

# Operative treatment

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Emergency In the emergency situation (or for a patient who is malnourished or on high-dose steroids), the safest procedure is subtotal colectomy and end-ileostomy. The rectosigmoid remnant may be left long and can either be brought out as a formal mucous fistula or closed just beneath the skin as a subcutaneous mucous fistula (Figure 75.6); alternatively, it can be closed off with staples across the upper rectum at the pelvic brim and rectal decompression achieved via a transanal catheter. This operation has the advantage that the patient avoids the risks of pelvic dissection while unwell and that colonic histology can be assessed to distinguish between UC and CD. Restorative surgery can be contemplated at a later date when the patient is no longer on steroids and has fully recovered. The mesentery should be divided where convenient and there is no evidence for or against preservation of the omentum in the laparoscopic era, when resection or preservation is a matter of surgical convenience. Most surgeons would recommend close dissection for UC and a greater degree of mesocolic resection for CD given the potential role for the mesentery

(b) (a). The rectal (b).

divide the sigmoid at a level that will comfortably reach the skin as a mucous fistula unless this part of the bowel is severely diseased, in which case resection at the sacral promontory is the preferred approach. Urgent subtotal colectomy for acute severe colitis can be performed laparoscopically, provided the surgeon and theatre team have adequate experience, with care to avoid perforation when handling friable bowel with laparoscopic instruments. Emergency colectomy for septic complications of acute severe colitis should be carried out in a timely fashion and should not be delayed pending availability of laparoscopic colorectal expertise. Proctectomy is rarely needed in the urgent or emergency situation and should be avoided as pelvic dissection of the diseased rectum is difficult, carries risks to bladder and sexual function, prolongs the surgery in a critically ill patient, increases the risk of mortality and reduces the potential for later restorative surgery. Fulminant colitis or toxic megacolon can also occur in CD but less frequently than in UC. Without a pre-established diagnosis, distinction is usually not possible unless there is clear radiological evidence of small bowel CD or clinically apparent perianal CD. In the urgent setting subtotal colectomy for pan colitis should be performed as for UC, preferably with omental resection and a more radical approach to the mesentery. In situations where a diagnosis of colonic CD is established a more tailored segmental resection may be considered in highly selected patients. Primary anastomosis should be avoided in the acute setting and in immunosuppressed patients. Elective In the elective setting the following operations are available – all of these can be successfully performed laparoscopically in experienced hands: subtotal colectomy and ileostomy (as in an urgent colectomy); proctocolectomy and permanent end-ileostomy; restorative proctocolectomy with ileal pouch–anal anastomosis (IPAA); subtotal colectomy and ileorectal anastomosis; segmental colectomy (Crohn's colitis only).

Segmental resections are not recommended for UC as, even when the right colon is not obviously involved, there is a high recurrence rate in the remaining colon. Segmental colonic resection may be considered in selected patients with isolated CD. Subtotal colectomy with ileostomy is performed electively in frail patients, patients who cannot be weaned from steroids and when there is doubt as to the underlying diagnosis. In such situations, restorative surgery or completion proctectomy can be considered at a future date. Complications of CD including fibrotic strictures not amenable to endoscopic dilatation and enteric fistulae are common indications for elective surgery in patients with CD. Patients who have previously undergone emergency resection and stoma formation will also require follow-up for counselling about restoration of bowel continuity .

For many patients who require surgical intervention for colitis, the timing of surgery will be a critical part of shared decision making between clinicians and patient. In the elective setting, patients will want to plan surgery around social, educational, family and work commitments to minimise the impact of surgery and postoperative recovery on their lives. As proctectomy carries small but recognised risks to sexual function and fertility , patients may choose to defer surgery until after completing their families or consider sperm, oocyte or embryo storage to allow assisted fertility at a later date. Steroid therapy in both UC and Crohn's colitis increases the risk of postoperative complications, although it is difficult to quantify this effect. Patients treated with steroids have an increased risk of infectious complications and poor healing. It is likely that there is a dose-related aspect to this phenomenon. In view of this, steroid use should be reduced as much as possible prior to surgery , preferably below 10 mg prednisolone , per day , particularly if an anastomosis is planned. Both anti-TNF  $\alpha$  and anti-integrin biological therapies also increase the risk of postoperative complications and should be discontinued wherever possible between 14 and 30 days prior to surgery .

