hasten rather than retard the impending dissolution; and yet some of these cases may be rescued by the very simple procedure of making a suprapubic puncture, under local anaesthesia, and passing a Keith's tube down into the pelvic basin. Recovery is, of course, slow on account of the prolonged suppuration which necessarily accompanies Nature's method of shedding the gangrenous appendix; but I am firmly persuaded that several of my patients owe their lives to the restriction of operative measures to the extent I have indicated, combined with the other adjuncts to treatment that I have already mentioned.

The procedure can be carried out at once, without moving the patient to hospital or wasting valuable time in elaborate preparations.

The prospect of success in ruptured gastric and duodenal ulcers is less hopeful, but even in these cases it should be tried if more ambitious measures are out of court. Upwards of a year ago I saw with Dr. Buckley, of Chesterfield, a man who had a ruptured duodenal ulcer of forty-six hours' duration. There were all the evidences of diffuse peritonitis; the pulse was barely discernible, and the extremities were blue and cold.

Our surgical armament was, I think, a record in simplicity. It consisted of a razor in lieu of a scalpel, a piece of gas rubber tubing, a few forceps, and a saucepan. The patient, although he ultimately died, made a splendid rally, and seemed to justify for a time the hope that he might recover.

REFERENCE.

¹ Rose and Carless, seventh edition, p. 1124.

APPENDICOSTOMY IN DIFFUSE SEPTIC PERITONITIS.*

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IN the *Annals of Surgery* (February, 1906) Murphy of Chicago published an account of his now well-known method of treatment of diffuse septic peritonitis. In brief, this consists in rapid elimination of the cause of the peritonitis—for example, the removal of a gangrenous appendix; free drainage of the peritoneum by means of rubber tubes passed through the operation wound and into the bottom of Douglas's pouch through a suprapubic puncture; the assumption by the patient of the semi-sitting position after operation; the prevention of peristalsis by withholding all food and fluids by the mouth; and the introduction into the circulation of large quantities of fluid by absorption from the rectum. He claims that in this way the current in the lymphatics of the peritoneum is reversed, that membrane becoming a secreting instead of an absorbing surface, with the result that septic matter is washed away in the free flow that takes place through the drainage tubes. Further, toxins already in the blood are diluted and their elimination facilitated by the free diuresis that is induced. Murphy states that only one death occurred amongst the last 29 cases treated by him in this way.

Of the value of this method of treatment there can be no doubt. Success, however, largely depends upon the quantity of fluid that the rectum can be made to absorb. Murphy introduces a nozzle with three or four openings into the rectum, and attaches it by means of rubber tubing to a bag containing warm water. The bag is slung 3 or 4 in. above the plane of the rectum, so that the water runs in at very low pressure, and all distension of the bowel is avoided. I have attempted to carry out this treatment on many occasions, but have never succeeded in getting the rectum to absorb the large quantities of fluid that Murphy mentions. With the patient sitting in a nearly upright position it is almost impossible to prevent leakage through the anus. This not only stultifies the procedure but causes the patient a good deal of annoyance. In many cases also the rectum becomes very intolerant of the prolonged presence of the tube, and straining occurs. Many other surgeons whom I have specifically questioned upon this point appear to have experienced the same difficulty.

* This paper was written before Mr. Keetley read his paper on the utility of the appendix before the Surgical Section of the Royal Society of Medicine. I believe no better example of the value of appendicostomy can be given than in the treatment of desperate cases of diffuse septic peritonitis.

It occurred to me that the appendix might with advantage be utilized for the purpose of introducing fluid into the large bowel, and on several occasions I have done so with marked success. When the appendix is healthy—for example, in peritonitis following perforation of a gastric ulcer—an incision is first made over the lesion, which is rapidly treated in such a way as to prevent further contamination. No attempt is made to cleanse the peritoneum by irrigation or mopping, but adequate drainage is provided for, preferably by means of rubber tubes passed through the wound. Then, instead of making a suprapubic puncture to allow of the introduction of a rubber tube into Douglas's pouch, the abdominal cavity is again opened by a small vertical incision over the lower part of the right rectus, the fibres of which are separated. The appendix is pulled up into the wound, and the distal portion cut off. The stump is then fixed in the upper angle of the wound by one or two silk sutures passing through all its coats and the skin. The open mouth of the stump is thus practically flush with the skin, and through it a small rubber catheter is passed into the caecum. A large rubber drainage tube is finally passed to the bottom of Douglas's pouch through the lower part of the wound. The patient is then put back to bed, with the rubber catheter projecting through the dressings, care being taken to prevent it being accidentally pulled out. Finally, the patient is placed in the Fowler position, and the catheter connected by rubber tubing to a tank in which is warm normal salt solution. The tank stands on a table at the bedside, and should not be more than 3 in. above the plane of the caecum. The flow of water is regulated by a clamp on the rubber tubing.

