

Complicated Ulcerative Colitis: Structure Of Complications And A Differentiated Surgical Tactic In A Three-Centre Cohort

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Abstract: 131 patients with complicated UC operated at three centres in 2010–2025 were analysed, including a main group (n=42, developed tactic), a control group (n=46, conventional tactic, propensity-matched) and an external validation group (n=43). Complication forms, disease extent (Montreal), attack severity (Truelove–Witts, Mayo, UCEIS), volume and staging of surgery and short- and long-term outcomes were assessed; pouch survival was estimated by the Kaplan–Meier method. The leading indications were refractory course (33.6%) and intestinal bleeding (29.0%), followed by combined complications (13.7%), toxic dilatation (9.2%), high-grade dysplasia (8.4%) and perforation (6.1%). Perforation and toxic dilatation required surgery within hours to days (0.7 ± 0.4 and 1.9 ± 1.2 days) at the highest severity, whereas refractory course and dysplasia were operated electively (46.2 ± 23.8 and 78.4 ± 35.6 days; ANOVA $F=118.4$; $p<0.001$). A staged approach predominated (two-stage modified 42.7%, three-stage 31.3%). The differentiated tactic reduced complications by 20.1 percentage points, anastomotic leak 3.2-fold and disability by 16.4 percentage points, with tactic concordance of 83.2%. Efferent therapy avoided surgery in 35.7% and converted an urgent situation into an elective one in 45.2%; a minimally invasive approach reduced blood loss by 55.8% and hospital stay by 31.2%. A diverting ileostomy reduced leak from 19.2% to 7.1% and delayed pouch formation from 15.6% to 5.4%; early salvage preserved the pouch in 77.8%, and cumulative pouch survival reached 90.0% at 24 months. A differentiated surgical tactic that links the form of complication to the urgency, volume and staging of the operation and combines organ-sparing preparation, minimally invasive access, leak prevention and early pouch salvage improves the outcomes of surgery for complicated ulcerative colitis.

Keywords: ulcerative colitis; surgical complications; colectomy; ileal pouch; surgical tactic; staged surgery; anastomotic leak; diverting ileostomy; pouch salvage; pouch survival.

Introduction: Ulcerative colitis (UC) remains one of the most severe forms of inflammatory bowel disease, with a progressive rise in incidence worldwide and in Uzbekistan [1, 2]. Despite the expansion of medical therapy, 10–15% of patients require surgery, and in complicated forms — intestinal bleeding, toxic dilatation, perforation and refractory course — the operation becomes life-saving [3, 4]. Postoperative mortality after elective colectomy does not exceed 0.7%, whereas after emergency surgery it reaches 5.3%, which determines the importance of a timely and justified choice of surgical tactic [5].

The differentiated choice of the volume, timing and

staging of surgery in complicated forms and the early diagnosis of anastomotic leak — the complication that determines the fate of the pouch and the need for a permanent stoma — remain unresolved [6, 7]. The absence of a unified system linking the form of complication to surgical tactics leads to heterogeneity of treatment and unsatisfactory long-term results [8]. The aim of this work was to study the structure and clinical-surgical features of complicated UC and to substantiate a differentiated surgical tactic linking the form of complication to the urgency, volume and staging of the operation.

Material and methods. The clinical material comprised

131 patients with morphologically verified complicated UC operated at three centres — the clinic of Samarkand State Medical University, a branch of the Republican Scientific Centre of Emergency Medical Care and the Bukhara centre — in 2010–2025. A main group (n=42) treated by the developed tactic, a control group (n=46) treated by the conventional tactic and an external validation group (n=43) were formed; the main and control groups were balanced by a propensity score computed from sex, age, disease extent (E1–E3), attack severity and the form of complicated course, with comparability confirmed at $p>0.05$. The mean age was 42.6 ± 13.8 years, the male-to-female ratio 1.30:1 and the mean UC history 61.3 ± 39.4 months.

Inclusion required age ≥ 18 years, verified UC and an indication for surgery (intestinal bleeding, toxic dilatation, colonic perforation, acute severe course refractory to therapy, or high-grade dysplasia). Crohn's disease, indeterminate colitis, isolated proctitis without an indication for surgery and invasive

carcinoma were excluded. Disease extent was classified by the Montreal system, attack severity by Truelove–Witts with the Mayo index, and endoscopic activity by the Mayo and UCEIS indices. Outcomes were compared between the pooled main and control groups with adjustment for the propensity score, operation year and centre; pouch survival was estimated by the Kaplan–Meier method and competing-risks analysis. Differences were considered significant at $p<0.05$.

