

# Evolution of Surgical Management for Ulcerative Colitis in the Last Decade: A Comprehensive Literature Review

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## ABSTRACT

**Introduction:** Inflammatory bowel disease (IBD) is a term that canopies disorders which involve conditions causing chronic inflammation of the gastrointestinal tract (GIT). It mainly includes two conditions, viz.: Crohn's disease (Crohn's) and ulcerative colitis (UC). Ulcerative colitis had a high mortality rate of >50% until the mid-1950s corticosteroids were first introduced for its treatment. Since then, there have been many advances in the management of UC, with the current approach being initial treatment with pharmacological therapy and switching over to surgical management in refractory cases. Our review aimed to look at how the surgical management of UC has advanced over the last decade in various aspects.

**Materials and methods:** The authors searched the PubMed database in December 2021 using the search terms "IPAA for UC" and "Total Proctocolectomy for UC". After applying the inclusion and exclusion criteria, we found 57 articles that were numbered from 1 to 57 and entered in a randomizer (<https://www.randomizer.org/>) that gave us seven random numbers, and articles corresponding to those numbers were considered for this review.

**Conclusion:** Surgical management for UC has evolved toward a minimal access approach in the last decade; however, complications such as pouchitis and anastomotic leak are still some of the challenges faced in surgical management for UC. Further multicenter cohort studies comparing the rates of complications in different approaches can produce results that may further improve patient outcomes.

**Keywords:** Ileal pouch-anal anastomosis, Minimal access surgery, Open surgery, Surgical management of ulcerative colitis, Total proctocolectomy, Ulcerative colitis.

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## INTRODUCTION

Inflammatory bowel disease is a term that canopies disorders which involve conditions causing chronic inflammation of the GIT. It mainly includes two conditions, viz.: Crohn's disease (Crohn's) and UC. Both these conditions are associated with inflammation of the digestive tract, with two major differences between the two viz.: (1) The depth of the tissue layers involved (Crohn's involves transmural thickness of the bowel wall; UC involves only the mucosal and the submucosal layers) and (2) the extent of the GIT involved (Crohn's may involve any portion of the GIT from the mouth to the anus; UC is restricted to involving any segment from the colon distally).

First described in 1859, UC is defined by mucosal inflammation initiating in the rectum and extending proximally to involve the colon in a continuous fashion. The most common presenting symptom of this condition is bloody diarrhea; however, the diagnosis is usually a combination of clinical and histopathological evidence. For almost a century after it was first described, the condition had a withering prognosis (mortality >50%), until the mid-1950s, when corticosteroids were first used to treat UC. Today, with scientific advancements, the treatment options for UC (and IBD in general) have broadened, where the current trends include initial management with pharmacological therapies and switching over to surgical management in refractory cases.

The aim of our comprehensive review is to see how the surgical management of UC has evolved over the last decade (2010–2020) compared to the previous decade (2000–2010) in various aspects such as technique, approach, outcomes, etc.

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## MATERIALS AND METHODS

The authors searched through the PubMed database in December 2021 using the search terms "IPAA for UC" and "Total Proctocolectomy for UC". Articles published only in the year 2010 and 2020 were considered for this review. There were 112 articles published in 2010 and 203 articles published in 2020, giving us a total of 315 articles. After applying the inclusion and exclusion criteria, we were left with 57 articles. We numbered these articles from 1 to 57, and we ran these numbers in a randomizer (<https://www.randomizer.org/>) which gave us a set of 7 random numbers viz.: 25, 20, 18, 30, 7, 23, and 39, and articles corresponding to these numbers were used.

The randomizer was used to avoid any selection bias in choosing the articles for review on the authors' part.

### Inclusion Criteria

- Patients  $\geq 18$  years of age.
- Articles on surgical management of UC.
- Articles published in the last 6 months of 2010 and 2020.

### Exclusion Criteria

- Surgical management of UC in the pediatric population.
- Articles regarding surgical management of any other gastrointestinal conditions except UC.

