Viewpoint

A reappraisal of the ileo-rectal anastomosis in ulcerative colitis

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Abstract

Colectomy is still frequently required in the care of ulcerative colitis. The most common indications are either non-responding colitis in the emergency setting, chronic active disease, steroid-dependent disease or neoplastic change like dysplasia or cancer. The use of the ileal pouch anal anastomosis has internationally been the gold standard, substituting the rectum with a pouch. Recently the use of the ileorectal anastomosis has increased in frequency as reconstructive method after subtotal colectomy. Data from centres using ileorectal anastomosis have shown the method to be safe, with functionality and risk of failure comparable to the ileal pouch anal anastomosis. The methods have different advantages as well as disadvantages, depending on a number of patient factors and where in life the patient is at time of reconstruction. The ileorectal anastomosis could, together with the Kock continent ileostomy, in selected cases be a complement to the ileal pouch anal anastomosis in ulcerative colitis and should be discussed with the patient before deciding on reconstructive method.

Keywords: Subtotal colectomy; ulcerative colitis; surgery; reconstruction; ileorectal anastomosis; ileal pouch anal anastomosis

1. Introduction

Emergency surgery in ulcerative colitis is indicated in patients not responding to medical management, due to the risk of otherwise developing life-threatening complications such as toxic megacolon, perforation, or refractory rectal bleeding. Elective surgery is indicated in patients with dysplasia or cancer, ulcerative colitis refractory to medical management, steroid dependence, or intolerance to long-term immunomodulation or other medical therapies. Colectomy is still frequently required in the care of ulcerative colitis and up to 30 % will in the long run be operated. There are conflicting data regarding a possible recent decrease in colectomy rates due to the introduction of biologics in the emergency situation and immune modulators as maintenance therapy.

Most patients requiring surgery are quite young and have high demands for quality of life and a life without ileostomy if possible. The first reconstructive method after colectomy in ulcerative colitis [UC] [Figure 1A] was the ileorectal anastomosis [IRA] [Figure 1 B].

and later the continent ileostomy [CI] was introduced by Nils G Kock as reconstruction after proctocolectomy [Figure 2A]. Both these methods were also used as reconstruction after colectomy in the hereditary carcinogenic disease familial adenomatous polyposis [FAP] or Lynch syndrome, but decreased in clinical use when the ileal pouch anal anastomosis [IPAA] Figure 2B became the gold standard after its introduction in the 1980s. This decrease in the utility of the CI was mainly due to the need for revisional surgeries and, in the case of IRA, due to recurrent proctitis and risk of rectal cancer in the long term. Lately long-term follow-up data have shown some problems with the ileal pouch anal anastomosis as well a yearly failure rate [diversion or excision] of approximately 0.6–1.9 %, partly dependent on hospital volumes. Topical anti-inflammatory medication together with meticulous endoscopic surveillance has led to the reintroduction of the ileorectal anastomosis in parts of the world. As medications have different advantages and disadvantages, so have surgical reconstructive methods, and we will
try to shed some light on the ileorectal anastomosis in this context both in general as used in FAP and Crohn’s disease [CD] and also its use specifically in UC.

2. Functional outcome

The main concern patients have regarding functional outcome after a reconstruction is the number of bowel movements [day and night], continence, and urgency to evacuate their bowels. This will be influenced by any ongoing inflammation [proctitis, pouchitis, or cuffitis], and the volume and compliance of the rectum or the pouch, as well as the sensory function. In published reports on both FAP and UC, the number of bowel movements during 24 h range between three and six for the IRA, compared with five to seven for the IPAA. The need for night-time evacuations has also been studied, showing an advantage for the IRA compared with the IPAA at 13–41 % and 53%, respectively [Table 1].

In FAP the IRA has been shown to give better function in comparison with IPAA regarding the number of bowel movements, leakages, need for a protective pad, capability to distinguish gas from stool as well as need for dietary restrictions. Continence has been studied less in any comparative fashion between the ileorectal anastomosis and the pelvic pouch, but a study by Günter et al. showed

![Figure 1. Subtotal colectomy (A) and ileorectal anastomosis (B).](image1)

![Figure 2. Proctocolectomy (A) and ileal pouch anal anastomosis (B).](image2)
a significant advantage for the IRA compared with IPAA measured with both Wexner and Jostardnt incontinence scores in patients with FAP.

