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ORIGINAL ARTICLE

Laparoscopic Management of Anastomotic Dehiscence in Colorectal Surgery

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ABSTRACT

Introduction: *In recent years there has been a great diffusion of laparoscopic surgery for the management of colorectal pathology. Anastomotic dehiscence is one of the most serious complications, with high morbidity and mortality. Laparoscopic reoperation could be a valid option to treat this complication, maintaining certain benefits of the minimally invasive approach. Objectives: To evaluate the viability and safety of the laparoscopic approach in the management of anastomotic dehiscence in colorectal surgery and as a secondary end point to compare the results with those of reoperation by conventional approach.*

Material and Methods: *A series of 1693 patients that underwent laparoscopic colorectal surgery was analyzed, from a prospective database (June 2000 - September 2018). Patients were divided into two groups according to the approach performed in the reoperative surgery: laparoscopy (G 1) or laparotomy (G 2). Demographic data, hospital stay, type of complication, morbidity and mortality were analyzed. Dindo-Clavien classification was used to stratify postoperative complications and only categories 3, 4 and 5 were included. Data were statistically analyzed with Student´s t test and chi-square test.*

Results: *A hundred six patients (6.26%) were reoperated because of AL, 85 (80%) by laparoscopy and 21 (20%) by conventional surgery. The only demographic difference between both groups was that more obese patients were included in G1 (G1: 17, 20% vs. G2: 0, p=0.02). Interval of time between surgeries was lower in G1 without statistical difference (5.18 vs. 6.23 days, p=0.22). In 84 patients (79%) abdominal lavage and loop ostomy was performed (G1: 74 vs. G2: 10, p=0.001). Anastomosis takedown was required in 8 patients (G1: 4 vs. G2: 4, p=0.02). 9 patients in G1 and 3 in G2 needed more than one reexploration (p= 0.63). Postoperative complications were similar in both groups, grades 3, 4 and 5 were included (G1: 21, 2% vs. G2: 28.6%, p= 0.34). In average hospital stay was decreased in G1 (10.7 vs. 11.6 days, p=0.66), without statistical difference.*

Conclusion: *Laparoscopic reintervention can be a safe treatment for anastomotic leakage after laparoscopic colorectal surgery.*

Key words: *Colorectal Laparoscopic Surgery; Reoperative Surgery; Anastomotic Leakage*

INTRODUCTION

Laparoscopic surgery for colorectal pathology has shown the benefits of the minimally invasive approach, including less postoperative ileus and pain, which translate into a faster recovery and shorter hospital stay. The smaller incisions and the lower rate of wound infections directly impact in a lower rate of parietal complications.[1] However, the rate of serious complications, such as anastomotic dehiscence, does not decrease with laparoscopic surgery and remains around 5% regardless of the type of approach.[2-5]

The advantages of laparoscopic reoperation initially were described for another type of pathology, like complications of biliary and bariatric surgery. In recent years, several articles have been published on the advantages of the laparoscopic approach for the management of anastomotic dehiscence in colorectal pathology.[5-17]

The objective of this study is to evaluate the safety and viability of the minimally invasive approach for the treatment of anastomotic leak in patients undergoing laparoscopic colorectal surgery, comparing them with those of patients reoperated by conventional approach.

MATERIAL AND METHODS

A retrospective analysis was carried out from a prospective database that includes all patients operated on laparoscopically for colorectal pathology between June 2000 and September 2018, at the Hospital Alemán of Buenos Aires. Patients who underwent reoperation due to anastomotic dehiscence were included in the present study; those who responded favorably to medical and/or percutaneous treatment were excluded. Two groups were formed depending on the approach to the reoperation. In group 1 (G1) those reoperated laparoscopically were included and in group 2 (G2) those that were reoperated conventionally were included. A comparative analysis of both groups was performed, taking into account demographic factors, type of surgery performed, hospital stay, days between operation and reoperation, postoperative morbidity and mortality. Obesity was defined as those patients with a BMI greater than 30. The decision of the approach used in each case depended on the judgment of the acting surgeon. The patients who required conversion from the second surgery were kept in the laparoscopic group, performing an "intention to treat" analysis.