Venous thromboembolism prophylaxis Patients with IBD have a threefold increased risk of venous thromboembolism compared with the general population and this risk increases in patients who require surgery . The rate of thromboembolic events after surgery for IBD is around 3%, with the strongest predictors of thromboembolic complications being stoma formation, preoperative steroid therapy , ileoanal pouch formation and increased length of stay . The risk of venous thromboembolism is higher in patients with UC than in those with CD. Because of the increased risk of venous thromboembolism, extended chemoprophylaxis has been recommended with low-molecular-weight heparin used for up to 28 days after any abdominal procedure for IBD.

Panproctocolectomy and ileostomy - This operation removes the entire colon and rectum and, by doing so, removes any risk of colorectal neoplasia or colitic symptoms; it results in a permanent ileostomy . It has a lower complication rate than an ileal pouch procedure, although the perineal wound can be problematic (10% fail to heal) and stoma problems are common. It is indicated for patients who are not candidates for restorative surgery owing to impaired anal sphincter function, comorbidities or patient preference. The colectomy is performed as above. In UC, provided there is no concern regarding rectal cancer, a close rectal dissection may be performed to minimise damage to the pelvic nerves, avoiding erectile and bladder dysfunction. Recent evidence suggests that the mesorectum should be excised when proctectomy is performed in CD as the mesentery itself may be involved in the inflammatory process and delay perineal healing. In UC without dysplasia or cancer present, an intersphincteric dissection of the anal canal should be performed. This results in a smaller perineal wound and fewer healing problems. In CD, wider excision of the anal canal and diseased permanent end-ileostomy is formed. The position of the ileostomy should be carefully sited preoperatively with the expert guidance of a stoma nurse specialist. Restorative proctocolectomy with ileal pouch-anal anastomosis Although restoration of bowel continuity by ileoanal anastomosis was first performed

by Nissen in 1933 and later by Ravitch and Sabiston, the functional outcomes were poor and the operation was rarely performed. The combination of improved surgical techniques, better understanding of the physiology of faecal continence and the relative success of the continent ileostomy operation (Kock pouch) led Parks and Nicholls in the 1970s to reintroduce the concept of IPAA first promulgated by Bacon in the 1950s. Parks and Nicholls devised an 'S' pouch and later a 'W' pouch configuration; however, these have been generally superseded by the 'J' pouch described by Utsunomiya, which is technically easier to construct and avoids a potentially obstructing efferent limb from the pouch reservoir ( Figure 75.7 ). Early pouch surgery included dissection of the rectal muscularis propria (mucosal proctectomy) but it is now clear that continence is better if the mucosa immediately above the dentate line (anal transitional zone) is preserved. A distal mucosectomy to the upper anal canal with anastomosis at the dentate line is now reserved for patients with rectal mucosal dysplasia and selectively for patients in whom the operation is performed for familial adenomatous polyposis (FAP) (see Chapter 77 Usually the anastomosis is double-stapled to the top of the anal canal, preserving the upper anal mucosa ( Figure 75.8 although a hand-sewn pull-through anastomosis is also possible. Care must be taken to ensure that the anastomosis is to the anal canal and not the distal rectum as residual inflamed mucosa behind may cause persistent symptoms, so-called cuffitis. IPAA is usually performed as a two-stage procedure with a covering loop ileostomy that may be closed at an interval once pouch healing has been confirmed, usually by means of a Gastrografin (water soluble) contrast enema radiograph. In patients who have previously undergone an urgent colectomy or those with IC in whom a colectomy had provided a definitive diagnosis of UC, the operation is considered to have been a three-stage procedure. In highly selected individuals whose operation is elective and immunosuppressive medication has been discontinued a one-stage operation without ileostomy may be considered. The modified two-stage approach of initial subtotal colectomy and end-ileostomy followed by proctectomy with pouch formation and without diversion is the standard of practice in many specialist centres. Rudolph Nissen , 1896–1981, surgeon, Istanbul, Turkey , later Jewish Hospital, New York, NY , USA, and University of Basel, Switzerland. Mark Mitchell Ravitch , 1911–1989, surgeon, Montefiore Hospital, Pittsburgh, PA, USA. David Sabiston , 1925–2009, surgeon, Duke University , Durham, NC, USA. Nils G Kock , 1924–2011, Professor of Surgery , University of Gothenburg, Sweden. Sir Alan Guyatt Parks , 1920–1982, surgeon, St Mark's Hospital, London, UK. Ralph John Nicholls , b. 1943, surgeon, St Mark's Hospital, London, UK. Harry Ellicott Bacon , 1900–1981, surgeon, Temple University , Philadelphia, PA, USA. Joyi Utsunomiya , surgeon, Hyogo College of Medicine, Hyogo, Japan. - - 15 cm (c) - - - ). - Postoperative complications include pelvic infection (usually resulting from a leak at the ileoanal anastomosis or, in a 'J' pouch, from the top of the 'J'), postoperative small bowel obstruction (which may occur in as many as 10–15% of patients) and pouch-vaginal fistula. The frequency of evacuation is determined by pouch volume, completeness of emptying, reservoir inflammation and intrinsic small bowel motility , but is typically between three and eight evacuations in each 24-hour period, of which at least one evacuation is nocturnal. Stool frequency , urgency and minor faecal incontinence are common, but usually reduce with time