In patients with UC there are less data, but Börjesson et al. found soiling or a need for protective pads in 11% and urgency in 33% of IRA patients in comparison with 28–34% and 16%, respectively, in IPAA patients from the same unit. Urgency was also found to be more common in a report from the Cleveland clinic by Moreira et al.

However, at the same time they also found the IRA to have less frequent bowel movements and less nightly seepage [Table 1]. In the latest report from Andersson et al., in Sweden patients with IRA [n = 89] reported significantly less bowel movements in comparison with patients with IPAA [n = 108].

### 3. Sexual function and fecundity

Sexual function is important in general and probably of even higher importance in the IBD population consisting of a young population. The effect of reconstructive surgery has been evaluated in FAP, showing a less favourable outcome for IPAA regarding physical functioning and sexual impact, so that the authors advocate IRA as a first-step procedure in young individuals and if possible postponement of the IPAA until the person is in a long-term relationship. Van Balkom et al. reported on young patients [11 males and 15 females] with FAP [n = 10] and UC [n = 16] being reconstructed with IPAA. All the males reported acceptable sexual function but 50% of the females showed signs indicating sexual dysfunction. Similar reports have been published showing a sexual dysfunction in almost half of the IPAA patients and, as in the report from van Balkom et al., especially among females. These findings are however quite different from two Scandinavian reports indicating a favourable outcome in UC patients going through IPAA. Koivusalo et al. reported 84% satisfactory sexual function and 68% enjoyable sex life in adult UC patients going through IPAA during childhood or adolescence. Fecundity is the actual reproductive rate and is often expressed as the fecundability or the probability of conception in a specific time period. In FAP the fecundability is unchanged after an IRA and comparable to that of the general population, whereas it drops to 0.54 [p = 0.004] after IPAA. The same finding was seen after IPAA in UC females where it dropped to 0.20 [p < 0.0001], from a preoperative level the same as within the general population. A meta-analysis showed that the IPAA increases the infertility rate from 20% before to 63% after the operation, in both FAP and UC patients [Table 1]. The mechanism is thought to be occlusion of the fallopian tubes by pelvic scarring and adhesions.

Two smaller studies including patients from five European expert centres, comparing complete laparoscopic and/or hand-assisted laparoscopic IPAA with open procedures, found the laparoscopic approach to be associated with less risk of infertility, but this still needs further evaluation.

### 4. Quality of life

The quality of life in UC is dependent on a range of different factors like symptom burden [remission or active disease], comorbidity, and gender. Health-related quality of life has been compared between UC patients in remission on anti-tumour necrosis factor [anti-TNF] therapy and patients reconstructed with IPAA after proctectomy. No differences were found regarding health-related quality of life or disability, despite a significantly higher stool frequency and need of anti-diarrhoeal medication in patients with IPAA. Similarly, in FAP patients IPAA and IRA had an equal outcome regarding quality of life, despite a better function in IRA. In the report by Moreira et al., IRA in UC was associated with fewer bowel movements and less night-time seepage but increased urgency compared with IPAA. Regardless of this, no difference in quality of life was found between the groups apart from some dietary and work restrictions in IRA.

### 5. Medication, cancer risk, and surveillance

Patients with UC reconstructed with IRA have a high need of anti-inflammatory medication, ranging from 60–91% [Table 1]. Due to both the anti-inflammatory effect and a possible cancer-preventing effect, topical 5-aminosalicylic acid [5-ASA] medication is often proposed. The experience of using

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**Table 1. Advantages and disadvantages of reconstructive methods after colectomy for ulcerative colitis.**