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Surgical technique

In all cases the initial surgery was laparoscopic. The reoperations were performed by the same surgical team or the surgeons on duty. In the case of laparoscopic reoperations, the same trocar incisions that had been made in the first surgery were used. The first trocar was inserted via open technique. In all cases, when a proximal ostomy was performed due to an anastomotic dehiscence, a drain offered to the anastomosis was placed, which was withdrawn by counter-opening through a trocar hole. In patients who underwent reoperation by conventional approach, a midline incision was made. Statistical analysis was carried out using Student's t, chi-square and Fischer tests. A $p<0.05$ was considered statistically significant.

RESULTS

In the period between June 2000 and September 2018, 1693 laparoscopic procedures were performed.

One hundred and sixty-one (9.5%) required a reoperation for some complication during the first postoperative month. One hundred and six (6.26%) were reoperated due to anastomotic dehiscence. Eighty-five (80.2%) patients were reoperated laparoscopically and were included in group 1 (G1). Twenty-one (20%) were included in G2. Table 1 shows the demographic characteristics of both groups. The only demographic difference consisted in the number of obese patients in G1 (17 vs. 0, p=0.02).

In both groups, the most frequent initial surgery was left colectomy/sigmoidectomy. Table 1 shows the type of initial surgery in both groups, with no statistically significant differences. Nineteen surgeries had been converted initially, 11 were reoperated conventionally and 8 laparoscopically (p=0.005), 3 of which required conversion.

The interval between operation and reoperation was shorter in G1 (5.18 vs. 6.23 days, p=0.22), although there were no statistically significant differences. The surgical procedures for reexploration can be seen in Table 2, the most frequent being lavage, drainage, and the creation of an ostomy, which was performed in 79% of patients who underwent reoperation. This management was more frequent in G1 (74 vs. 10, p = 0.001). The take down of the anastomosis with proximal end colostomy was required in 8 patients (G1: 4 vs. G2: 4, p=0.02). Nine patients in G1 and 3 patients in G2 required more than one surgery (p=0.63). The overall conversion rate of G1 was 8.23% (7/85).

The complications of reexplorations can be observed in Table 2. The rate of complications (Dindo-Clavien classification >3) was 21.2% in G1 and 28.6% in G2, with no statistically significant differences (p=0.34). The overall mortality of the series was 6.6% and it was similar in both groups (G1: 4.6% vs. G2: 14.2%, p=0.99).

The mean hospital stay was lower in G1 (10.7 vs. 11.6 days, p=0.66) although there were no statistically significant differences.

There were no significant differences regarding postoperative events (G1: 13% vs. G2: 19%, p=0.47). In the multivariate analysis, the only values that remained with statistically significant differences between both groups were obesity and surgical management (lavage, drainage and proximal ostomy), both more frequent in G1 (Table 3).

DISCUSSION

Anastomotic dehiscence is the most serious complication of colorectal surgery, regardless of the surgical approach; the rate is around 5%, but it can rise to close to 25% in certain situations. In our series, the overall rate of reoperations due to dehiscence is 6.26%, similar to that described in the literature.[7,9,18]

The importance of this complication lies in the fact that mortality after anastomotic dehiscence can amount to 30%, depending on multiple factors.[19] Additionally, it has an impact on oncological results, increasing local recurrence with direct impact on long-term, disease-free, and overall survival.[20] The economic impact is not negligible either. Turrentine et al.,[21] described that expenses practically double when this complication occurs (US $ 16085 vs. US $ 30409, p<0.0001).

