Practice Parameters for the Surgical Treatment of Ulcerative Colitis

Prepared by
The Standards Practice Task Force
The American Society of Colon and Rectal Surgeons

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specific form of treatment. These guidelines are intended for the use of all practitioners, health care workers, and
patients who desire information about the management of the conditions addressed by the topics covered in these
guidelines. It should be recognized that these guidelines should not be deemed inclusive of all proper methods of
care or exclusive of methods of care reasonably directed to obtaining the same results. The ultimate judgment
regarding the propriety of any specific procedure must be made by the physician in light of all of the
circumstances presented by the individual patient.

METHODOLOGY

An organized search of Medline, PubMed, and the
Cochrane Database of Collected Reviews was per-
Reprints are not available.

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1. Patients with clinical evidence of actual or im-
pending perforation should undergo urgent sur-
Severe acute colitis affects between 5 to 15 percent of patients with ulcerative colitis. The diagnosis of severe colitis is based on the criteria of Truelove and Witts and is defined as colitis with more than six bloody stools per day, fever (temperature, >37.5°C), tachycardia (heart rate, >90 beats per minute), anemia (hemoglobin, <75 percent of normal), and elevated sedimentation rate (ESR, >30 mm per hour).

Alternatively, toxic, or fulminant, colitis is characterized by more than ten bloody stools per day, fever (temperature, >37.5°C), tachycardia (heart rate, >90 beats per minute), anemia (transfusion required), elevated sedimentation rate (ESR, >30 mm per hour), colonic dilation on radiography, and abdominal distention with tenderness. When the colonic distention of the transverse colon exceeds 6 cm, the diagnosis becomes toxic megacolon. Patients whose condition worsens on medical therapy or who fail to make significant improvement after a period of 48 to 96 hours of appropriate medical therapy should be considered for surgery. Level of Evidence: III; Grade of Recommendation: B.

Surgery. Level of Evidence: III; Grade of Recommendation: A.

Severe acute colitis affects between 5 to 15 percent of patients with ulcerative colitis. The diagnosis of severe colitis is based on the criteria of Truelove and Witts and is defined as colitis with more than six bloody stools per day, fever (temperature, >37.5°C), tachycardia (heart rate, >90 beats per minute), anemia (hemoglobin, <75 percent of normal), and elevated sedimentation rate (ESR, >30 mm per hour). Alternatively, toxic, or fulminant, colitis is characterized by more than ten bloody stools per day, fever (temperature, >37.5°C), tachycardia (heart rate, >90 beats per minute), anemia (transfusion required), elevated sedimentation rate (ESR, >30 mm per hour), colonic dilation on radiography, and abdominal distention with tenderness.

When the colonic distention of the transverse colon exceeds 6 cm, the diagnosis becomes toxic megacolon. Surgery is required in 20 to 30 percent of patients with toxic colitis.

Perforation in patients with toxic colitis has a high mortality rate, which ranges from 27 to 57 percent regardless of whether the perforation is contained or free. The mortality rate increases as the time interval between perforation and surgery increases. Patients with toxic colitis receiving surgical intervention before perforation have a significantly better outcome than those operated on after perforation. However, there are few “hard” signs of impending perforation in patients with toxic colitis. Perforation can occur without dilation and these patients often do not exhibit classic signs of peritonitis. Persistent or increasing colonic dilation, pneumatosis coli, worsening local peritonitis, and the development of multiple organ failure can be signs of impending or actual perforation. Localized peritonitis may reflect only local inflammation or may be a sign of impending perforation.

The development of multisystem organ failure (MSOF) is an ominous sign. In a series of 180 patients with toxic colitis, 11 developed MSOF. The overall mortality in the entire group was 6.7 percent; however, of the 12 patient deaths, 8 occurred in patients with MSOF.

2. Patients whose condition worsens on medical therapy or who fail to make significant improvement after a period of 48 to 96 hours of appropriate medical therapy should be considered for surgery. Level of Evidence: III; Grade of Recommendation: B.

