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Results of videolaparoscopic surgical treatment of diverticular disease of the colon

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ABSTRACT

Introduction: Diverticular disease of the colon (DDC) is the fifth most common gastrointestinal disease in developed Western countries, with mortality rates of 2.5 per 100,000 inhabitants per year.
Objective: The objective of this study is to compare the occurrence of complications, conversion rate, use of stoma, deaths and time of hospitalization among patients undergoing rectosigmoidectomy for DDC and patients undergoing the same surgery for other reasons.
Method: This was an observational retrospective comparative study. This study was approved by the ethics committee of the Hospital Felicio Rocho – Minas Gerais, Brazil – and the data were obtained from the same hospital database.
Results: The groups were classified according to age, gender, presence of comorbidities, and ASA classification. There was no evidence indicating a significant difference between groups. In this analysis, no perioperative complications were observed and there was no need for a stoma, and no deaths or fistulas occurred.
Conclusion: Elective laparoscopic surgical treatment of DDC in the analyzed group showed no difference in complications, duration of surgery and hospitalization time versus control group. Therefore, the laparoscopic surgical treatment of diverticular disease translates into an excellent tool for both the surgeon and the patient.

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Resultados do tratamento cirúrgico videolaparoscópico da doença diverticular do cólon

Palavras-chave:
Doença diverticular
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RESUMO

Introdução: A Doença Diverticular do Cólon (DDC) é a quinta doença gastrointestinal mais frequente nos países desenvolvidos do ocidente com índices de mortalidade de 2,5 por 100.000 habitantes por ano.

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Objetivo: O objetivo desse estudo é comparar a ocorrência de complicações, taxa de conversão, utilização de estoma, óbito e tempo de internação entre pacientes submetidos a retossigmoidectomia por DDC e pacientes submetidos ao mesmo procedimento cirúrgico por outras causas.
Método: Trata-se de um estudo comparativo, retrospectivo observacional. Este estudo foi aprovado pelo comitê de ética do Hospital Felício Rocho - Minas Gerais, Brasil - e os dados foram obtidos no banco de dados do mesmo hospital.
Resultados: Os grupos foram classificados em relação à idade, sexo, presença ou não de comorbidades e classificação ASA. Observou-se que não existem evidências indicando diferença significativa entre os grupos. Não houveram complicações per-operatórias, necessidade de estoma, bem como óbitos ou fístulas nesta análise.
Conclusão: O tratamento cirúrgico eletivo videolaparoscópico da DDC no grupo analisado não apresentou diferença quanto às complicações, o tempo de cirurgia e o tempo de internação em relação ao grupo controle. Portanto, o tratamento cirúrgico laparoscópico da doença diverticular traduz-se em excelente ferramenta tanto para o cirurgião quanto para o paciente.

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Introduction

Diverticular disease of the colon (DDC) is the fifth most common gastrointestinal disease in developed Western countries and courses with an estimated mortality rate of 2.5 per 100,000 inhabitants per year.[1,2]

About 10–25% of patients with DDC will develop diverticulitis and its associated complications.[3] The sigmoid is the most affected segment and is involved in 90% of cases.[4]

The American Society of Colorectal Surgeons (ASCRS) recommends that the elective surgical treatment of DDC is based on the evaluation of each case, taking into account the patient's age, clinical conditions, and the severity of his/her diverticulitis crisis and persistent symptoms after conservative treatment of an acute episode.[5–8]

With the development of videolaparoscopic techniques (VL) in the 1990s, this access has been used for the treatment of complicated DDC, or in cases with recurrent diverticulitis attacks. In a study of 1118 patients undergoing laparoscopic colectomy, DDC was the reason for the indication in 27% of cases.[9]

In a multicenter study conducted in Brazil in 2007 and involving 4744 patients undergoing colorectal laparoscopic surgery, diverticular disease was the cause of surgical indication in 40.0% of patients.[10]

