Colostomy Closure by the Intraperitoneal Method*

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THE EFFECTIVENESS of sulfonamide and antibiotic drugs in the prevention of postoperative peritonitis has given such impetus to primary resections of the colon that staged procedures are performed with relative infrequency at the present time. It is, therefore, of more than passing interest that intraperitoneal closure of colostomies has not been accorded the general approval that it merits. Recently an experienced and distinguished surgeon made the following significant statement, "When I have carried a patient with a serious condition to this point I do not feel justified in taking any chance of losing him by attempting an intraperitoneal closure of his colostomy."

Although the technic of temporary colostomy has been standardized for many years, closure of the abdominal stoma has not been an entirely satisfactory procedure until recently. In fact, a few surgical operations have failed in their purpose more often than closure of colostomy. When the artificial anus has served its purpose spontaneous closure may occur, but it cannot always be relied upon because of the presence of a spur and adhesion of the mucous membrane to the skin. The prevalent method of closure has been crushing of the spur and extraperitoneal suture of the stomal margins. Crushing the colostomy spur usually causes abdominal distress often requiring administration of narcotics. In addition to discomfort and prolonged hospitalization spur crushing itself is attended by some risk, and it is by no means a minor procedure. Serious complications such as injury to a loop of small intestine adherent between the limbs of the colonic stoma with resulting small intestinal fistula, hemorrhage, peritonitis, etc., have been recorded. Ackland[1] reports three serious complications in 87 cases and Dixon and Benson[4] report that 30 per cent of their cases were complicated by fecal drainage. Nicholas Senn in 1894, stated that he considered that advances in surgery would in time make spur crushing obsolete, yet as late as 1951 Wilson,[5] an Australian surgeon, stated that extraperitoneal closure remains unchallenged. The need for repeated crushing of the spur is the rule rather than the exception, not only adding to the patient's discomfort but increasing his hospital stay as well. Undoubtedly incomplete crushing of the spur is the commonest cause of failure when the extraperitoneal method is utilized. Pauchet and Le Gac[3] made notable contributions when the former advised division of the spur at the time of closure and the latter suggested excising a quadrilateral segment of the spur as a preliminary measure. The extraperitoneal operation for colostomy closure has been successful in about two thirds of the cases in which it has been employed. Ackland[1] reports on 87 cases in which only one third of the patients had no leakage and 16 per cent required more than one operation.

The chief causes of failure are incomplete crushing of the spur and excessive tension on the intestinal suture line. The latter results from inadequate mobilization of the

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bowel because of an understandable desire to avoid entering the peritoneal cavity. The bowel margins must be freed sufficiently to allow closure of the stoma by a double row of sutures placed without tension, a detail that in most cases entails complete freeing of the peritoneal attachments. Lockhart-Mummery in 1923, and Grey-Turner again in 1943, emphasized the difficulties encountered and the frequent unsatisfactory results of extraperitoneal closure. Aguirre Mac-Kay[2] in his splendid monograph on "Colostomias" advocates intraperitoneal closure but states that we should not forget the good points of the extraperitoneal method.

General dissatisfaction with the old methods of closure has given great impetus to the adoption of the modern technic of resection of the colostomy stoma and primary end-to-end anastomosis. Since 1945, all colostomy closures performed at the Henry Ford Hospital have been accomplished by the intraperitoneal technic as will be outlined. There have been no deaths in this series of 200 cases and the morbidity has been extremely low. The great majority of the operations were for closure of transverse colostomy which had been performed as an emergency decompressive measure for carcinoma of the left portion of the colon. There has been only one anastomotic failure. This occurred in a patient after closure of a colostomy in the transverse colon originally performed as a decompressive measure for acute diverticulitis. A small fecal fistula persisted for many months but eventually closed without surgical intervention. Apparently the tissues of this patient lacked normal hearing qualities because, in addition to the difficulty with the colostomy a postoperative ventral hernia developed at the site of the lower left rectus incision used for resection of the involved area of bowel. The great majority of wounds have healed by first intention but subcutaneous infection occurred in a small percentage of our patients. We believe that this mild difficulty can be lessened by the use of sulfanilamide powder and by closing the skin flaps loosely to permit adequate drainage. Postoperative hernia at the site of closure of the abdominal stoma has been a problem of minimal significance since adoption of the relaxing incision in the rectus sheath (Fig. 1) and the use of steel wire sutures in the anterior rectus sheath.