Results and Discussion. . Refractory course (33.6%) and intestinal bleeding (29.0%) accounted for the largest shares of surgical indications, followed by combined complications (13.7%), toxic dilatation (9.2%), high-grade dysplasia (8.4%) and colonic perforation (6.1%) (Table 1). Total colonic involvement predominated (E3 54.2%), and severe and fulminant attacks together accounted for 60.3% of the cohort, reflecting the link between disease extent, attack severity and the risk of complications and colectomy.

Table 1

Structure of surgical complications of ulcerative colitis (n=131)

Form of complication	n	%
Refractory course	44	33.6
Intestinal bleeding	38	29.0
Combined complications	18	13.7
Toxic dilatation	12	9.2
High-grade dysplasia	11	8.4
Colonic perforation	8	6.1

The clinical features of the forms differed in the time to surgery and severity (Table 2). Perforation and toxic dilatation required intervention within the first hours and days (0.7 ± 0.4 and 1.9 ± 1.2 days) at the highest severity (9.2 ± 1.1 and 8.1 ± 1.7 points), whereas

refractory course and dysplasia were operated electively after weeks and months (46.2 ± 23.8 and 78.4 ± 35.6 days); the between-form differences in timing were significant (ANOVA $F=118.4$; $p<0.001$). This gradient underpins the link between the form of complication and the urgency of the operation.

Table 2

Time to surgery and severity score by form of complication ($M\pm\sigma$)

Form	Time to surgery, days	Severity, points
Perforation	0.7 ± 0.4	9.2 ± 1.1
Toxic dilatation	1.9 ± 1.2	8.1 ± 1.7
Intestinal bleeding	3.4 ± 2.1	7.3 ± 1.5
Refractory course	46.2 ± 23.8	6.4 ± 1.3
High-grade dysplasia	78.4 ± 35.6	3.1 ± 1.2

Subtotal colectomy predominated in the volume of surgery (38.9%), followed by proctocolectomy with an ileal pouch (20.6%), ileorectal anastomosis (18.3%) and permanent ileostomy (22.1%) (Table 3). A staged

approach prevailed — two-stage modified in 42.7% and three-stage in 31.3% — matching the profile of complicated course, in which source control precedes reconstruction. Perforation and toxic dilatation were

managed predominantly by subtotal colectomy with stoma, whereas restorative reconstruction was reserved for the elective setting after nutritional and inflammatory optimization.

Table 3
Volume and staging of surgery (n=131)

Indicator	n	%
Subtotal colectomy	51	38.9
Permanent ileostomy	29	22.1
Proctocolectomy with pouch	27	20.6
Ileorectal anastomosis	24	18.3
One-stage tactic	34	26.0
Two-stage modified	56	42.7
Three-stage tactic	41	31.3

Outcomes of the differentiated tactic

Compared with the conventional tactic, the differentiated tactic reduced postoperative complications by 20.1 percentage points, anastomotic leak 3.2-fold and disability by 16.4 percentage points, with tactic concordance of 83.2% (Table 4). Organ-sparing preparation contributed to this result: a course of efferent therapy produced a response in 78.6% of

patients, avoided surgery in 35.7% and converted an urgent situation into an elective one in 45.2%, with a fall of the Mayo index from 10.1 ± 1.7 to 5.8 ± 2.1 and of C-reactive protein from 87.2 ± 41.6 to 32.7 ± 19.8 mg/L ($p < 0.001$). A minimally invasive reconstructive stage reduced intraoperative blood loss from 412 to 182 mL (-55.8%) and hospital stay from 15.7 to 10.8 days (-31.2%) and halved complications (34.1% to 16.3%).

Table 4
Outcomes of the differentiated versus conventional tactic

Outcome	Conventional	Differentiated
Postoperative complications	effect -20.1 percentage points	
Anastomotic leak	3.2-fold reduction	
Disability	effect -16.4 percentage points	
Leak — diverting ileostomy	19.2 %	7.1 %
Leak — delayed pouch formation	15.6 %	5.4 %
Tactic concordance	—	83.2 %

Leak prevention acted on modifiable links of risk: a diverting ileostomy reduced anastomotic leak from 19.2% to 7.1% and delayed pouch formation from 15.6% to 5.4%, while intraoperative fluorescence perfusion assessment changed the planned resection level in 16.7% of patients. Early salvage of the pouch

upon the first signs of leak preserved it in 77.8% of patients; both pouch losses were of infectious origin. Cumulative pouch survival reached 100% at 6 months, 95.0% at 12 months and 90.0% at 24 months (Figure 1), consistent with international benchmarks and confirming pelvic sepsis as the principal threat to the pouch.