For some time there was some controversy about the feasibility of the laparoscopic approach in patients with peritonitis, due to the potential risk of endotoxemia caused by the increase in intra-abdominal pressure due to pneumoperitoneum. However, it was subsequently possible to prove that the use of minimally invasive surgery is safe in patients with generalized peritonitis.[22-26] In recent years, the number of national and international publications that describe the usefulness of the minimally invasive approach for the management of complications of colorectal pathology nave increased.[5-17] Although, the majority are retrospective series, it would seem logical to think that in this way certain benefits of the laparoscopic approach would be maintained. The literature highlights a review published by Chang et al.,[8] which includes 11 series with a total of 118 patients reoperated laparoscopically. The authors concluded that laparoscopic reoperation is safe and effective for the management of complications from laparoscopic colorectal surgery. It includes the article published by our group in 2009 that analyzes a series of 510 patients undergoing laparoscopic colorectal surgery and compared 17 patients reoperated by minimally invasive approach with 10 reoperated by conventionally. [27]

Although there were no statistically significant diffe-

TABLE 1: DEMOGRAPHIC FACTORS AND SURGERIES PERFORMED

		G1	G2	p
Gender: Male/Female, n		66/19	15/6	0,508
Previous surgeries, n (%)		44 (51%)	14 (66%)	0,201
BMI > 30, n (%)		17 (20%)	0	0,02
Age, mean (range)		58,9 (28-83)	64,3 (25-86)	0,14
ASA, n (%)	I	16 (18,8%)	1 (4,7%)	0,12
	II	56 (65,8%)	14 (66,6%)	0,94
	III	13 (15,3%)	5 (23,8%)	0,352
Pathology: Benign/Malign, n		26/59	8/13	0,509
Initial procedure, n (%)	Right colectomy	15 (17%)	6 (28,6%)	0,261
	Left colectomy/Sigmoidectomy	43 (50,6%)	7 (33,3%)	0,156
	Anterior resection	11 (13%)	3 (14,3%)	0,87
Conversion, n (%)		8 (9,4%)	11 (52,4%)	0,005

TABLE 2: TREATMENT PERFOMED IN THE REINTERVENTION AND POSTOPERATIVE COMPLICATIONS

		G1	G2	p
Days between initial operation and reoperation, mean (range)		5,18 (1-18)	6,23 (2-14)	0,22
Reoperation treatment, n (%)	Lavage, drainage and ileostomy	72 (84,7%)	10 (47,6%)	0,001
	Terminal ostomy	5 (5,9%)	3 (14,3%)	0,36
Hospital stay, days, mean (range)		10,71 (1-35)	11,57 (2-34)	0,66
Postoperative complications n (%)	IIIa	6 (7%)	1 (4,7%)	0,7
	IIIb	2 (2,3%)	0	0,47
	IVa	6 (7%)	2 (9,5%)	0,72
	V	4 (4,6%)	3 (14,2%)	0,99
	Total	18 (21,2%)	6 (28,6%)	0,8
Incisional hernia, n (%)		11 (13%)	4 (19%)	0,47

rences in most of the demographic characteristics of both groups, there was a greater tendency for laparoscopic reoperation when dehiscence occurred in obese patients (BMI greater than 30). The advantage of the laparoscopic approach in obese patients, by allowing an adequate visualization of the entire cavity, is well known.[28] Furthermore, the conventional approach would undoubtedly require a large incision. This could be the reason for the greater tendency to reoperate obese patients in this way. The rationale for laparoscopic reexploration in obese patients who had undergone surgery for colorectal disease is poor. However, the advantages of laparoscopic reexamination can be clearly seen in patients complicated by bariatric surgery.

It is important to highlight that early reoperation is associated with better postoperative recovery.[14,18] In our series, on average, a shorter interval between operation and reoperation was observed when the laparoscopic approach was performed, despite the fact that there were no differences statistically significant. This could be due to less hesitation in taking a surgical approach when reoperation is done by the same approach as the initial one, due to the use of the same incisions. Kwak et al.,[11] demonstrated that there is a greater tendency to reoperate laparoscopically in those patients who had initially undergone laparoscopic surgery, and vice versa for those who had initially undergone laparotomy. In our series, there was a greater tendency to reoperate laparotomically in those patients who had been converted in the initial surgery, and when compared with G1, a statistically significant difference was observed.

