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Anastomotic leaks: technique and timing of detection

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Abstract

BACKGROUND: Despite the proven benefits of laparoscopic colorectal surgery, the rate of anastomotic leaks has not changed. This study looks at the time of presentation of anastomotic leaks between laparoscopic and open colectomies.

METHODS: Retrospective chart review was performed between July 2008 and 2012. Two groups were created, laparoscopic and open. The time of presentation of significant leaks requiring reoperation were compared between the groups by index colectomies. Statistical analysis is presented as paired *t* test and chi-square test ($P < .05$).

RESULTS: From 1,424 segmental colectomies, the anastomotic leak rate between the two groups was not statically significant ($P = .69$). No difference in the time of leak detection was evident ($P = .67$). Mortality rate was equal between the groups. The overall complication rate of the entire cohort was statically significant ($P \leq .001$).

CONCLUSION: The timing of anastomotic leak detection does not differ between laparoscopy and open colorectal resections.

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The robust scientific evidence supporting the benefits of minimally invasive laparoscopic surgery in the colorectal field can be found in the literature. Such benefits include a decrease in the length of stay (LOS), better pain control, improvement in pulmonary function, and decrease in the incidence of wound infection and cardiovascular events, as well as less overall complications.

The inflammatory response after a surgical insult has also been reported to be less in laparoscopic colectomies

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compared with open colectomies, characterized by a decrease in soluble mediators such as cytokine interleukin-6, or an increase in interferon gamma, an immunomodulator of the cell-mediated immunity.^{1,2} These findings could suggest an earlier detection of leaks, since there maybe lesser inflammatory response that could mask early leak symptoms. Currently, it is uncertain if anastomotic leaks following laparoscopic colectomy present differently than with open surgery. The description of the leak timing detection between these 2 groups and patterns of detection (early vs late) is lacking in the literature.

This study seeks to determine the influence of surgical approach on clinical presentation of anastomotic leaks by comparing and contrasting open colectomy with laparoscopic colectomy.

Methods

Between July 2008 and 2012, a total of 1,424 segmental colectomies were performed within our institution. A retrospective review of the clinical chart and hospital records from this population was performed and subsequently divided into 2 groups (laparoscopic/open) on the basis of the surgical approach.

All segmental colectomies were included regardless of whether these were performed in an elective or emergent fashion. Rectal resections were not included. Patients transferred from outlying institutions with an abscess or leaks were excluded unless they had these complications after surgery at our institution.

The primary end point of our study was to compare the time of presentation of anastomotic leaks with significant clinical impact and radiographic confirmation, leading to reoperation between laparoscopic versus open colorectal resections for index operation.

Demographic features analyzed were age, sex, and race. The LOS after reoperation and the mortality rate between the two groups with significant clinical anastomotic leaks were also analyzed. The overall complication rate of the entire cohort after initial surgery was reported, including patients with anastomotic leak requiring reoperation as well as those patients with complications other than an anastomotic leak.

Statistical analysis was performed comparing the laparoscopic and open groups with regard to the timing of anastomotic leak detection, and LOS utilizing a paired *t* test. The leak rate between the groups was correlated using chi-square test, with significance set at .05 ($P \leq .05$).

Results

Over a 5-year period, 654 patients underwent a laparoscopic segmental colectomy and 770 underwent an open colectomy.

A total of 24 patients (1.7%) were found to have an anastomotic leak requiring reoperation, including 15 women (62.5%) and 9 men (37.5%). The mean age of the patients with a leak was 57.6 years (range: 32 to 83 years).

Ninety-one percent of the patients who had an anastomotic leak were considered to be a white-caucasian and 8% belonged to another ethnic group such as Asian ($n = 1$) or Latino ($n = 1$). Of all the anastomotic leaks for both laparoscopic and open groups, the most common indication of the index colectomy was diverticulitis, and the procedure most frequently performed was sigmoidectomy (Table 1).

The overall leak rate in the laparoscopic group was 1.8% (12/654), and 1.6% (12/770) in the open group, with no statistical differences ($P = .69$). The timing of leak detection between the two groups was very similar. The combined mean time after index operation was 9.8 days: 8.6 ± 11.6 days in the laparoscopic group and 11.2 ± 16.7 days in the open group ($P = .67$).

Computed tomography scan of the abdomen and pelvis was utilized to diagnose the anastomotic leak in 15 (62.5%) of the 24 patients, contrast enema was obtained in 3 (12.5%) cases, and with the remaining 6 patients, 2 (8.3%) patients had plain films as initial work up before reoperation. Four patients were taken to the operating room secondary to severe clinical peritonitis without further imaging work up.

The LOS was similar in both groups after reoperation, with an average of 16.3 ± 2.1 days in the laparoscopic group and 20.2 ± 2.8 days in the open group ($P = .28$; Table 2).

In terms of mortality rate, no differences were found with one deceased in each group.

All mortalities were attributed to complications arising from sepsis.

The overall rate of complications after the initial surgery of the entire cohort between the two groups was statically significant, the complication rate for the laparoscopic group $.26 \pm .03$ in comparison with the open group $1.15 \pm .08$ ($P \leq .001$; Table 3).

Comments

The literature is replete with studies on the rate of anastomotic leak in colorectal surgery, emphasizing the fact that there is no difference between laparoscopic and open techniques. However, most recently, Levack et al³

Table 1 Demographic features from patients with anastomotic leak

	Sex		Diagnosis			Ethnicity		Type of resection				
	Male	Female	Diverticulitis	Neoplasias	Other	White-caucasian	Other	IC	RC	REC	LC	Sigmoidectomy
Laparoscopic ($n = 12$)	5	7	6	4	2	11	1	1	3	0	0	8
Open ($n = 12$)	4	8	6	4	2	11	1	0	2	1	4	5

IC = ileocectomy; LC = left colectomy; REC = right extended colectomy; RC = right colectomy.

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