<table>
<thead>
<tr>
<th>Surgical method</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
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<tbody>
<tr>
<td>Ileostomy</td>
<td>Seldom need of revision</td>
<td>Negative impact on body image</td>
</tr>
<tr>
<td></td>
<td>Controlled emptying from stoma bag</td>
<td>Negative impact on sexual function</td>
</tr>
<tr>
<td></td>
<td>Preservation of fertility</td>
<td>Uncontrolled emptying into stoma bag</td>
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<tr>
<td>Ileorectal anastomosis</td>
<td>Less complicated procedure</td>
<td>Proctitis</td>
</tr>
<tr>
<td></td>
<td>Transanal defaecation</td>
<td>Need for anti-inflammatory medication</td>
</tr>
<tr>
<td></td>
<td>Less frequent bowel movements</td>
<td>Urgencies</td>
</tr>
<tr>
<td></td>
<td>Continence</td>
<td>Need of surveillance</td>
</tr>
<tr>
<td></td>
<td>No [or postponed] pelvic surgery</td>
<td>Cancer risk</td>
</tr>
<tr>
<td>Ileal pouch anal anastomosis</td>
<td>Transanal defaecation</td>
<td>Complicated procedure</td>
</tr>
<tr>
<td></td>
<td>No remaining disease [apart from rectal cuff in stapled anastomoses]</td>
<td>More frequent bowel movements</td>
</tr>
<tr>
<td>Kock’s continent ileostomy</td>
<td>Controlled emptying of stoma</td>
<td>Impaired continence [especially night]</td>
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<tr>
<td></td>
<td>Patient controlling bowel rather than bowel controlling patient</td>
<td>Urgency</td>
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<td></td>
<td></td>
<td>Pouchitis</td>
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<tr>
<td></td>
<td></td>
<td>Impaired sexual function and fecundability</td>
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<td>Need for revisions</td>
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<tr>
<td></td>
<td></td>
<td>Pouchitis</td>
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<td></td>
<td>Complicated procedure [few centres worldwide</td>
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<td></td>
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<td>with contemporary experience</td>
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immunomodulators and/or biologicals in UC patients with IRA is limited. In most units undertaking IRA for UC in Sweden, the algorithm so far has been proctectomy and IPAA in those developing intractable proctitis despite the use of topical 5-ASA. The risk of rectal cancer was one of the reasons why IRA was abandoned after colectomy for UC and the risk of developing rectal cancer needs to be kept in mind. However, in several of the reports on IRA in UC, no patients developed rectal cancer within 10 years of diagnosis and rectal cancer is also existent in IPAA, although to a lesser extent. The major problem with rectal cancer in IRA has been poor selection of patients or insufficient surveillance. Accordingly, patients with severe dysplasia, history of colonic cancer, or unwillingness to attend surveillance are not suitable candidates for IRA.

6. Surgical risks and failure?

Reconstruction with an IRA is a limited procedure in comparison with an IPAA, and in a recent Swedish report, was shown as a shorter operating time and less blood loss. After both procedures the risk of postoperative complications was quite high but there was a significant advantage of IRA compared with IPAA at 23.8% and 39.9% risk, respectively; and this was also found regarding more severe complications. Furthermore, most patients with an IPAA will have the construction protected by a proximal loop ileostomy, so they will need a second operation taking down the ileostomy. This procedure although relatively minor also has its complications.

The need for diversion with a stoma after restorative colectomy, with or without proctectomy or excision of the rectum/pouch in the case of IRA or IPAA, respectively, is considered a failure. The failure rate for IRA was 24.1% after 10 years in the latest study by Andersson et al., but seems to be around 16% at 5 years and 31.

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**Box 1. Maintenance therapy and surveillance algorithm for reconstruction with ileorectal anastomosis in ulcerative colitis**

**Medical therapy**

Maintenance therapy is recommended with topical mesalamine 1000 mg twice daily.

**Surveillance**

Surveillance is recommended using flexible endoscopy and multiple random biopsies [including any suspicious area]:

- Early onset of the disease (< 20 years of age) and < 10 years’ duration: Yearly interval
- Early onset of the disease and > 10 years’ duration: Twice yearly
- All others: Yearly interval

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![Figure 3. Possible reconstructive algorithm after colectomy in ulcerative colitis.](image-url)
% at 10 years.49,40 The failure rate for IPAA is partly dependent on
the experience of the team involved in the care of the UC patient10,12
and was approximately 1 % per year in the UK between 1996 and
2008.10 In other reports the failure rate was 6–9 % after 5 years and
13–19 % after 10 years.8,14.

A possible advantage with the IRA, if it fails or dysplasia
develops, is the chance of doing a proctectomy with a second-
ary IPAA [Figure 1]. About 36–70 % of the failed IRAs in UC
received an IPAA later on in life.9,27 There is, however, limited
knowledge regarding the functional outcomes after a secondary
IPAA in UC, but in FAP the functional outcome was no worse
after a secondary IPAA compared with a primary.10 There is of
course the possibility to perform a redo of an IPAA, but so far the
success rates are far from excellent, especially when performed for
septic complications, and with a poorer function compared with
primary IPAA.49,51

A comparison of the outcome of IRA in FAP is not completely
comparable with the outcome of IRA in UC. A meta-analysis com-
paring IPAA in UC and FAP showed the risk for pouchitis to be
higher in UC as well as a small increased stool frequency but with
otherwise comparable outcomes in function and failure as among
those with FAP.52

7. Discussion

Despite the pharmaceutical revolution in inflammatory bowel dis-
case, colectomy is still a quite frequent procedure in the lifelong per-
spective of patients with ulcerative colitis.