Patients are judged to have failed medical therapy if their condition worsens while on medical therapy or their condition fails to improve after a period of initial stabilization. Limited evidence suggests that intravenous cyclosporine is more effective than standard steroid-based treatment for severe colitis and has been advocated as a second-line agent before colectomy. The need for and timing of surgery in patients whose condition seems to “plateau” after a period of initial improvement often is difficult to judge. However, patients with more than eight stools per day or three to eight stools and a C-reactive protein > 45 mg/ml after three days of therapy have an 85 percent chance of requiring colectomy during the same hospitalization, regardless of whether corticosteroid or

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<td>I</td>
<td>Meta-analysis of multiple well-designed, controlled studies, randomized trials with low-false positive and low-false negative errors (high power)</td>
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<td>II</td>
<td>At least one well-designed experimental study; randomized trials with high false-positive or high false-negative errors or both (low power)</td>
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<td>III</td>
<td>Well-designed, quasi experimental studies, such as nonrandomized, controlled, single-group, preoperative-postoperative comparison, cohort, time, or matched case-control series</td>
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<td>Well-designed, nonexperimental studies, such as comparative and correlational descriptive and case studies</td>
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cyclosporine treatment is used. Furthermore, persistent colonic distention seems to characterize a subgroup of patients who respond poorly to medical therapy and are at increased risk for the development of megacolon. Prolonged observation of these patients may risk exhaustion of their physiologic reserve but does not necessarily increase perioperative morbidity. Most series define a period of 48 to 96 hours after which surgery is indicated if the patient fails to improve, although evidence specifying the most appropriate time period for a trial of medical therapy, especially with “second-line” agents, is lacking.

Intractability

1. Surgery is indicated in ulcerative colitis when medical therapy is ineffective. Level of Evidence: III; Grade of Recommendation: B.

Intractability is one of the most common surgical indications for ulcerative colitis. Medical therapy can fail for several reasons. Symptoms may be insufficiently controlled despite an intensive medical regimen and the patient is unable to achieve an acceptable quality of life. Alternatively, the response to treatment may be adequate, but the risks of chronic medical therapy (especially long-term corticosteroids) may be excessive. Patients also may be unable to tolerate the deleterious side effects of medical therapy. Patients who are noncompliant with treatment regimens might be candidates for surgical management. The postoperative quality of life for patients with ulcerative colitis is improved after colectomy.

Growth failure in children is another form of intractability that may require colectomy. Surgery should be considered if growth failure persists despite maximal nutritional and medical therapy. Substantial disability from colectomy-responsive extraintestinal manifestations also may prompt resection.

Cancer Risk

1. Patients with long-standing ulcerative colitis should undergo endoscopic surveillance. Level of Evidence: IV; Grade of Recommendation: B.

Although it is clear that patients with longstanding ulcerative colitis have an increased risk of colorectal cancer, its magnitude has been difficult to estimate. A recent meta-analysis estimated the risk of colorectal cancer for a patient with colitis to be 2 percent at 10 years, 8 percent at 20 years, and 18 percent after 30 years of disease. Surveillance colonoscopy has been recommended in these patients despite a lack of clear evidence that shows surveillance prolongs survival in patients with ulcerative colitis. Carcinomas tend to be detected at an earlier stage in persons who are undergoing surveillance colonoscopy, and these patients have a better prognosis.

Patients with extensive colitis (microscopic disease proximal to the splenic flexure) should be advised to undergo a screening endoscopy after eight years of disease symptoms and should have a surveillance colonoscopy performed every one to two years. If a person suffers from left-sided disease (i.e., microscopic disease distal to the splenic flexure yet proximal to the rectum), he or she may begin the same surveillance program after 15 years of disease symptoms despite a lack of direct supporting evidence for this duration-dependent stratification. Surveillance colonoscopies should be ideally performed when the disease is in remission to minimize confusion regarding neoplasia. Because it is necessary to take at least 33 biopsies from the colon and rectum to achieve 90 percent sensitivity, it is reasonable to obtain four quadrant random biopsies at 10-cm intervals along the large intestine, taking particular care to biopsy any strictures or mass-like lesions while avoiding any nonsuspicious pseudopolyps. Polyps that appear potentially dysplastic can be removed by polypectomy, and the adjacent flat mucosa also should be biopsied to exclude dysplasia. Recent enthusiasm has emerged for targeted biopsies with chromoendoscopy by using pancolonic indigo carmine dye spraying.

