

Short-term outcomes of reactive versus
preemptive conversion
in laparoscopic colorectal resection

By

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Introduction

The popularity of laparoscopic colorectal resections has markedly increased

- Faster patient recovery
- Less postoperative pain
- Shorter hospital stay
- Same oncological outcomes reported after open surgery

In spite of the great advances achieved in medical technology and medical training, conversion rates are reported to reach up to 30% Others reported higher conversion rates, reaching 42%

Introduction

Several risk factors for conversion to open surgery in laparoscopic colorectal surgery have been identified.

- **Patient-related factors** (e.g. sex, obesity, and previous abdominal operations)
- **Surgeon-related factors** (e.g. experience, technical ability, and learning curve)
- **Procedural factors** (e.g. resection site), and intraoperative complications, like poor visualization, equipment malfunction, and bleeding.

Introduction

In general

Adequate training and experience can control **surgeon** and **procedural-related** reasons for conversion

Patient related factors remain largely outside the control of the surgeon

Conversion to open surgery

1. more blood loss,
2. more postoperative morbidity
3. prolonged hospital stay
4. Probably, longer operative time and more blood loss may have a negative effect on the immune system, leading to an increased risk of major complications

Introduction

Surgeon should always keep in mind that conversion may be required during minimally invasive technically demanding colorectal surgery.

Surgeon experience plays a crucial role in the decision and timing of conversion

Introduction

Two types of conversions have been reported

Reactive and preemptive (strategic) conversion

Reactive conversion occurs secondary to operative complication

preemptive conversion is performed to avoid complications.

It was reported that reactive conversion is significantly associated with more postoperative complications compared with the preemptive one

Aim of the study

The existing literature is poor in handling that comparison. Therefore, this study aims to compare the short-term outcomes after preemptive versus reactive conversion.

Patients and methods

This retrospective study conducted at the General Surgery Departments of both Tanta and Ain Shams University Hospitals. It included cases that underwent laparoscopic colorectal resections in both hospitals during the period between January 2017 and December 2020.

We retrospectively reviewed the data of such cases, and a total of 313 cases had planned to undergo the laparoscopic operation (based on intention to treat), from whom 67 cases were converted to the open approach.

Patients and methods

An informed written consent was taken from all cases before operation after the explanation of the possible complications of the procedure. Furthermore, the study was approved by the local ethical committee of both universities

Patients and methods

Conversion was defined by the need to perform a surgical incision rather than the laparoscopic ports, and the incision needed for specimen extraction (usually suprapubic)

The included 67 cases were divided into two groups: reactive conversion group, which included **45 cases** that were subjected to reactive conversion

Preemptive group, which included the remaining **22 cases** that were subjected to preemptive conversion

Patients and methods

Preemptive conversion was established when a standard laparotomy was directly performed after assessment of the feasibility of completing the procedure laparoscopically and because of anticipated operative difficulty or logistic considerations

Reactive conversion was defined as the need for laparotomy owing to a complication or because of operative difficulty after a considerable dissection time (>30 min)

Patients and methods

All the surgeries were performed by a team led by a consultant surgeon who is well experienced in both laparoscopic and open colorectal surgeries, and the decision to perform either preemptive or reactive conversion was based only on the operator opinion and experience, supported by two other surgeons, the other assistant, and the cameraman.

Patients and methods

all cases were subjected to

- History taking
- Full clinical examination
- Routine laboratory investigations, including tumor markers.
- Radiological evaluation included abdominal ultrasonography, triphasic pelviabdominal computed tomography, barium study, and/or pelvic MRI. Additionally, cases were evaluated by the anesthesia team and were classified according to the American Society of Anesthesiologists (ASA) status.

Patients and methods

The collected data included

Preoperative (age, sex, BMI, and ASA score)

Operative (operative time, pathology, cause of conversion, and blood transfusion)

Postoperative data (hospital stay, in hospital mortality, complications, and short-term recurrence over 6-month follow-up period).

The rate of postoperative complications was the primary outcome, whereas operative time, operative complications, and hospital stay were the secondary outcomes

RESULTS

Table 1 Preoperative demographic data

Variables	Groups		P value
	Reactive conversion (N=45)	Preemptive conversion (N=22)	
Age (years)	55 (46–62)	54 (43–60)	0.416
Sex [n (%)]			
Male	24 (53.33)	11 (50)	0.684
Female	21 (46.67)	11 (50)	
BMI (kg/m ²)	30.66 (27.36–42.5)	29.45 (28.2–41.4)	0.752
ASA [n (%)]			
I	31 (68.89)	12 (54.54)	0.225
II	14 (31.11)	10 (45.45)	

ASA, American Society of Anesthesiologists.