During the same period, Queiroz et al. conducted a study in the state of Minas Gerais; in a total of 503 colorectal surgery procedures by videolaparoscopic access, 31 cases were of patients with DDC.[11]

Although laparoscopy is a method of treatment with proven benefits, for example, less blood loss, less postoperative pain, shorter recovery time and less days of hospitalization, besides a faster return to professional activities when compared to conventional surgery, many authors report greater difficulties in carrying out a left colectomy in patients with DDC versus patients who underwent the same surgery for other reasons, such as neoplastic diseases.[12–14]

Despite all the benefits already known with the use of VL colectomy compared to the conventional method, only 5–10% of the procedures are carried out by that route. Of this small percentage, less than half are related to the treatment of DDC, even taking into account that this condition is more prevalent than colorectal cancer (CRC).

This greater technical difficulty, reported by some authors, could be attributed to the formation of adhesions and local fibrosis, secondary to a chronic or recurrent inflammatory process. There are few studies that have examined whether the rate of complications, technical difficulties, and of conversion observed in patients submitted to left colectomy/rectosigmoidectomy is higher in patients operated for DDC versus patients undergoing the same procedure, but for other causes, such as colorectal cancer.

Objective

The aim of this study is to compare the occurrence of complications, conversion rate, use of a stoma, deaths and hospital stay among patients undergoing rectosigmoidectomy for DDC and patients undergoing the same surgery for other reasons.

Method

This is a comparative, observational, retrospective study. This study was approved by the ethics committee of the Hospital Felicio Rocho (HFR) under the protocol 37720114.9.0000.5125. Data were obtained from the database of the Coloproctology Service of Hospital Felicio Rocho – Minas Gerais, Brazil. Patients of genders, aged over 18 years, and undergoing elective laparoscopic surgical treatment in this hospital between Jan/2008 and Dec/2013 were included. Operated patients in the emergency department and those who underwent previous colorectal surgery were excluded. And in the group of cancer patients (used as a control group), patients with stage

Table 1 – Patients' characteristics.

	Group I	Group II	*p*-Value	*p*′
N	33	30		
Gender, M:F	22:11 (66%:34%)	12:18 (40%:60%)	0.200	
Age	55.45 (33–70)	59.46 (42–79)	0.510	0.134
Comorbidities	SAH (15; 42.85%)	SAH (10; 30%)		
	COPD (2; 5.72%)	COPD (2; 6.66%)		
	DM (3; 8.57%)	DM (1; 3.33%)		
	Other (14; 42.42%)	Other (10; 33.33%)		
ASA	I (13; 37.14%)	I (7; 23.34%)	0.470	
	II (21; 60%)	II (21; 70%)		
	III (1; 2.85%)	III (2; 6.66%)		

ASA, American Society of Anesthesiology; SAH, systemic arterial hypertension; COPD, chronic obstructive pulmonar disease; DM, diabetes mellitus.

IV tumors, locally invasive, and synchronous tumors were excluded.

Sixty-five patients undergoing videolaparoscopic rectosigmoidectomy (VLRS) were included, of whom 35 had sigmoid DDC (Group I) and 30 had sigmoid CRC, T stage (is-3)N(0–1)M0 (Group II).

In group I, two patients were excluded because they had been previously treated with total colectomy with ileorectal anastomosis due to a diffuse involvement of the colon by the diverticular disease with areas of fibrosis, hemorrhagic areas, and microabscess.

In group II, three patients had their laparoscopic procedure converted to laparotomy due to the difficulty of exposure and adhesions and thus were excluded.

All patients underwent an anterograde bowel cleansing with ingestion of 90 ml of disodium phosphate (oral solution) divided into 2 parts, with an interval of 6 h. Parenteral antibiotic prophylaxis with ceftriaxone 2 g and metronidazole 1.5 g was administered 30 min before the procedure, and antithrombotic prophylaxis with enoxaparin 40 mg was also carried out.