Several studies indicate patients with concomitant primary sclerosing cholangitis (PSC) are at a higher risk of colorectal neoplasia. The absolute cumulative risk of cancer or dysplasia in this subset of patients has been estimated to be 9 percent after 10 years, 31 percent after 20 years, and 50 percent after 25 years of colitis. Patients with PSC often have quiescent colitis, so it is difficult estimating the precise onset of disease in this subgroup. For the above reasons, it is recommended that such patients should undergo annual surveillance colonoscopy.

2. Total proctocolectomy is recommended for patients with carcinoma, nonadenoma-like dysplasia-associated lesion or mass (DALM), high-grade dysplasia, and low-grade dysplasia in a stricture that is symptomatic or impassable during colonoscopy. The diagnosis of dysplasia should ideally be confirmed by two independent expert gastrointestinal histopatholo-
gists. Level of Evidence: Class III; Grade of Recommendation: C.

Dysplasia detection by conventional histopathologic assessment of colonoscopic biopsies remains the “gold standard” to identify patients at highest risk of developing cancer in ulcerative colitis.\(^35\) Ten prospective surveillance programs published before 1994 demonstrated that in patients diagnosed with a DALM, 43 percent had a synchronous cancer at immediate colectomy.\(^36\) The risk of cancer at immediate colectomy was 42 percent for high-grade dysplasia and 19 percent for low-grade dysplasia. The risk of developing high-grade dysplasia, DALM, or cancer was 2.4 percent in patients without dysplasia on initial screening, 18 percent for those with “indefinite dysplasia,” and 29 percent for those with low-grade dysplasia. In another review, 9 of 18 patients identified with ulcerative colitis and low-grade dysplasia developed advanced neoplastic lesions, which were defined as adenocarcinoma, raised dysplasia, or high-grade dysplasia, during follow-up.\(^37\) Moreover, a surveillance study indicated the five-year predictive value for cancer or high-grade dysplasia in patients with low-grade dysplasia was 54 percent.\(^38\)

However, in a conflicting study, 60 patients with low-grade dysplasia in flat mucosa found during endoscopy were followed for an average of ten years; low-grade dysplasia was found at several locations and during repeated colonoscopies in 73 percent of cases, but progression to high-grade dysplasia or a dysplasia-associated lesion/mass occurred in only 11 patients (18 percent).\(^39\) The high rates of interobserver variation between histopathologists further confounds the management of low-grade dysplasia.\(^40–43\)

There also is controversy regarding the natural history of adenoma-like DALMs. Specifically, in the absence of dysplasia in neighboring flat mucosa, recent reports suggest that adenoma-like DALMs can be effectively removed by colonoscopic resection without placing the patient at increased risk of developing future dysplasia or carcinoma.\(^44–46\)

Patients should be encouraged to take prescribed 5-aminosalicylate (ASA) medication, because recent literature suggests that regular consumption of 5-ASA compounds may reduce their colorectal cancer risk.\(^47–49\) In a case control study,\(^49\) regular 5-ASA therapy reduced cancer risk by 75 percent (odds ratio (OR), 0.25; 95 percent confidence interval (CI), 0.13–0.48; \(P < 0.00001\)). Another study demonstrated that pharmacologic therapy, especially sulfasalazine, was associated with a significant protective effect (relative risk (RR), 0.38; 95 percent CI, 0.2–0.69) independent of disease activity.\(^57\) The risk of developing cancer was 5 of 152 (3 percent) in a group who took long-term 5-ASA and 5 of 16 (31 percent) in those who had had their treatment stopped or did not comply with therapy.\(^58\)

3. Patients with ulcerative colitis who develop a stricture, especially with long-standing disease, should undergo resection. Level of Evidence: III, Grade of Recommendation: A.