## DISCUSSION/REVIEW

Ulcerative colitis is an autoimmune disease belonging to the group of IBD. First described in 1859, UC is defined by mucosal inflammation initiating in the rectum and extending proximally to involve the colon in a continuous fashion. The diagnosis is usually a combination of the clinical and histopathological evidence of the same.<sup>1</sup> It presents with a constellation of symptoms, the most common being bloody diarrhea. The long-standing disease can lead to dysplasia and colorectal cancer, which are some of its most serious complications, if left untreated.<sup>2</sup> Until the mid-1950s, when corticosteroids were first used to treat UC, the condition had a withering prognosis with  $>50\%$  mortality rate among patients.<sup>1</sup> However, steroids are also associated with side effects like osteoporosis, osteonecrosis, weight gain, insulin resistance, increased risk of infections, etc. With the advancement of medical science, the treatment options for UC and IBD, in general, have broadened, where the current trends include initial management with medical therapies and switching over to surgical management in refractory cases. The review aimed to understand how surgery has evolved in the last decade compared to the previous decade in terms of surgical procedures, patient outcomes, quality of life, and complications. In our review, we found that the surgical procedure used for the management of UC has largely remained the same in the last decade, with the procedure of choice being restorative proctocolectomy with ileal pouch-anal anastomosis (RP-IPAA).<sup>1</sup> Restorative proctocolectomy with ileal pouch-anal anastomosis involves removal of the colon and rectum and establishing continuity, most commonly using a J-pouch, which is created using a loop of the small intestine. It is usually performed as a staged procedure over two or three operative occasions.<sup>3</sup> It best helps eliminate the need for a permanent stoma in these patients, which is associated with a better overall quality of life.<sup>4</sup> Since Parks and Nicholls described it for the first time in 1978, the technique has undergone several technical modifications.<sup>4</sup> In a study by Ikeuchi et al., where 1000 patients undergoing IPAA were followed over a period of 24 years for short-term and long-term outcomes, they demonstrated that ileal pouch-anal anastomosis (IPAA) had low rates of mortality and morbidity with pouch success rates to be 97% and 92% after 10 and 20 years, respectively.<sup>5</sup> With increased availability and accessibility to laparoscopic and robotic equipment, we have seen a shift in trend from open RP-IPAA to minimal access RP-IPAA.<sup>4</sup> This change in approach from open to minimal access has shown improved overall outcomes in patients, along with fewer associated complications, while using the same, although technically more challenging surgical procedure. There is some literature suggesting a laparoscopic approach being used to perform RP-IPAA in the previous decade as well.<sup>4</sup> In a study

following 95 patients undergoing IPAA, McKeivitt et al. reported a shift in the trend for IPAA, from an open surgical approach toward a minimal access approach over a period of 20 years (1998–2017).<sup>6</sup> This they attributed to potentially fewer complications as well as improved cosmesis and functional results with the latter.<sup>6</sup>