If the peritonitis is secondary to disease of the appendix, the above procedure must be modified somewhat. An incision is then made over the appendix and its condition ascertained. If, as is often the case, the part nearest the caecum is comparatively healthy, the distal portion is cut off and the stump sutured to the skin, as already described. If this is impracticable, the appendix is extirpated in the usual way and a small portion of the caecal wall nearest the surface sutured to the skin. A puncture sufficient to admit the rubber catheter is then made in it. It is advisable in these cases to introduce a large rubber tube into the pelvis through a separate suprapubic puncture.

I use normal salt solution in preference to plain water, believing it to be less irritating to the mucous membrane of the bowel. Not more than 1 pint per hour is admitted in order to avoid distension, and care must be taken not to place the supply tank at too high a level. When absorption ceases, as much fluid is evacuated from the rectum as is introduced into the caecum, and the supply is then cut off. It is not necessary to leave in the catheter for more than forty-eight hours. At the end of that time it is withdrawn, the mucous membrane of the stump of the appendix is removed for a little distance down, and the opening closed by uniting the sero-muscular coats with a catgut stitch. Finally, any adhesions between the skin and the stump are gently broken down and the latter allowed to retract. In this way the risk of a faecal fistula is minimized.

In practice this procedure has many advantages over that employed by Murphy. It does not prolong the initial operation by more than two or three minutes. I have removed a gangrenous appendix, sutured the stump in the wound, and provided for drainage, with the patient on the operating table for only twelve minutes. The quantity of fluid admitted to the bowel can be regulated exactly, while the whole length of the large intestine takes part in its absorption. The patient suffers practically no discomfort, as no disturbance of bedclothes is necessary, and there is no leakage from the anus until absorption is at an end. Further, stimulants and nutrients can be easily and rapidly administered, if desired, by simply disconnecting the tank and connecting the catheter to a glass funnel into which they are poured.

Illustrative Case.

Mrs. A., aged 36, was admitted into the Queen's Hospital on August 4th, 1908. Three weeks prior to admission she had aborted, and two weeks later was seized with severe hypogastric pain, which had become much worse lately. When seen she presented the typical appearance of advancing peritonitis. The temperature was 103°, and the pulse 140, small, and thready.

The whole abdomen was rigid and tender, and the lower half tumid.

The abdomen was opened in the middle line, when a considerable quantity of brownish-yellow free pus escaped. The pus was not faeculent. On examining the pelvis an opening leading into an abscess cavity in the neighbourhood of the left Fallopian tube was found. Evidently the abscess had ruptured into the peritoneal cavity, and excited a generalizing peritonitis. The appendix, which was healthy, was cut across about 1½ in. from the caecum, and the stump fixed in the upper angle of the wound. A No. 6 rubber catheter was passed through the stump into the caecum. Two large rubber tubes were placed in Douglas's pouch, and brought out through the lower part of the incision, and the patient put back to bed. No attempt was made to cleanse the peritoneum.

The patient was propped up in the Fowler position, and a pint of warm saline solution passed into the colon every hour. Twelve hours later the pulse had fallen to 90, and was of good volume; the temperature was normal; the cheeks had filled out, and the patient looked and expressed herself as feeling very comfortable. The irrigation was kept up for twenty-four hours, during which time 24 pints of saline solution passed into the bowel. Of this, only about 5 pints escaped from the rectum. There was a copious discharge from the tubes, and a large amount of urine excreted. The catheter was withdrawn from the appendix, and on the second day the silk stitches connecting it to the skin were cut, and the stump allowed to retract. No escape of faecal matter occurred, then or later. Subsequent progress was uneventful, and the patient was discharged at the end of three weeks, with a single tube from which there was very little discharge.

APPENDICOSTOMY: WITH NOTES ON THE SURGICAL ASPECT OF COLITIS.*

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THE appendix vermiformis, which has occasioned a literature probably unequalled by that of any other part of the human system, seems of late to have, in some measure, justified its existence. Instead of being regarded as an unnecessary and dangerous possession, there have been found for it uses. The operation of appendicostomy, whereby the appendix is used to establish a temporary or permanent communication with the exterior, was first proposed in 1894¹ by Keetley, who suggested that by bringing the appendix through the abdominal wall and amputating the apex it might be used as a spout to relieve the distension of a case of obstruction occurring at a point below the caecum. He put this suggestion to the test during 1906. The credit of first performing the operation seems to be due to Weir, of New York, who in 1902² reported a case of ulcerative colitis upon which he performed the operation with marked success.

THE OPERATION.