Strictures develop in 5 to 10 percent of patients with ulcerative colitis. Although the majority of strictures are benign, as many as 25 percent will be malignant, and malignant strictures account for up to 30 percent of cancers occurring in ulcerative colitis patients. Strictures that arise on a background of long-standing disease, originate proximal to the splenic flexure, or cause obstructive symptoms are more likely to be malignant.\(^50\) Endoscopic biopsy of strictures can reveal dysplasia or malignancy\(^51\) but may be unreliable because of sampling error and the more infiltrating nature of colitis-associated malignancies.\(^50,52\)

**SURGICAL OPTIONS**

**Emergency**

1. The most appropriate operative procedure for emergency surgery in ulcerative colitis is total or subtotal abdominal colectomy with end ileostomy. Level of Evidence: III, Grade of Recommendation: B.

The surgical alternatives in the acute setting are designed to restore patient health with the greatest reliability and minimal risk while preserving reconstructive options after the patient has recovered. Subtotal colectomy with end ileostomy and Hartmann’s closure of the distal bowel or creation of a mucous fistula is a safe and effective approach.\(^18,53\) This procedure removes the majority of the inflamed bowel with a comparatively straightforward operation and avoids pelvic dissection as well as an intestinal anastomosis.\(^54,55\) Compared with intraperitoneal closure of the rectal stump, extrafascial placement of a closed rectosigmoid stump may be associated with fewer pelvic septic complications and facilitates subsequent pelvic dissection.\(^56\) Transanal drainage of the distal stump may further decrease the risk of pelvic sepsis.\(^57\)

The resected colon specimen should be histopathologically examined for confirmation of ulcerative colitis or Crohn’s disease because the likelihood of an
altered diagnosis is appreciable after colectomy.\textsuperscript{38,53} In patients with ulcerative colitis, a completion proctectomy and ileal pouch-anal anastomosis (IPAA) often can be safely performed at a later date to remove the remaining disease and restore intestinal continuity. If the diagnosis is Crohn’s disease and the rectum is reasonably compliant and distensible, consideration may be given to an ileorectal anastomosis.

Elective Surgery

1. Total proctocolectomy with ileostomy is an appropriate surgical alternative for patients with ulcerative colitis. Level of Evidence: III; Grade of Recommendation: B.

Proctocolectomy with ileostomy has been the conventional operative approach for patients with ulcerative colitis and may be considered a benchmark procedure to which all other operations are compared.\textsuperscript{58,59} It has been established as a safe, curative operation that permits most patients to live a full, active lifestyle.\textsuperscript{20,60} Although restorative proctocolectomy with IPAA has become increasingly popular during the past two decades, proctocolectomy with ileostomy can still be considered the first-line procedure for patients who choose not to undergo a restorative proctocolectomy and for those at significant risk for pouch failure, such as patients with impaired anal sphincter muscles, previous anoperineal disease, or limited physiologic reserve secondary to comorbid conditions.\textsuperscript{61}

The operation, however, does have recognized complications. Although stoma-associated problems, such as prolapse, are probably most frequent,\textsuperscript{62} other complications that are common to any abdominal/pelvic procedure also have been recognized.\textsuperscript{52,63} These include small-bowel obstruction, infection/fistula, persistent pain, unhealed perineal wound, sexual and bladder dysfunction, and infertility.\textsuperscript{64} In one recent study of 44 patients, the long-term complication rate of proctocolectomy with permanent ileostomy was significantly lower than restorative proctocolectomy (26 vs. 52 percent).\textsuperscript{65}

2. Total proctocolectomy with ileal pouch-anal anastomosis is an appropriate operation for most patients with ulcerative colitis. Level of Evidence: III; Grade of Recommendation: A.

Total proctocolectomy with IPAA has become the most commonly performed procedure for patients with ulcerative colitis requiring elective surgery. The operation is relatively safe and durable,\textsuperscript{65,66} associated with an acceptable morbidity rate (19 to 27 percent),\textsuperscript{57,68} an extremely low mortality rate (0.2–0.4 percent),\textsuperscript{67,68} and a quality of life that approaches that of the normal population.\textsuperscript{69–72} The complications of the procedure include those of any major abdominal operation: risks arising from the pelvic dissection, such as infertility or sexual dysfunction, and pouch-specific complications, such as pouchitis.\textsuperscript{73–81}

a. Total proctocolectomy with IPAA may be appropriately offered to selected ulcerative colitis patients with concomitant colorectal cancer. Level of Evidence: IV; Grade of Recommendation: C.