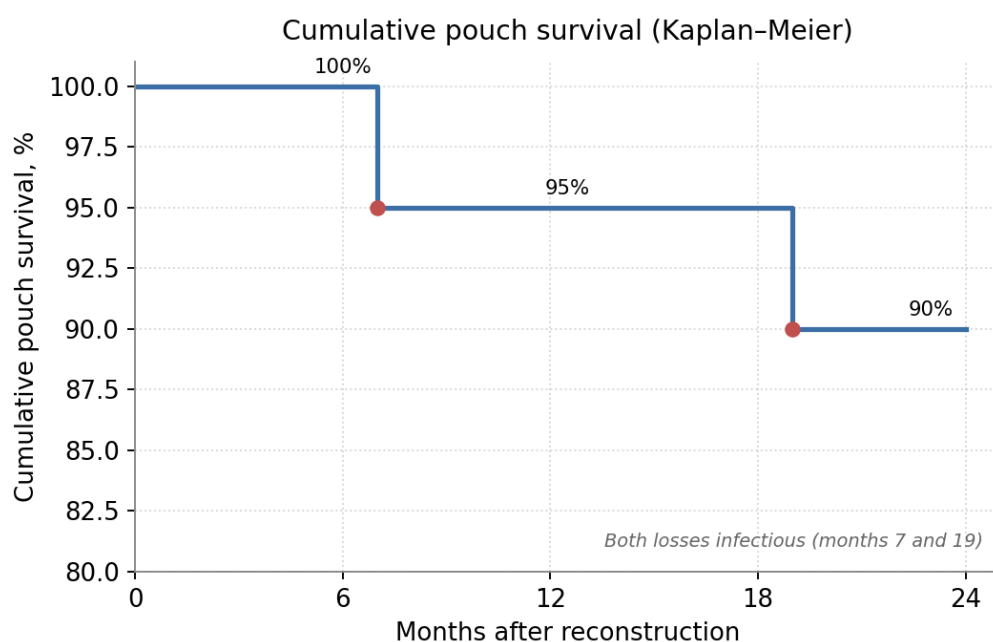


Figure 1 — Cumulative pouch survival (Kaplan-Meier); both losses of infectious origin.

The results support a differentiated surgical tactic in which the form of complication determines the urgency, volume and staging of the operation. The clear timing gradient — from emergency surgery for perforation and toxic dilatation to elective reconstruction for refractory course and dysplasia — provides an objective basis for matching the operation to the clinical situation [3, 4, 6]. The predominance of a staged approach reflects the principle of source control before reconstruction, which is central to modern management of complicated UC [7, 9].

The differentiated tactic reduced complications, anastomotic leak and disability, combining organ-sparing preparation, minimally invasive access, leak prevention and early pouch salvage. Efferent therapy allowed surgery to be avoided or postponed to the elective setting, where mortality is far lower than in emergency operations [5, 10]. A diverting ileostomy and delayed pouch formation reduced leak by acting on modifiable risk, and early salvage preserved the pouch in most cases, translating into high cumulative pouch survival [11, 12]. These findings are consistent with international benchmarks of pouch loss around 11% and three-year pouch survival of 94–96% [13].

Limitations include the observational design, the retrospective control arm recruited in an earlier era and the small number of rare forms (perforation, toxic dilatation), for which subgroup comparisons are preliminary; temporal bias was mitigated by adjustment for operation year and centre but remains a limitation. Prospective multicentre confirmation is warranted.

Conclusions

1. In complicated ulcerative colitis the leading surgical indications are refractory course (33.6%) and intestinal bleeding (29.0%); the form of complication determines the urgency of surgery, from emergency operation for perforation and toxic dilatation (0.7–1.9 days) to elective reconstruction for refractory course and dysplasia (ANOVA $F=118.4$; $p<0.001$).
2. A staged approach predominates (two-stage modified 42.7%, three-stage 31.3%), reflecting source control before reconstruction, with subtotal colectomy the most frequent operation (38.9%).
3. The differentiated tactic reduces complications by 20.1 percentage points, anastomotic leak 3.2-fold and disability by 16.4 percentage points (tactic concordance 83.2%); efferent therapy avoids surgery in 35.7% and converts an urgent situation into an elective one in 45.2%, and a minimally invasive approach reduces blood loss by 55.8% and hospital stay by 31.2%.
4. Leak prevention (diverting ileostomy 19.2%→7.1%; delayed pouch 15.6%→5.4%) and early pouch salvage (preserved in 77.8%) yield cumulative pouch survival of 90.0% at 24 months.

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