ABDOMINAL DRAINAGE TUBES.

BY RODNEY MAINGOT, F.R.C.S.

(Surgeon, Royal Waterloo Hospital, London.)

THE employment of drainage tubes after abdominal operations is a very vexed question on which many surgeons hold divergent views, even at the present time. No definite rules can be laid down as to when they should be used and not, but in this article it is my intention to attempt to elucidate my own views on the matter, and for this purpose I would classify as follows:—

(1) For Extraperitoneal Drainage.

- (a) For drainage of the fat and subcutaneous tissues of the abdominal wound.
- (b) For drainage of the retroperitoneal space after certain operations, e.g., partial colectomy.

(2) For Intra-abdominal Drainage.

- (a) For drainage in cases of generalized peritonitis or contamination of the peritoneal cavity following a ruptured viscus.
- (b) For drainage of a localized intraperitoneal abscess. e.g., appendix abscess.
- (c) For drainage of an oozing surface.
- (d) For drainage of a viscus, e.g., ileostomy.
- (e) For insertion into various portions of the gut, either for medicinal or for feeding purposes, e.g., gastrostomy, appendicostomy, &c.

1. *(a) Drainage of the Fat and Subcutaneous Tissues of the Abdominal Wound.*—Drainage is here advantageous in very obese patients, even in “clean” cases. The wound is very prone to suppurate or to develop stitch abscess, owing to the poor resistance of the fat, and to the accumulation of blood or serum in the many dead spaces that are left after the wound has been sutured. A small drainage tube inserted either at the top, bottom, or at a special stab incision at the side of the wound will drain away much blood and serum. Should the wound show signs of normal, “clean” healing, the tube can be withdrawn at the end of two or three days, without affecting the integrity of the wound. If, on the other hand, the wound becomes infected, the drainage tube serves the useful purpose of giving vent to discharges, and at the same time can be used for irrigation.

It is urgently required where the wound has been infected during an abdominal operation by pus or foul peritoneal fluid. Many of the toxæmic and general constitutional symptoms from which patients suffer after operation may be traced to suppuration in the wound. In fat patients it should be emphasized that special care and attention must be bestowed on the wound, because, should suppuration ensue, and too many skin stitches be removed in order to liberate the pus, the wound may take many weeks to heal, and such tragedies as ventral hernia and burst abdomen result.

If a tube has been placed in the subcutaneous or fatty layers of the abdominal wall for drainage purposes, and suppuration follows, the whole area should be thickly coated with equal parts of zinc and castor oil, and hot fomentations applied to the part no less than three times a day. Radiant heat baths for ten to twenty minutes, three times a

day, are recommended to amplify the hot fomentations. One or two stitches may be judiciously removed, and frequent irrigations with hydrogen peroxide, saline, or eusol, be undertaken through the drainage tube. Even the most extensive suppuration of the wound will clear up satisfactorily under this treatment, the resulting scar being firm and sound. In wounds that suppurate it is a great mistake to remove all the skin stitches and to lay bare the parts. Wounds thus treated take many weeks to heal, and are often keloidal, painful and weak.

(b) *Drainage of the Retroperitoneal Space after Certain Operations.*—After resection of the cæcum and ascending or descending colon, or, in fact, where extensive mobilization of the large gut has been undertaken at the operation of colectomy, partial or complete, it is a wise precaution to drain the retroperitoneal tissues with a rubber tube of wide bore through a stab incision in the flank, as any spreading suppuration here may prove fatal.

2. (a) *Drainage in Cases of Generalized Peritonitis, or Contamination of the Peritoneal Cavity following a Ruptured Viscus.*—It has been proved quite conclusively that it is a physical impossibility to drain the whole peritoneal cavity by means of a drainage tube for more than twenty-four hours. The tube that is left *in situ* for a longer period than this will attract many adhesions, will become shut in and form a sinus. The tube, therefore, after this time will only drain its own sinus. Such complications as intestinal obstruction due to bands, perforation of the gut owing to erosion, &c., may arise, and are by no means infrequent where a tube has been allowed to remain beyond the twenty-four hours.

Wherever the primary incision has been made, whether in the upper or lower half of the abdomen, a special stab wound, placed suprapubically, should be performed for the insertion of a tube down to the depths of Douglas' pouch. A tube placed here will often drain copiously for twenty-four hours, but after this time little or no discharge will find its way to the surface, indicating, as previously suggested, the futility of leaving the tube beyond the stated time.

In cases of appendicitis with generalized peritonitis, where the appendix has been removed through a gridiron or Battle's incision, drainage of Douglas' pouch should always complete the operation by making a separate suprapubic stab wound to accommodate the tube that is to be inserted into Douglas's pouch, the primary wound being completely sutured. The practice of draining Douglas' pouch by the circuitous route through a gridiron or Battle's incision has now been entirely abandoned, as such a tube, in addition to acting under great physical disadvantages, has been known to produce erosion of the common iliac vein with fatal hæmorrhage and, by pressure on the cæcum which may be inflamed and friable, give rise to pressure necrosis and perforation of the gut.

Where a gastric or duodenal ulcer, or in fact any portion of the gut, has perforated, leading to gross soiling of the peritoneal cavity, after dealing effectively with the perforation and mopping up as much fluid as possible, a suprapubic drainage tube should again be inserted and the primary wound closed up in separate layers.

The insertion of multiple drainage tubes in such cases, through the top or bottom of the wound, through both flanks, and suprapubically, is now regarded as superfluous.