The procedure was performed with the patient supine on the table with split leggings after urinary catheterization and a nasogastric probe (with removal after the surgery). The operations began by an umbilical puncture with a Veress needle, followed by pneumoperitoneum, placement of 5 portals (one of 12 mm, two of 10 mm and two of 5 mm): one portal for the optical device, two portals to the right and two other to the left of the patient, and the pneumoperitoneum was maintained at a pressure of 15 mmHg.

Trendelenburg position was used to obtain a proper exposure, and the dissection was performed in a medial-lateral direction, starting at the inferior mesenteric vein (IMV), followed by the release of the mesocolon of the body and tail of the pancreas. Next, ligature and section of the inferior mesenteric artery (IMA) were carried out, with subsequent release of the colon from the parietocolic gutter and systematic release of the splenic flexure.

In male patients with DDC (Group I), whenever it was technically possible, the superior rectal artery was preserved, in order to get better results from the point of view of sexual function, and also to decrease the chance of an anastomotic dehiscence.

The two groups were compared with respect to age, gender, presence of comorbidities, and ASA classification, with no difference between groups (Table 1). The variables analyzed and compared between groups were surgical time, the length of hospital stay, the occurrence of peri- and postoperative complications, the conversion rate, the need for a stoma, and deaths.

The data analysis was performed by statistical methods using the Kolmogorov–Smirnov test, the non-parametric Mann–Whitney test (a hypothesis testing tool), and the Fisher's exact test and the *t* test for independent samples.

To evaluate the normality of variables "length of hospital stay" and "surgical time," the Kolmogorov–Smirnov test was conducted. In this test, *p*-values greater than 0.10 indicate the normality of variables. As can be seen in Table 2, no normality occurred for the variables "length of hospital stay" and "surgery time." For such situations, the non-parametric Mann–Whitney test for hypothesis testing was carried out, in order to assess the presence of a significant difference ($p < 0.05$) between the elapsed time in both groups.

To evaluate the existence of a significant difference ($p < 0.05$) between the hospitalization times, a *t*-test for independent samples was conducted.

Results

The groups were classified according to age, gender, presence of comorbidities and ASA classification (Table 1).

Table 2 – Statistical analysis of continuous variables.

	Normality test (*p*-value)	Comparison between Groups I and II (*p*-value)
Hospital stay	0.047	0.583
Surgery time	0.035	0.229

Table 3 – Chronology.

	Group I	Group II
N	35	30
Hospital stay	4.57 (2–12)	5.23 (2–12)
Surgery time (hours)	03:53 (02:30–05:10)	04:05 (02:00–06:00)

Table 4 – Statistical analysis of postoperatory complications.

	Group I	Group II	*p*-Value
Postoperatory complications	Urinary retention (2; 5.72%)	Paralytic ileum (1; 3.33%)	0.558

The length of hospital stay ranged from 2 to 12 days: 4.5 days in group I and 5.2 days in group II (Table 3). There is no evidence indicating a significant difference between the groups (Table 2).

Surgical time ranged from 2 h 30 min to 5 h 10 min in the DDC group (mean, 3 h 52 m) and from 2 h 00 min to 6 h 00 min in the CRC group (mean, 4 h 07 min). The results indicate that there is no evidence of a difference in surgery time between groups (Table 2).

Conversion to open surgery occurred in three of 63 (4.63%) operated patients and all cases occurred in group II. Although the conversion rate was higher in group II, the sample size did not allow an assessment of the risk involved, and it was not possible to calculate the odds ratio or even to evaluate the existence of association by the use of the Fisher's exact test. Thus, a larger sample is required in order to allow an assessment of the presence of a relationship.

In this analysis, no intraoperative complications occurred, and there was no need for a stoma; on the other hand, no deaths or fistulas occurred.

Finally, to study the occurrence of postoperative complications between groups, the Fisher's exact test was performed (Table 4). The *p*-value was 0.558, indicating that there is also no evidence indicating an association between the variables in question.