As medications have different advantages and disadvantages, so
have surgical reconstructive methods after a colectomy. The use of
ileorectal anastomosis in FAP has been well characterised, but the
use in UC has been less described. Despite the lack of complete
knowledge, recent data have shown the IRA, in combination with
topical treatment and surveillance, to be a safe procedure in UC
and with a functional outcome and failure rate well in line with the
IPAA. In parts of the world the IRA has been just as common as
the IPAA. Of 994 UC patients going through colectomy in Sweden
during the period 2000–10, the reconstructive method was IRA in
478 cases [48.0%], IPAA in 497 cases [50.0%] and the remaining
19 patients were reconstructed with a continent ileostomy.51 A ran-
domised controlled trial in Sweden, randomising between IRA and
IPAA as primary reconstruction in eligible patients after colectomy
for UC, was not able to enrol patients due to strong patient opin-
ions after receiving information from surgeons regarding the possi-
ble advantages and disadvantages of the two procedures. In Sweden
the use of IRA has mainly been offered to patients with a distensible
rectum and good response to topical 5-ASA therapy after subtotal
colectomy and without a history of colorectal cancer or high grade
dysplasia.9 Further, patients with primary sclerosing cholangitis or a
family history of colorectal cancer are less suitable for IRA,13,44 due
to increased risk of cancer and, in the former case, poor function
as well.55

In contrast, young patients could have a favourable outcome
with IRA, possibly as a temporary solution, with regard to fecundity
and sexual function. Further, patients with a late onset in life of the
disease, and/or a short history of colitis, could be suitable candidates
for IRA as well.

The use of IRA in ulcerative colitis is safe and has an acceptable
outcome regarding function and risk of failure. It can in selected
cases be used as a permanent solution and in other cases as a tempo-
rary solution, resorting to proctectomy and IPAA later in life. With
the use of ileorectal anastomosis as a complement to the continent
ileostomy and the ileal pouch anal anastomosis, we can increase the
choices for ulcerative colitis patients who have been colectomised –
and our patients should be introduced to the different choices, their
advantages as well as their limitations.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgements

The authors contributed equally to the manuscript

References

1. Aratari A, Papi C, Clemente V, et al. Colectomy rate in acute severe ulcer-
2. Kaplan GG, Seow CH, Ghosh S, et al. Decreasing colectomy rates for ulcera-
tive colitis: a population-based time trend study. Am J Gastroenterol
for medically refractory ulcerative colitis has declined in parallel with
increasing anti-TNF use: a time-trend study. Aliment Pharmacol Ther
5. Kock NG. Intraperitoneal “reservoir” in patients with permanent ileos-
tomy. Preliminary observations on a procedure resulting in fecal “conti-
6. Parks AG, Nicholls RJ. Proctocolectomy without ileostomy for ulcerative
8. McLaughlin SD, Clark SK, Tekkis PP, et al. Review article: restorative
proctocolectomy, indications, management of complications and follow-
909.
in comparison with ileal pouch anal anastomosis in reconstructive sur-
gery for ulcerative colitis: a single institution experience. J Crohns Colitis
2014;8:582–9.
11. Hahnloser D, Pemberton JH, Wolfe BG, et al. Results at up to 20 years
after ileal pouch–anal anastomosis for chronic ulcerative colitis. Br J Surg
and surgical technique lead to improved outcome after ileal pouch-anal anas-
13. Hueting WE, Buskens E, van der Tweel I, Gooszen HG, van Laarhoven
CJ. Results and complications after ileal pouch anal anastomosis: a meta-
analysis of 43 observational studies comprising 9,317 patients. Dig Surg
14. Tulchinsky H, Hawley PR, Nicholls J. Long-term failure after restorative
15. MacRae HM, McLeod RS, Cohen Z, O’Connor BJ, Ton EN. Risk factors
colectomy and ileorectal anastomosis: a valid surgical option for ulcer-