The surgical procedure is simplicity itself. Nevertheless, although, as in Weir's original case, the appendix may conveniently present itself, yet if adhesions be present, if the organ is kinked, or if it passes behind the caecum, the operation may be long and difficult, rarely, however, should it be found impossible to liberate a sufficient length of well-nourished appendix to extend through the thickness of the abdominal wall. A small oblique incision, large enough to admit two fingers, is made through the abdominal wall in the region of McBurney's point. If the split flap method is used, the muscular fibres should be notched at right angles to their direction, otherwise the vessels in the meso-appendix may be so constricted as to cause sloughing of the organ. If the appendix is free it can at once be brought out through the wound; if, however, there are adhesions, or the appendix is for some reason inaccessible, the incision must be enlarged. The appendix should be pulled out until the caecum is flush with the parietal peritoneum, care being taken that there is no twist in its mesentery. Two fine silk sutures are inserted to secure the meso-appendix and the free border of the appendix to the edges of the incision in the peritoneum. The muscles are allowed to fall back, and if necessary brought into apposition with a loosely tied catgut suture. The skin incision is sutured, the last suture taking in the sero-muscular coats of the appendix protruding through one angle of the wound. A dressing of gauze and collodion is applied, covered by wool and bandage, and the patient returned to bed.

Two or three days later the tip of the appendix is severed within ¼ in. of the skin and the appendical artery secured. The exposed mucous membrane is caught with fine catch forceps, dragged out a little and secured by one or two sutures to the edge of the skin. A rubber catheter is introduced into the caecum, and, if desirable, irrigation or other treatment can be at once proceeded with. If difficulty is experienced in passing the catheter, one designed by Mr. Keetley, having a tapering solid end extending beyond the eye of the instrument, can be used. Beyond a slight risk of infecting the wound, there is no reason why the appendix should not be opened and a catheter introduced at the time of the operation, if immediate entry is required. Should the lumen be small, it is very easy to dilate it gradually to admit a No. 10 or 12 English. It is desirable to leave the catheter in continuously during the first ten days to overcome any tendency to contraction on the part of the wound producing stenosis of the appendical lumen. Later it is sufficient to pass the catheter once daily.

There are several difficulties which may arise in the operation:

1. In the first appendicostomy I saw performed the surgeon, accustomed to appendicectomy, inadvertently tied part of the meso-appendix. Subsequently the distal end of the appendix sloughed below the level of the skin, but, fortunately, not below the level of the muscular layers. The only consequence was a great tendency of the opening to close.

2. A similar condition occurred in another case, in which the appendix was kinked upon itself in such a manner that only sufficient was obtained to just reach the skin margin.

3. When the tip is amputated, unless the mucous membrane is secured to the skin edge at once, it retracts within the sero-muscular coats, and a tendency to stenosis arises.

THE POSSIBILITY OF THE OPERATION.

The question naturally arises whether there may not be a percentage of cases in which the appendix is so situated as to render appendicostomy impossible; in 100 autopsies at St. George's Hospital the appendix was a fibrous cord without a lumen in 2; in 2 the lumen admitted a bristle only; in 96 appendicostomy would have been possible.

INDICATIONS FOR APPENDICOSTOMY.

The following classification is modified from that of Jacobson and Rowlands.³

Appendicostomy may be performed:

1. For irrigation and medication of the colon.
2. For obstinate and protracted constipation.
3. For drainage of the caecum and relief of abdominal distension.
4. For nutritive purposes.
5. For irrigation and medication of the lower ileum.

THE SURGICAL TREATMENT OF COLITIS.

The terms, colitis or enteritis membranacea, pseudo-membranacea, pellicularis, tubularis, muco-membranacea, crouposa, fibrinosa, pseudo-enteritis, catarrhus⁴ desquamativus, diarrhoea membranacea, tubularis, etc., have been invented, but to my mind the condition is one simply of a mucus secreting, epithelium covered membrane subject to inflammatory reaction of various degrees. There are, however, rare forms of colitis dependent upon definite and well recognized general constitutional disorders which do not come within the scope of this paper. Such are the colitis due to injury, pyaemia, diabetes, Bright's disease, purpura, scurvy, amyloid degeneration, venous or arterial stasis, and spinal cord lesions.

In dealing with colitis due to local lesions the question of some form of classification arises. The following is simple, and I think sufficient:

- Simple acute.
- Simple chronic.
- Ulcerative acute.
- Ulcerative chronic.

Whilst there are distinct cases both of simple and ulcerative colitis, yet the demarcation between these two varieties is by no means well defined. A simple inflammatory condition of the colonic mucosa may or may not proceed with greater or less rapidity to definite destruction of the mucous epithelium. Cases brought under notice in

* Read before the York Medical Society.