Studies examining the use of IPAA in patients with invasive cancers of the colon or upper rectum without distant metastases have yielded somewhat conflicting findings. In several series, ulcerative colitis patients with a concomitant carcinoma had a rate of postoperative complications and functional results comparable to colitis patients without cancer; metastatic disease developed in a small number of patients.\textsuperscript{82–85} In contrast, a separate study revealed that nearly 20 percent of ulcerative colitis patients with cancer who underwent an IPAA subsequently died of metastatic disease.\textsuperscript{86} A more conservative management approach has been advocated by some who recommend an abdominal colectomy with ileostomy followed by a restorative proctectomy after an observation period of at least 12 months to better assure that no recurrent disease develops.\textsuperscript{87}

Metastatic disease is generally considered a contraindication to IPAA. These patients should usually be managed with segmental colectomy or abdominal colectomy with anastomosis to facilitate early discharge and allow them to spend the rest of their lives relatively free of complications. Another group of patients who may not be eligible for IPAA are those with invasive carcinomas of the mid or low rectum, because basic principles of cancer surgery may be compromised. Adjuvant radiotherapy, if indicated, should be performed preoperatively whenever possible, because postoperative radiotherapy is associated with a high incidence of pouch loss secondary to radiation enteritis and poor pouch function.\textsuperscript{88} Ulcerative colitis patients with cecal cancers represent another unique subgroup of patients. If a long segment of adjacent distal ileum with its mesenteric vessels must be sacrificed, difficulties with positioning of the reservoir into the pelvis may ensue, and an ileostomy may be necessary if a tension-free anastomosis cannot be attained.

b. Total proctocolectomy with IPAA may be appropriately offered to selected elderly patients with ul-
It is important that the surgeon per-
However, two randomized trials comparing
vs other
Despite aggressive nonoperative and opera-
 Chronologic
others have found the number of day-
S-pouches were ini-
because of concerns about compro-
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This highlights the need for great caution
112,119,124
107
In one
108
The W-
pouch has been advocated because of a greater ca-
However, two randomized trials comparing
106
However, the 2-cm exit
forming an IPAA be familiar with both techniques in
misperception of fecal incontinence.
65,95
are both appropriate techniques in most circum-
stances. Level of Evidence: II; Grade of Recom-
Recommendation: A.
The potential advantages of the double-stapled ap-
approach include enhanced technical ease because it
avoids mucosectomy and the perineal phase of the
operation, there is less tension on the anastomotic
suture line, and possibly improved functional results.
Sphincter injury is minimized and the anal transition
zone with its abundant supply of sensory nerve end-
ings is preserved. Conversely, short segment inflam-
ation and perianastomotic zone carcinoma are legitimate concerns, highlighting the importance
of performing the anastomosis to the top of the anal
canal. Three prospective, randomized trials have
demonstrated no significant difference in periopera-
tive complications or functional results for patients in
whom a mucosectomy was performed vs. those
patients in whom the proximal anal canal mucosa was
preserved.99–101 It is important that the surgeon per-
forming an IPAA be familiar with both techniques in
the event of failure or inability to use a surgical stapler
or when a handsewn anastomosis is contemplated
but anastomotic tension is excessive. Patients should
be followed in a surveillance program with biopsies
of the retained columnar mucosa performed at least
every two years beginning eight to ten years after the
onset of their initial disease symptoms.102