Additionally, an important impediment to being able to reoperate laparoscopically is the dilation of the loops generated by a diffuse peritonitis. When reoperating earlier, it is assumed that the dilation is less, allowing laparoscopic surgery to be performed. This also translates into a non-negligible rate of conversion in laparoscopically reoperated patients, whose main impediment is that the great distension of the loops makes the approach difficult. In our series, the conversion rate of laparoscopic reoperated patients was 8.23%, which could be due to an adequate selection of patients and early reoperation. In our se-

TABLE 3: MULTIVARIATE ANALYSIS

	Coef.	p	95% Confidence Interval	
Age	-.0272643	0.474	-.1019261	.0473975
BMI > 30	.4071577	0.050	.0002535	.8140618
Interval between surgeries	-.2638386	0.123	-.5988622	.0711851
Hospital stay	.0263634	0.766	-.1474701	.2001968
No of reoperations	214.136	0.345	-2.307.081	65.898
Lavage and drainage	4.269.728	0.020	.6646297	7.874.826
Incisional hernia	.413312	0.771	-2.369.162	3.195.786
Gender	-1.312.536	0.366	-4.159.688	1.534.616
Malign pathology	1.840.062	0.205	-1.003.159	4.683.283
Previous surgeries	-2.210.281	0.085	-4.725.142	.3045801
ASA1	2.872.536	0.234	-1.857.031	7.602.103
ASA 2	-.0008189	1.000	-3.147.038	31.454
Type of surgery	-.1048079	0.894	-1.643.633	1.434.017
Conversion	-1.248.166	0.422	-4.292.633	1.796.302
Discharge between surgeries	2.703.375	0.163	-109.726	650.401

ries, the most widely used surgical tactic is the creation of an ostomy proximal to the dehiscence, performed in 87% of cases. This strategy is feasible when there is no alteration in the vascularization of the anastomosed bowel ends and when the defect is less than 50%. Otherwise, the anastomosis must be taken down and a proximal end ostomy made. The advantage of a loop ostomy lies mainly in the lower complexity of the second stage. The morbidity of a loop ostomy reconstruction is notably less when compared to that of a terminal ostomy, (Hartmann's reversal). Additionally, the rate of permanent ostomies is lower for loop ostomies.[18]

The decrease in the mean hospital stay is surely due to the fact that there are certain benefits of the minimally invasive approach when the patient is reoperated laparoscopically, although there were no statistically significant differences. As in our previous publication[27] several authors[11,16,17] also evidenced a shorter hospital stay in patients operated laparoscopically. The mortality rate of patients who presented anastomotic dehiscence was 6.6%, significantly lower than in various publications. Marres et al.,[14] describe a series of 127 patients, including patients with conservative management. Nine of 44 patients who had to be reoperated died postoperatively, a rate of 25%. In this series, many patients were reoperated conventionally, which could be related to high mortality.

Limitations

The study presented is retrospective, therefore, there is a clear selection of patients based on the general condition of the patient and the surgeon's criteria. It is logical to think that the most systemically compromised patients or those with a more complex abdominal picture were reoperated conventionally and this may impact on postoperative evolution, regardless of the surgical approach.

CONCLUSIONS

Laparoscopic reoperation is a valid and safe treatment for the management of anastomotic dehiscence in laparoscopic colorectal surgery.

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COMMENT

The subject and the objective of the study have not been evaluated in this way to date.

The group to which the authors belong has recognized experience and publications of their results in laparoscopic colorectal surgery, being among the first in our country to report its complications.

Thus, treating the most critical issue of colorectal pathology, both in the elective and emergency setting, with coherence and intellectual honesty, validates these results.

Anastomotic dehiscence and its treatment are the main point of discussion in colorectal surgery and the assessment of its prophylaxis and treatment appears to be insufficient in the literature of the specialty. Laporte and his co-workers report their results and complications, both by laparoscopic and conventional approach and analyze them comparatively. The experience is important and its results and incidence are consistent with that of the literature. It also includes the historical series.

Laparoscopic treatment of colorectal dehiscence involves less aggressive options with better results or postoperative variables. The authors show that it improves the variables of hospital stay and postoperative recovery when compared to conventional surgery, without increasing the risk of implementing this approach. It should be noted that the mortality rate was lower in the group with the lowest aggression.

The article exposes clear and valid limitations from the care and pragmatic point of view. The conclusion is clear, concise, and valid for implementation in the daily practice.

It is a study with an experience that can be extrapolated to the daily clinical practice of any colorectal surgeon.

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