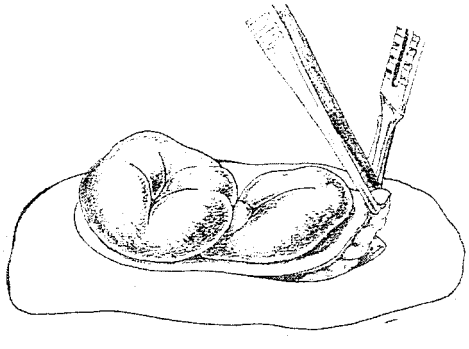

FIG. 1. Circumferential incision leaving a small margin of skin attached to the bowel.

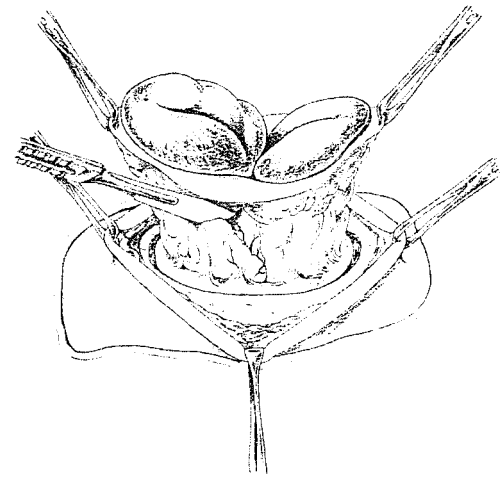

FIG. 2. Clearing the colon from peritoneal and omental attachments.

Preparation of Patient: Roentgenologic examination of the colon after a barium enema should always be performed to deter-

mine patency of the bowel distal to the colostomy. Sulfaguanidine or sulfathalidine, 4 Gm. should be administered four times a day for four days before operation, castor oil, ½ oz., should be given the morning of the day preceding operation and this should be followed by a "washout" of the proximal portion of the colon. Preoperative diet need not be restricted.

Anesthesia: General or spinal anesthesia may be used but when necessary the operation can be performed satisfactorily with local infiltration anesthesia.

Skin Preparation: The abdominal wall is thoroughly scrubbed with detergent solution followed by the usual skin clean-up technic.

Surgical Technic: Volsella clamps are attached to the margin of the bowel opening and vertical traction is applied to define the skin margins. A circular incision (Fig. 1) is carried through the skin surrounding the extruded colon, leaving a narrow strip of skin to prevent injury to the bowel wall. The original skin incision is reopened and extended in both directions for a distance of about three inches. The skin flaps are dissected up and the surface of the rectus sheath is thoroughly cleared of fat until the

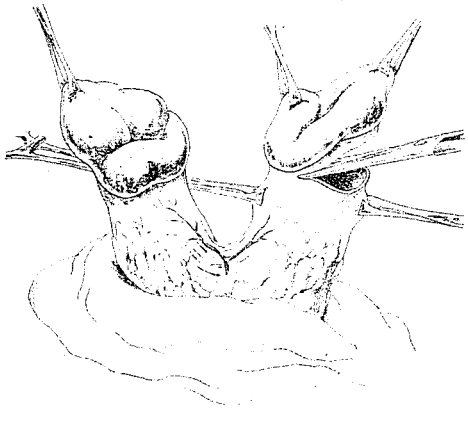

FIG. 3. Removal of the everted indurated terminal segments.

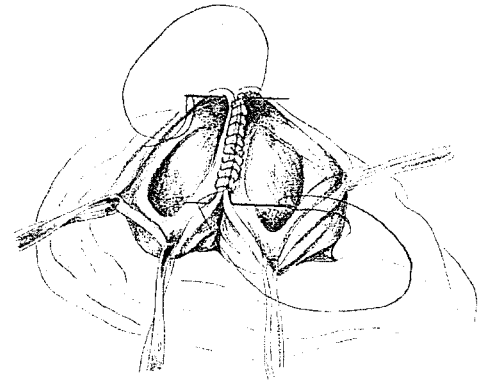

FIG. 4. Inner anastomotic, interlocking suture of catgut.

margins of the opening are well defined and a circumferential area of fascia is revealed. The anterior rectus sheath is opened at both extremities of the incision and the rectus muscle, its anterior and posterior sheaths, and the peritoneum are dissected free. It is important to free the bowel completely from all peritoneal and omental attachments (Fig. 2). The proximal and distal openings of the colostomy are then carefully identified and grasped with Allis clamps until separation of the individual segments is accomplished by sharp dissection. The mesentery of the colon is then detached from the extruded portions of bowel until at least one inch is cleared below any area of indurated intestine. Kocher clamps are attached to each terminal segment of bowel where its walls are pliable and the indurated areas are removed (Fig. 3). The Kocher clamps are detached and four Allis clamps are attached to the margins of each segment, dividing the opening into four quadrants as an aid to accurate approximation. Usually there is inequality of the diameter of the respective lumens. Either the proximal or distal loop is rotated through a 45-degree angle in order to avoid placing in apposition the two mesenteric areas of the bowel. Anastomosis is effected by taknig small "bites" of tissue in an inner circular layer of inter-