A retrospective review by Fajardo et al. which compared the outcomes of 55 patients undergoing laparoscopic IPAA and 69 undergoing open IPAA between April 1999 and July 2008, showed that the laparoscopic approach of IPAA was comparable to the open approach in terms of postoperative mortality and morbidity.<sup>7</sup> One of their significant findings was the duration of the closure of ileostomy which occurred on an average of 24.1 days sooner in the laparoscopic group compared to the open group, irrespective of patient characteristics and occurrence of postoperative complications.<sup>7</sup> This resulted in shorter discharge time and also helps explain the shorter length of stay (LOS) as reported by multiple trials in the past.<sup>7</sup> Laparoscopic IPAA was also associated with longer average operating times of 79.2 minutes compared to a conventional open procedure (266.7 minutes vs 187.5 minutes).<sup>7</sup> However, the study showed no significant difference between the two groups in terms of estimated blood loss, return to bowel function, readmission rates, and total complications.<sup>7</sup> Some of its limitations are its retrospective nature which could contribute to selection bias in patients.<sup>7</sup> The last decade has also seen the development of newer techniques such as Robot-assisted and hybrid IPAA, which seem very promising. As reported by Hota et al., based on a survey conducted on 2129 UC patients who underwent robotic, laparoscopic, or open IPAA, 30-day postoperative outcomes were better for minimally invasive techniques in terms of postoperative ileus, wound infections, and anastomotic leaks, but the multivariate analysis of their data shows no statistically significant difference in LOS among the three groups.<sup>8</sup> The minimal access approach also provided advantages in other aspects of 30-day postoperative surgical outcomes and shorter postoperative LOS, respectively.<sup>8</sup> Lim et al., in their institutional experience study, where they reported outcomes and impact of surgical evolution over a period of 26 years (1990–2016), also reported a shift toward minimal access technique (laparoscopic) in the last decade, with an increase in stapled IPAA (vs Hand-sewn IPAA) and modified 2-stage procedure (vs a 3 stage procedure) compared to the previous decade.<sup>9</sup> Their findings also show a decline in the defunctioning ileostomy rate in the last decade compared to the previous decade.<sup>9</sup> Over time, the use of J-pouch configuration (vs a W-pouch configuration) gained more importance, which was supported by their randomized trial findings comparing functional outcomes between the 2 configurations showing better outcomes with J-pouch compared to W-pouch.<sup>9</sup> They found their results to be consistent with a surgical evolution study conducted by the Leuven group, who in their study also reported decreased rates of anastomotic leak and small bowel obstruction with surgical evolution.<sup>9,10</sup> Lim et al., however, also reported an increase in the number of patients undergoing acute surgery, despite an increase in the use of immunomodulatory therapies over time, the reason behind this was not clear.<sup>9</sup> A multivariate analysis of their complications revealed that a BMI of 18.1 or more before surgery was associated with a decreased rate of anastomotic leak, while steroid use before colectomy was a risk factor that was not further elaborated on.<sup>9</sup> In terms of complications, Lim et al., also reported an increase in pouchitis rates which was seen in patients with a more aggressive preoperative disease, evidenced by the increased

number of surgeries being performed for acute indications, lower albumin levels before colectomy, and more patients with the extensive disease which is a known risk factor for pouchitis.<sup>9</sup> Limitations of the study are its unicenter, retrospective design, and a small sample size of 212 patients relative to the duration of the study (26 years).<sup>9</sup> Over the last decade, minimal access IPAA has evolved from a laparoscopic approach giving way to newer techniques like single incision laparoscopy surgery (SILS), natural orifice transluminal endoscopic surgery (NOTES), and robotic surgery.<sup>11</sup> However, there is scope for further improvement, especially in terms of minimizing complications and improving educational training, access, and feasibility of minimally invasive techniques for treating UC. Complications from IPAA such as pouch failure, small intestinal obstruction, and Crohn's disease of pouch still are some of the challenges in care provision for UC.<sup>3,12</sup> Perhaps, further cohort studies comparing outcomes between the open and the minimal access approach could help delineate finer differences between the two approaches which were not previously seen due to paucity of data.

## CONCLUSION

Restorative proctocolectomy with ileal pouch-anal anastomosis has emerged as the gold standard procedure for surgical management of UC. In our review, we observed the evolution of the surgical approach from open to minimally access surgery in the last decade. It has also paved the way for recent advances such as SILS, NOTES, and robotic surgery which have shown immense potential. Although minimal access surgery is associated with better postoperative outcomes, especially in terms of return to function and cosmesis, it also requires longer operating times and specialized training. Complications such as pouchitis, anastomotic leak, and small intestinal obstruction are still some of the challenges faced in surgical treatment for UC. Further, multicenter cohort studies comparing the rates of complications in different approaches can help delineate finer differences that may help improve the overall quality of life in UC patients as we move on to the next decade.

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