d. Pouch configuration may be chosen based on
individual preference. Level of Evidence: II; Grade of
Recommendation: B.
Although the initial ileal reservoir created by Parks
in the late 1970s was a triple-loop S-pouch, other
pouch configurations have been described in a
attempt to reduce pouch complications and improve
functional outcome. These include the double-loop
J-pouch, the lateral isoperistaltic H-pouch, and the
quadruple-loop W-pouch.104–106 S-pouches were ini-
itially plagued with evacuation problems associated
with a long (≥5 cm) exit conduit, frequently requiring
pouch catheterization.103 With shortening of the exit
conduit to ≤ 2 cm, mandatory catheterization has
been substantially reduced.107 The long outlet tract
formed in the H-pouch also was associated with
pouch distention, stasis, and pouchitis.108 The W-
pouch has been advocated because of a greater ca-
pacity.106 However, two randomized trials comparing
the J-pouch and W-pouch did not substantiate an
improvement in functional outcomes.109,110 In one
study,109 the median number of stools per day was the
same in patients with a J-pouch or W-pouch, and
and there was no difference between the two reservoirs
in the rates of incontinence, urgency, soiling, and the
use of antidiarrheal agents. Another controlled
study110 also demonstrated similar functional results
between J-pouch and W-pouch one year after sur-
gery. An S-pouch can provide additional length (2–4
cm) compared with the J-pouch and may help mini-
mize anastomotic tension.111 However, the 2-cm exit
conduit of the S-pouch may elongate with time, and
obstructive defecation can develop.

e. A diverting loop ileostomy may be reasonably
omitted in some patients. Level of Evidence: III;
Grade of Recommendation: B.
Retrospective and prospective trials suggest that
one-stage restorative proctocolectomy can be safely
performed in selected patients by experienced sur-
geons. The one-stage procedure is associated with a
more challenging early recovery,112 as well as a
slightly increased rate of anastomotic disruption and
pelvic sepsis.113–121 Although some disagree,122 these
complications should usually be managed with fecal
diversion118,119 because of concerns about compro-
mised functional outcome and resultant pouch
loss.123 Despite aggressive nonoperative and opera-
tive measures, the estimated cumulative three-, five-
and ten-year rate of pouch failure in all patients with
septic complications is 20, 31, and 39 percent, respec-
tively.121 This highlights the need for great caution
when considering pelvic pouch surgery without tem-
porary diversion. Single-stage IPAA avoids the risks of
ileostomy closure, which include anastomotic leaks
from the closure site and an increased incidence of
postoperative small-bowel obstruction that often
mandates hospitalization or laparotomy.119,124–127 In

coervative colitis. Level of Evidence: III; Grade of Recom-
mandation: C.
Many groups have demonstrated that IPAA in the
elderly patient is safe and feasible.88–91 Chronologic
age should not itself be used as an exclusion criterion.
However, careful consideration should be given to
other comorbidities, as well as the patient’s mental
status and anal sphincter function. Pouch procedures
are feasible in suitably motivated elderly individuals
who understand the risks and potential function dif-
ficulties that often accompany this procedure. Al-
though some series have found that bowel frequency
remains constant in the first decade after the surgical
procedure,92 others have found the number of day-
time and nighttime stools increases as does the like-
ilelihood of fecal incontinence.65,95
general, selective omission of the ileostomy may be considered safe when the anastomosis appears intact, is under no tension, the procedure is not complicated by excessive bleeding or other technical difficulties, and the patient is not on high doses of corticosteroids before surgery.\textsuperscript{84,116,117,121–123,127,128}

f. Routine surveillance of ileal pouches for dysplasia in the ileal mucosa is not warranted. Level of Evidence: III; Grade of Recommendation: B.

A decrease in villous height and increase in concentration of crypts have been observed in most ileal pouches.\textsuperscript{129} These metaplastic changes of the ileal mucosa to a colonic type mucosa are considered adaptations to the reservoir function of the pouch. This transformation also may be driven by the chronic inflammation frequently observed in these pouches.\textsuperscript{130} Inflammatory changes could theoretically lead to dysplasia and cancer in the ileal mucosa. However, dysplastic and neoplastic transformation within the pouch seems to be extremely rare.\textsuperscript{131–135}

g. Pouchitis is common after IPAA and readily managed with antibiotics in most circumstances. Level of Evidence: II; Grade of Recommendation: A.