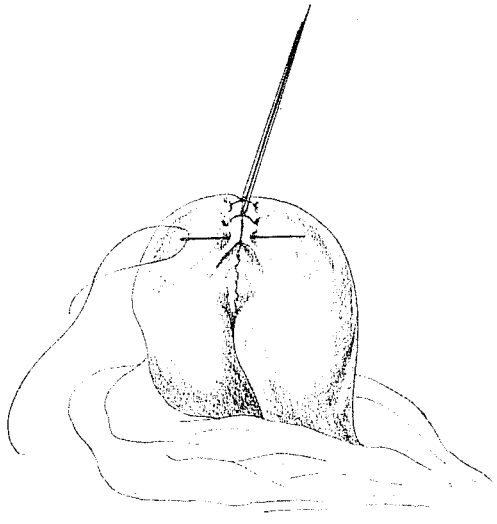

FIG. 5. Outer anastomotic suture of interrupted fine silk.

locking catgut sutures (Fig. 4). In order to avoid spur formation it is advisable not to place any of the outer layer of sutures until the inner layer has been closed. An outer layer of interrupted black silk sutures (Fig. 5) is now added after removing any areas of fat on the bowel wall which interfere with coaptation. The margins of the mesocolon are united, patency of the closure is ascertained and the suture line is covered with omental tags. The anastomotic area

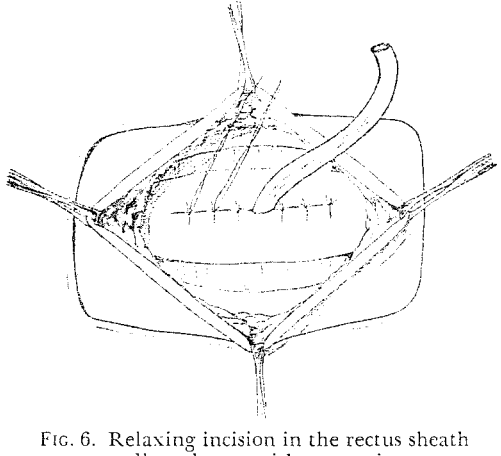

FIG. 6. Relaxing incision in the rectus sheath to allow closure without tension.

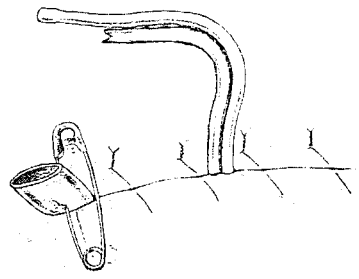

FIG. 7. Skin suture with fine steel wire—thyroid and sump drains.

is then dusted with sulfanilamide powder and closure of the abdominal incision is begun.

The intraperitoneal operation of colostomy is usually performed in the right upper quadrant through a transverse incision. In these cases the anterior and posterior rectus sheaths, the rectus muscle and the peritoneum are adherent in a single layer and apparently no advantage is gained by disturbing this anatomic relationship. The upper and lower skin flaps are retracted and a relaxing incision is made in the anterior rectus sheath (Fig. 6) about 2½ inches above and below the opening to facilitate approximation of the wound margins without tension. Closure is completed with interrupted sutures of chromic catgut which include all the muscle and fascial layers of the abdominal wall and reinforcement is provided by two or three stainless steel sutures placed through the anterior rectus sheath. A thyroid drain is introduced through the wound down to the anastomotic site to provide for drainage of fecal material should there be any defect in the anastomosis. The wound area is then flooded with saline solution. Sulfanilamide powder is dusted into the wound and the transverse skin incision is closed with three interrupted vertical mattress sutures of fine steel wire. It is important not to close the incision too tightly and to use relatively few

sutures since there will be some serous drainage and it is important to provide for its escape. A sump drain is beneficial (Fig. 7).

Postoperative Care: The wound is treated with moist compresses for 72 hours in order to promote drainage, after which dry heat such as that provided by an ordinary bedside lamp is applied. The thyroid drain is removed when bowel function has been restored. Food by mouth should be allowed as soon as peristalsis is restored and liquid petrolatum, 2 oz. should be administered daily. The majority of these wounds heal without delay.

Summary and Conclusions

A series of 200 patients in whom colostomy stomas have been closed by the intraperitoneal method is presented. There were no deaths. There was only one anastomotic failure. Morbidity is insignificant.

The intraperitoneal method of colostomy closure is preferable to the extraperitoneal procedure which subjects the patient to the discomfort of repeated application to the spur, of the crushing clamp and fails to accomplish its purpose in a high percentage of cases.

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