he believes that many of the recurrent symptoms to which the patients are often subjected are due to the presence of the ligature upon the tube." Penrose[1] has described an operation as follows: "The first ligature is passed through the broad ligament near the pelvic wall, securing the proximal portion of the ovarian artery. The second ligature may include the Fallopian tube if there is no disease of the isthmus, or it may be passed immediately beneath the tube if it be necessary to exsect the tube from the uterine cornu. With the liga-

[1] *American Journal of Obstetrics*, August, 1895, p. 223.

tures thus placed, the tube and ovary may be completely and safely removed. Usually there is no bleeding from the portion of the broad ligaments between the ligatures. Any bleeding which does occur can be readily controlled by separate ligatures. It is not necessary to place both ligatures before cutting away the ovary and tube. The first ligature may be placed about the aproximal portion of the ovarian artery and then the infundibulo-pelvic ligaments may be cut, bleeding from the distal end being controlled with forceps. This will enable the operator readily to bring the ovary and tube through the incision, and to ligate the ovarian artery at the uterine cornu."

In the same number of the *American Journal of Obstetrics*, page 283, I briefly described this operation for the removal of the ovaries and tubes without a pedicle and presented a specimen.

V. CONTROL OF HEMORRHAGE.

Hemorrhage from separation of omental adhesions is immediately controlled by fine catgut or silk sutures, or ligatures. If in the separation of intestinal adhesions, hemorrhage occurs from laceration of the intestinal wall, the rent is closed at once with fine catgut sutures, which will stop the hemorrhage. General oozing from slight abrasions of the intestine, can easily be controlled by firm pressure with hot sponges or gauze. Active bleeding frequently occurs, while firm tubo-ovarian adhesions are being separated. This can usually be sufficiently controlled by firmly packing hot gauze or sponges against the bleed-

ing surface. Should the hemorrhage persist, a forceps should be placed on the broad ligament external to the ovary and tube on the side from which the hemorrhage occurs, in order to secure the ovarian artery, and a forceps should be placed on the broad ligament at the cornu of the uterus to secure the uterine artery. Hemorrhage from the separation of uterine adhesions may be controlled with suture, but if after both appendages have been excised, hemorrhage occurs from numerous or extensive abrasions, hysterectomy should be performed. Hemorrhage from the pelvic wall may be checked with fine sutures or gauze packing.

VI. DRAINAGE.

The term "drainage," as here considered, refers to removal of fluid, to quarantining necrotic or infected tissue, and to tamponnade for hemorrhage. Drainage should be employed : (1) When general septic peritonitis exists. (2) When septic matter has escaped into the general peritoneal cavity. (3) When necrotic or septic tissue is left in the pelvic cavity. (4) When hemorrhage exists which cannot be readily controlled by ligature, suture, or temporary pressure. (5) When an intestine has been so injured that fecal fistula is liable to occur.

The vaginal route of drainage should be almost invariably employed in preference to the abdominal route because: (1) The most dependent portion of the abdomen is drained. (2) Drainage is downward. (3) The surface which usually requires drainage is in, more or less, close prox-

imity to the vagina. (4) The danger of hernia is diminished. (5) Fewer adhesions must of necessity occur, as the abdominal cavity is kept more free from exudates. (6) The danger of infection of the abdominal wound is diminished.

In my experience, better results have been obtained with the vaginal than with the abdominal route of drainage. The statement frequently made that the vagina can not be made clean enough to drain through, is not substantiated by the results obtained from vaginal operations. Drainage through the abdomen is preferable: (1) When the surface to be drained is near the abdominal incision. (2) When the opening into the vagina can not be readily made on account of adhesions posterior to the uterus. (3) When septic disease of the vagina or vulva exists. Combined abdominal and vaginal drainage may be employed when indications for drainage by both routes are present. Gauze is the best material for vaginal drainage in almost every case.

I employ the following technic in the application of vaginal gauze drainage : Before the sponges which protect the intestines are removed, the patient is lowered from the Trendelenburg to the horizontal position, and the point of a long sharp-pointed scissors, curved on the flat, is pushed from the vagina into the peritoneal cavity posterior to the uterus. The blades of the scissors are then separated and withdrawn. With one finger inserted from the vagina, and one from the abdomen, the opening is dilated to the desired size. If the surface to be drained is large, the

end of a piece of gauze, two feet wide and folded, is then carried into the abdominal incision out through the vaginal opening, caught by the finger or forceps and pulled out over the perineum. As little of the gauze as is required to cover the necrotic or infected tissue, or to stop hemorrhage is left in the peritoneal cavity. The punctured wound will not usually bleed unless the tissue is indurated. If hemorrhage occurs it may be necessary to pass a suture and ligate, or to use forci-pressure through the vagina. Little or no more time is required for the application of vaginal gauze drainage than for abdominal drainage.