Discussion

Studies have shown that the experience gathered with the use of videolaparoscopic access in the elective surgical treatment of DDC caused this technique to become the preferred procedure for treating such a condition.[15]

The sample assessed in our study showed homogeneity among the evaluated groups and similarity among the evaluated individuals, in the setting of better control criteria.

It was observed that there were no differences in the occurrence of deaths and in stoma rates among groups, although some studies disagree with this finding, stating that the practice of colectomy for DDC increases both morbidity and mortality. The most recent studies agree with our findings,[16–19] considering that they had shown that intestinal bypass increases morbidity (surgical site infection, DVT, AKI, sepsis, etc.), reoperation rate and mortality rate of those patients undergoing colectomy without an increased risk of fistula.

Although few studies have evaluated the length of hospital stay and duration of the surgical procedure for the VLRS procedure, their results involve a statistically significant increase of both variables when related to the treatment of cancer or inflammatory disease.[20] However, our analysis showed a similarity between the length of hospital stay and duration of surgery between the analyzed groups.

In the past, some studies have shown a higher rate of peri- and postoperative complications in VLRS. However, more recent studies do not show different rates of peri- and postoperative complications. In this analysis, no patient developed stenosis or anastomotic dehiscence; furthermore, there was no need for stomata or surgical reinterventions. Schwandner et al. evaluated these outcomes and showed that laparoscopic colectomy for the treatment of diverticular disease does not imply increased morbidity, when compared to other procedures requiring the same treatment; these authors pointed as a causal factor of the occurrence of anastomotic dehiscence the implied tension, when the mobilization of the splenic flexure is not carried out.[21–23] As in other studies, the prevalence of minor complications, for instance, paralytic ileus and urinary retention, was low.[24]

Special circumstances relating to the complexity of the procedure and the presence of severe inflammation accompanied by adhesions, collections and fistulas were reported in several studies, as causes of conversion to DDC in patients treated with VLRS.[25–27] The overall conversion rate for colorectal surgery was estimated at 15.38% in a meta-analysis published in 2001.[25] The elective colectomy to prevent recurrence or progression of the disease presents conversion rates between 2% and 19.7%.[28] However, our study showed no conversions, which may be related to the experience of the surgical team, the knowledge of anatomy, and the pathology of patients.

In the USA, recently Van Arendonk et al. performed a retrospective analysis involving nearly 20% of the hospitals in that country, with an assessment of the costs of elective surgery for the treatment of diverticular disease, comparing them with the costs of other diseases that also required colectomy. In this study, 50.5% of patients had DDC and 43.48% suffered CRC. After analyzing the data, the authors concluded that the elective surgical treatment of DDC has a high rate of complications and a high cost versus surgical treatment of CRC.[20]

However, Van Arendonk et al. conducted an analysis involving the surgical modalities of laparotomy and VL, which compared patients with various comorbidities, with higher and lower scores ASA, and with different disease sites. Soon the authors obtained discrepant results pointing to better and tendentious indices for the group with CRC.

We understand that this is a retrospective study conducted in a single institution and which examined a small sample of individuals. However, the tests used for statistical analysis are specific to small samples and translate reliability.

Conclusion

Thus, we can conclude that the elective videolaparoscopic surgical treatment of DDC in the analyzed group showed no

difference in complications, duration of surgery and length of hospital stay when compared to the treatment of colorectal cancer by the same approach. In the analyzed group, the results of rectosigmoidectomy in patients with DDC were similar to those of the same procedure performed in patients with CRC.

We acknowledge that the treatment of diverticular disease is fraught with variables that allow us to carefully evaluate the individual needs of each patient; so when indicating surgery as the best therapeutic option, we should not fear or underestimate the videolaparoscopic procedure, since when well indicated, it translates into an excellent tool for both the surgeon and the patient.

Conflicts of interest

The authors declare no conflicts of interest.

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