(b) *Drainage of a Localized Intra-peritoneal Abscess.*—The best illustration of this is an appendix abscess. In over 50 per cent. of cases of appendix abscess the best results

will be obtained by expectant treatment on the lines laid down by Ochsner and Sherren. Should operation become imperative, it is better by far to drain the abscess than to attempt removal of the appendix plus drainage. The mortality in cases where the appendix has been removed and drainage instituted is approximately 14 per cent., while the fatal results from simple drainage alone amount to only 4 per cent.

The tube that has been used to drain an appendix abscess should remain untouched for forty-eight hours. After this time it is loosened, rotated, and shortened daily, and at the end of a week or thereabouts removed and replaced by a tube of smaller dimensions. The second tube should be submitted to the same process of daily rotation and shortening, until it becomes quite obvious that no further drainage is required. If, however, a fæcal fistula ensues where a drainage tube has been inserted, it should at once be discarded, as to allow it to remain would only aggravate the condition.

The practice of irrigating a localized appendix abscess through the tube should not be encouraged, as if the fluid is injected too forcibly it is conceivable that the surrounding protective barrier, which may be weak at one spot, may give way under the strain imposed upon it, leading to spreading peritonitis.

Much that has been written under this section applies in a like way to the management of all drainage tubes that have been employed in the treatment of subphrenic abscess and other definitely localized intraperitoneal collections of pus.

(c) *Drainage of an Oozing Surface.*—Many illustrations could be cited where drainage of an oozing surface is salutary after the removal of an organ, such as following the operation of cholecystectomy, or a bound-down retrocæcal appendix with much hæmorrhage. It is the practice of most surgeons to insert a drainage tube down to the cystic duct and artery along the fossa in the liver which results after the gall-bladder has been removed. Such a tube drains away blood and serum from the oozing surface of the liver, and in addition to this forms a sinus for the discharge of bile in the event of the ligature applied to the cystic duct working loose.

Gauze packing is sometimes used to control an oozing surface, but for drainage, and for drainage alone, it cannot be recommended, as after the blood and serum have become congealed in its meshes it merely acts as a plug. Gauze plugging is advocated to arrest bleeding after an injury to the liver, where suture is impracticable or undesirable, in certain cases following cholecystectomy, where the numerous points of hæmorrhage cannot be detected, and after a very difficult appendicectomy in an obese patient, where, owing to the position of the appendix and the technical difficulties of the operation, bleeding is hard to control.

The removal of a gauze plug introduced for the above reasons always gives rise to a certain amount of apprehension, as it may restart the hæmorrhage. It should therefore be allowed to remain for four or five days, and then a part may be gently and cautiously extracted, and the remainder in the course of the next day or two.

In cases of acute hæmorrhagic pancreatitis, a large drainage tube is usually inserted up to the inflamed or necrotic pancreatic tissue, as after these operations secondary hæmorrhages are prone to occur, owing to the vascularity of the organ and erosion of the blood-vessels by the digestive action of the pancreatic juices.

Again, large sloughs may come away from the pancreas and be discharged, or may be picked out through the tube. Such sloughs from the pancreas may take a week or more to separate, and as secondary hæmorrhage from the gland may occur up to the

tenth day, the tube should be undisturbed for at least ten days. The skin around the drainage tube is liable to become severely inflamed, or in part digested, if it is not properly protected. The best protection is gauze soaked in 0.5 per cent. hydrochloric acid, the surrounding area being smeared with zinc and castor oil or vaseline.

(d) *Drainage of a Viscus.*—There are numerous operations in abdominal surgery which demand drainage of certain viscera. Tubes introduced into the gall-bladder, common bile duct or intestines for drainage purposes, e.g., cholecystostomy, enterostomy, &c., are sewn into the gut, and are expected to remain in position until they work loose. It is actually injurious and dangerous to attempt their removal until they have cut adrift and can easily be extracted without any force.

Where the gall-bladder, small gut, &c., have been drained by a rubber tube, it is not as a rule released, or ripe for removal, until the tenth to the fourteenth day after the operation. Its extraction before this time may lacerate the viscus to which it is tethered, or cause hæmorrhage.

Where a cæcostomy has been performed for acute intestinal obstruction or preparatory resection of the colon, the longer the tube remains in position the better. Unfortunately, however, such tubes are apt to free themselves before the full ten to fourteen days have expired. Special care and frequent dressings of the wound should be enforced after the tube has been removed, owing to the corroding action of the liquid intestinal contents, and the possibility of extensive suppuration and a spreading cellulitis in the wound and in the region around.

(e) *Insertion into Various Portions of the Gut, either for Medicinal or for Feeding Purposes.*—Tubes introduced into any portion of the gut for medicinal or feeding purposes, although they are intraperitoneal, can hardly be included in the subject under discussion, and they require special management.

The surgeon should take special care after the operation of gastrostomy to place the tube at the bottom of the wound, so that, should the tube by mischance work loose at an earlier date than intended, there would be no difficulty in finding the sinus into which to introduce another tube for feeding purposes.

Where an ileostomy, appendicostomy, or cæcostomy has been performed with the object of feeding the patient, or for special medication, the sinus which remains after the tube has worked loose should be gently stretched with a sound or bougie before the fresh tube is passed.

Remarks.—Intra-abdominal drainage by means of rubber tubes has undergone a great revolution during recent years, and Lawson Tait's maxim, "When in doubt, drain," has been replaced by the reverse principle. Surgeons are learning to trust the peritoneum and its recuperative powers more and more every day, and cases which a few years ago would certainly have been drained are now successfully left to their own resources.