When the slightest indication for drainage exists, I believe the vaginal gauze drainage should be employed because it is almost impossible for it to do harm, and it may do much good. If active drainage is required, the end of the gauze should project over the perineum so as to get siphonic action, and the end of the drain should be covered by a pad of gauze which should be changed as often as it becomes moist. The drain should be removed at the end of twenty-four hours if employed for hemorrhage, otherwise it may be left *in situ* for forty-eight or seventy-two hours. The operator should keep his hands scrupulously clean while inserting the drain, as well as in all the other steps of the operation. When general peritonitis exists, or when a large amount of infective fluid is present in the general peritoneal cavity, tubal drainage alone, or in conjunction with the gauze drainage, should be employed through the vagina.

VII. TOILET OF THE PERITONEUM.

With the patient in the horizontal position, all blood or serum is thoroughly removed by sponging out the pelvic cavity. The sponges covering the intestines are removed, and if necessary the pelvis is again cleaned by sponging. The abdominal cavity is not irrigated unless general peritonitis exists, unless a large amount of fluid has escaped among the intestines, or unless tubercular peritonitis is present. If the escaped fluid has been confined to the pelvis, it should be removed by sponges rather than by irrigation, because of the danger of carrying infection into the general peritoneal cavity. If irrigation is employed, a normal saline solution at the temperature of about 100° is probably the best to use, and the amount of fluid used should be sufficient to insure thorough cleansing. The fluid should be allowed to escape through the vaginal incision, as, after irrigation, drainage is a necessity. The omentum is then turned down over the intestines to prevent adhesions of the intestines to the abdominal incision. The omentum will possibly become adherent to the wound, but this is less objectionable than adhesions of the intestines to the wound. When the patient is exhausted from hemorrhage, and when the abdominal cavity is not infected, as occasionally occurs in cases of rupture of ectopic pregnancy, it is a good practice to leave blood in the cavity or fill it with normal saline solution for absorption.

VIII. CLOSURE OF THE ABDOMINAL WOUND.

The accidents that most frequently follow closure of the abdominal wound are suppuration and hernia. The former now seldom occurs. The causes of suppuration are infection from contact with pus or septic tissue, from faulty technic in the closure of the wound, from the employment of drains, and from meddlesome after-treatment of the wound.

When the wound becomes infected by contact with pus or septic tissue, it should be thoroughly sponged with sterilized water, or with weak antiseptic solution, not strong enough to produce necrosis of the tissue. I have seen cases in which, I believe, suppuration resulted from the use of solutions of 1–1000 bichlorid of mercury. When the wound has been infected, buried sutures should be avoided on account of the danger of suppuration, the wound should be closed by sutures, which include all the layers of the abdominal wound, and the aponeurosis should be accurately coaptated by the additional use of quilled sutures. In an infected wound, sutures, such as silkworm-gut, or silver wire, which have no capillary action, should be used. If the abdominal wall is very thick, a drain may be used for a short time between the skin and aponeurosis, or preferably the superficial part of the wound may be left open and packed with gauze for twelve hours, and then carefully closed by tying sutures placed at the time of the operation. The aponeurosis, muscles, and peritoneum are closed,

before the packing is inserted, by quilled sutures.

When suppuration occurs in a wound which has not been exposed to septic fluid or tissue, the sepsis must be due to faulty technic in closure.

The use of vaginal drainage in cases which would otherwise have required abdominal drainage, will eliminate one of the principal causes of suppuration in the abdominal wound. Infection may occur from unnecessary changing of the dressings or washing of the wound. When no abdominal drain is used, the gauze over the wound may be changed at the end of twenty-four hours if much soiled, but the wound should not otherwise be disturbed until the time for the removal of the sutures, unless symptoms indicate suppuration. Hernia may result from incomplete primary closure of the wound, from inaccurate coaptation of the aponeurosis, from suppuration in the wound, from the patient getting up too soon after the operation, or from non-use of an efficient abdominal supporter.

Incomplete primary closure of the wound always occurs when abdominal drainage is employed, and is especially noticeable when the Mikulicz drain is used. The abdominal drain is necessary only in exceptional cases, and, I believe, that the vagina offers a better route of drainage than the abdomen in nearly all cases, when considered either from a theoretical or a practical standpoint. When the abdominal drain is used it should be removed as soon as the discharge ceases, and the wound should be closed by tying sutures which

were placed at the time of the operation, if the cavity drained is not a suppurating one, or does not contain necrotic tissue.

Incomplete coaptation of the aponeuroses probably always occurs to a greater or less extent when the "through and through" suture is used. When the wound has not been infected, the peritoneum should be closed with a fine continuous catgut suture, and the fascia, external to the recti muscles, should be accurately coaptated. "This is the most important step in the closure, as in this fascia lies the strength of the abdominal wall, and in this proper reunion lies the protection against hernia." [1]

When the wound is aseptic this should be accomplished by means of buried sutures, or by quilled sutures. Either catgut, kangaroo tendon, silkworm-gut, or silver wire, may be employed for buried sutures. It has not yet been determined which of these suture materials is preferable. I believe that the muscles should not be sutured, because to suture them causes an unnatural union which has no material strength and which must interfere with their action. Suture of the muscles also increases the pain in the wound. It causes atrophy from including parts of the muscles in the sutures and from union of muscle-fibers. The strong aponeuroses in an infected wound may be accurately coaptated by the quill suture. The skin and subcutaneous tissue are united by silkworm-gut sutures.

[1] "American Text-book of Gynecology," p. 79.