Table 2 Operative data of the study cases

Variables	Groups		P value
	Reactive conversion (N=45)	Preemptive conversion (N=22)	
→Disease nature [n (%)]			
Adenocarcinoma	39 (86.67)	20 (90.91)	0.537
Squamous cell carcinoma	1 (2.2)	0	
Diverticulosis	4 (8.89)	2 (4.44)	
Ischemic colitis	1 (2.2)	0	
→Type of surgery [n (%)]			
Right colectomy	17 (37.78)	9 (40.91)	0.682
Left colectomy	19 (42.22)	9 (40.91)	
Ant resection	8 (17.77)	4 (18.18)	
Abdominoperineal resection	1 (2.2)	0	
→Cause of conversion [n (%)]			
Patient related			0.309
Abdominal adhesions	6 (13.33)	4 (18.18)	
Disease related			
Large mass	10 (22.22)	5 (22.73)	
Infiltration of surrounding organ	14 (31.11)	9 (40.9)	
Perforation and abscess	3 (6.67)	3 (13.63)	
Technique related			
Difficulty grasping colon	5 (11.11)	1 (4.54)	
Bleeding	4 (8.89)	0	
Organ injury	3 (6.67)	0	
Operation time (min)	245 (210–320)	190 (160–280)	0.001*
Blood transfusion	14 (31.11)	3 (13.36)	0.015*

*It denotes that this factor has statistically significant impact or effect as relation to P value result.

Table 3 Postoperative data of the study patients

Variables	Groups		P value
	Reactive conversion (N=45)	Preemptive conversion (N=22)	
Start oral (day)	5 (1-8)	4 (1-5)	0.039*
Hospital stay	10 (7-12)	6 (5-9)	0.003*
Complication rate	23 (51.11)	6 (27.27)	<0.001*
Wound infection	15 (33.33)	3 (13.63)	0.009*
Anastomotic leakage	5 (11.11)	1 (4.5)	0.368
Ileus	11 (24.44)	3 (13.6)	0.048*
Chest infection	10 (22.22)	1 (4.5)	0.015*
In-hospital mortality	0	0	1
Recurrence	0	0	1

*It denotes that this factor has statistically significant impact or effect as relation to P value result.

Table 4 Univariate and multivariate analysis of predictors of postoperative complications

Variables	Univariate analysis	Multivariate analysis		
		<i>B</i>	95% CI	<i>P</i> value
Age	0.28			
Male sex	0.832			
BMI	0.582			
ASA I	0.763			
Adenocarcinoma	0.858			
Squamous cell carcinoma	0.231			
Diverticulosis	0.843			
Ischemic colitis	0.656			
Colonic lesion	0.208			
Rectal lesion	0.22			
Abdominal adhesions	0.423			
Large mass	0.38			
Difficult grasping colon	0.758			
Surrounding organ infiltration	0.299			
➔ Perforation and abscess	<0.001*	3.26	2.93–3.72	0.013*
Bleeding	0.47			
Organ injury	0.251			
Operation time	0.988			
Blood transfusion	0.314			
➔ Reactive conversion	0.001*	1.517	1.241–2.28	0.045*
Preemptive conversion	0.214			

ASA, American Society of Anesthesiologists; CI, confidence interval. *It denotes that this factor has statistically significant impact or effect as relation to *P* value result.

To summarize results

Adenocarcinoma the commonest encountered pathology (86.67 and 90.91% of cases in the reactive and preemptive groups, respectively). Other pathologies included diverticulosis, ischemic colitis, and squamous cell carcinoma.

No significant difference was detected between the two groups regarding the operation performed ($P=0.682$).

Infiltration of surrounding organs was the commonest cause of conversion in both groups (31.11 and 40.9% in the reactive and preemptive groups, respectively)

Other causes

- adhesions
- large mass making it difficult for manipulation, thick-walled edematous colon making it very difficult to grasp (like in diverticulosis and ischemic colitis)
- perforation together with abscess formation (cancer and diverticulosis),
- bleeding, and other organ injuries (ureter, spleen, and urinary bladder, one case for each complication)

Operative time was significantly increased in the reactive group (245 vs. 190 min in the preemptive group – $P=0.001$).

Blood transfusion was significantly more needed in the reactive group (31.11 vs. 13.36% of cases – $P=0.015$).

Oral intake was significantly delayed in the reactive group (fifth vs. fourth postoperative day in the preemptive group – $P=0.039$).

Hospital stay was much longer in the same group (10 vs. 6 days – $P=0.003$).

- ❖ The rate of **postoperative complications** was significantly higher in the reactive group compared with the preemptive one (51.11 vs. 27.27%, respectively – $P < 0.001$).
- ❖ **Wound infection, paralytic ileus, and chest infections** were significantly more encountered in the reactive group compared with the other group ($P < 0.05$).
- ❖ However, the incidence of anastomotic leakage did not significantly differ between the study groups. No cases with in-hospital mortality or recurrence were detected in the current study.

Conclusion

Based on our findings, reactive conversion appears to be associated with worse postoperative outcomes compared with preemptive conversion.

Once conversion is necessary, surgeon should not waste time performing laparoscopy.

Therefore, more studies with more cases should be conducted to specify the indications for conversion to avoid the complications of delayed conversion.

THANK YOU