Figure 75.7 Ileoanal anastomosis with a pouch. A substitute rectum is made from joined folds of ileum to form an expanded pouch of small intestine. The pouch is then joined directly to the anus at the level of the dentate line, all other rectal mucosa having been removed. Three ways of forming a pouch are illustrated: (a) a simple reversed 'J'; (b) an 'S' pouch; (c) a 'W' pouch.

as ileal pouch capacity increases. The majority of patients with IPAA have a very good quality of life. The main reasons for pouch failure are pelvic infection, poor functional outcome and pouchitis (see below). Follow-up of patients with IPAA shows that, although the functional outcome may deteriorate with ageing, between 85% and 90% of patients retain their IPAA in the long term. Women of reproductive age should be advised of potentially reduced fertility, as well as vaginal dryness, owing to denervation of the secretory glands of the vaginal mucosa. Laparoscopic or robotic techniques may reduce this effect; however, women who have not completed their family may elect for a colectomy with ileostomy and IPAA at a later date. Pouchitis is inflammation of the ileal pouch mucosa that occurs to varying degrees in up to 50% of patients who undergo IPAA for UC. Interestingly, pouchitis is exceedingly rare after IPAA for FAP, suggesting that there is an inherent enteric mucosal proinflammatory response to an altered gut-associated microbiome following IPAA for UC. Pouchitis usually responds to a short course of antibiotic therapy, notably with metronidazole or ciprofloxacin, and can be followed by maintenance with probiotics. In a small percentage of patients (3–5%), pouchitis is recurrent or persistent such that pouch excision may be necessary. In such cases, previously undiagnosed CD and pouch ischaemia should be considered as alternative diagnoses.

Giovanni Battista Morgagni, 1682–1771, Professor of Anatomy, Padua, Italy. Antoni Leśniowski, 1867–1940, Professor of Surgery, Warsaw University, Warsaw, Poland. Thomas Kennedy Dalziel, 1861–1924, surgeon, Western Infirmary, Glasgow, UK. Leon Ginzburg, 1989–1988, surgeon, Mount Sinai Hospital, New York, NY, USA. Gordon D Oppenheimer, 1900–1974, surgeon, Mount Sinai Hospital, New York, NY, USA. The Kock pouch was originally designed as a continent urostomy but later adapted as a continent ileostomy for patients following proctocolectomy for IBD. The technique confirmed the safety of a small bowel reservoir, but difficulties with prolapse of the nipple valve mechanism required for continence and the success of IPAA as a mechanism to retain continence and anatomical continuity has meant that the operation is now rarely performed.

Colectomy and ileorectal anastomosis This procedure is occasionally performed in UC if there is minimal rectal inflammation. A very considerable percentage (at least 50%) of patients with a quiescent rectum after total colectomy will develop significant mucosal inflammation in the rectum once the faecal stream has been re-established. Although rectal inflammation can be controlled with medical treatment, functional results may be disappointing. If the rectum is preserved, then annual rectal inspection is advocated. This procedure has the advantage of avoiding a stoma and the risk to sexual function associated with rectal dissection, and so may provide a useful transition in highly selected patients.

Figure 75.8 Stapled 'J' pouch with the stapler creating an ileal pouch–anal anastomosis

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