The most frequent long-term complication after IPAA for ulcerative colitis is a nonspecific inflammation of the ileal pouch known as pouchitis.\textsuperscript{57,68,92,134} The presence of extraintestinal manifestations of ulcerative colitis before colectomy, especially primary sclerosing cholangitis, has been associated with an increased incidence of pouchitis.\textsuperscript{134,135} It is unclear whether the presence of backwash ileitis or extent of disease predict the likelihood of ultimately developing pouchitis.\textsuperscript{136–138} The etiology of this nonspecific inflammation is unclear but may be the result of an overgrowth of anaerobic bacteria.\textsuperscript{139,140} Presenting symptoms usually include abdominal cramps, fever, pelvic pain, and an increase in stool frequency. Clinical diagnosis may require confirmation by endoscopy and pouch mucosal biopsy, because clinical symptoms alone can be misleading.\textsuperscript{141} However, it seems that histologic evaluation may be omitted without compromising diagnostic accuracy.\textsuperscript{142} Treatment of pouchitis relies primarily on antibiotics, such as metronidazole and ciprofloxacin.\textsuperscript{143–145} Probiotics have been used successfully in pouch patients to provide prophylaxis against pouchitis and to maintain remission in chronic pouchitis.\textsuperscript{146,147} In antibiotic refractory cases, budesonide enemas or other medical treatments may be useful.\textsuperscript{148} Patients suffering with chronic pouchitis should be assessed for a diagnosis of Crohn’s disease. Uncommonly, an ileostomy with or without pouch excision is required for severe refractory pouchitis.\textsuperscript{145}

3. Continent ileostomy is an alternative surgical option for patients with ulcerative colitis who are not eligible for or have had a failed restorative proctocolectomy. Level of Evidence: III; Grade of Recommendation: B.

The present role of the continent ileostomy is primarily confined to patients with poor sphincter function, a failed IPAA, or those who are dissatisfied with a conventional Brooke ileostomy.\textsuperscript{149,150} This reduced role is the result of the success of the IPAA and the high rate of early and late complications associated with the continent ileostomy.\textsuperscript{151}

Early complications are seen in approximately one-quarter of patients, most commonly sepsis (secondary to suture line leaks, fistulas, and stomal necrosis) and obstruction.\textsuperscript{152,153} Late complications occur in up to 50 percent of patients and include incontinence and obstruction secondary to disruption or dysfunction of the valve; valve revision is required in up to 60 percent of patients.\textsuperscript{151} Although valve prolapse has been reduced with stapling techniques,\textsuperscript{150,154} the overall pouch failure rate has not decreased.\textsuperscript{155}

The cumulative success rate of the continent ileostomy in a recent study was 71 percent at 29 years.\textsuperscript{151} The failure rate is greater after secondary construction after a failed IPAA (46 percent) than after primary construction (23 percent).\textsuperscript{155} For the two-thirds of patients with a functional continent ileostomy, the reported quality of life is similar to that described for patients with IPAA.\textsuperscript{151,155,156}

4. Total abdominal colectomy with ileoproctostomy is an acceptable surgical approach in a highly selected group of patients with ulcerative colitis. Level of Evidence: III; Grade of Recommendation: B.

Because the performance of a total abdominal colectomy with ileoproctostomy requires a relatively normal rectum to create a safe anastomosis, severe rectal inflammation or a marked decrease in rectal distensibility are contraindications to the procedure.\textsuperscript{157,158} Severe anorectal disease, although unusual in ulcerative colitis, also precludes an ileorectal anastomosis.\textsuperscript{159} Other contraindications to this operation are colonic dysplasia or carcinoma in a potentially curative situation.\textsuperscript{160}

Whereas the benefits of total abdominal colectomy with ileoproctostomy are its relative simplicity and predictability compared with IPAA, the disadvantages are related to the long-term durability of the procedure. Studies demonstrate a 12 to 50 percent failure
rate with follow-up of more than six years. In addition, the theoretical risk of developing cancer in the remaining rectum should be considered when counseling the patient and other options discussed. Although the incidence of developing cancer seems to be low (0–6 percent with long-term follow-up), patients undergoing total abdominal colectomy with ileorectal anastomosis must be willing to undergo annual endoscopic screening.

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