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ORIGINAL ARTICLE

Comparison of two surgical techniques for resection of uncomplicated sigmoid volvulus: Laparoscopy or open surgical approach?



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KEYWORDS

Sigmoid volvulus;
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Summary

Aim of the study: The optimal treatment for acute sigmoid volvulus has not been defined. Our aim was to compare the results of two techniques for the management of uncomplicated sigmoid volvulus coming from two separate surgical services, which had each chosen a different technique: open surgical versus laparoscopic.

Patients and methods: Patients with sigmoid volvulus who underwent a surgical resection with immediate anastomosis, either emergency or scheduled, were included. Risk of morbidity (Dindo-Clavien criteria) and mortality (criteria of the AFC-French Association of Surgery) were evaluated.

Results: Thirteen patients in the open surgical group were operated in a 10-year period and 17 patients in the laparoscopy group were operated on in a seven-year period. The mean age (57 years in both groups) and sex ratio (0.7 versus 0.6, respectively), and the length of hospital stay (18 versus 15 days, respectively) were comparable in the two groups. The open surgical procedure was performed urgently in 62% ($n=8/13$) versus 24% ($n=4/17$) in the laparoscopic group. The two groups were comparable in terms of risk factors for mortality by AFC score. The anastomotic leak rate was 8% ($n=1/13$) for the open surgical group versus 18% ($n=3/17$) for the laparoscopic group, while serious morbidity was 15% ($n=2/13$) versus 12% ($n=2/17$). No recurrence of volvulus was observed in the open group (mean follow-up of 26 months) versus 12% ($n=2$) in the laparoscopy group (mean follow-up of 32 months).

Conclusion: We did not find any significant difference between the two techniques. But the technical simplicity and the absence of recurrence in the open surgical group emphasize the importance of this technique.

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Sigmoid volvulus consists of torsion of the sigmoid colon around the axis of its sigmoid mesenteric causing colonic obstruction [1], with strangulation that can result in ischemic necrosis, perforation and death. High fiber diet, constipation and anatomical variations (megadolichosigmoid, narrow mesenteric insertion) appear to play a role in the development of this pathology. Sigmoid volvulus occurs commonly in Africa, Asia, Eastern Europe and South America [2,3]. It is the cause of 20–50% of colonic obstructions in Africa [1,4]. Although it occurs much less frequently in Western Europe, it is still the third leading cause of colonic obstruction for adults [5]. Volvulus occurs most commonly during the eighth decade and is equally distributed between the sexes [6]. In 25–35% of cases, patients are under care in psychiatric facilities, while 10–15% are residents of nursing homes [6] thus characterizing a population of frail patients who frequently need emergency colonic surgery.

For patients who present without signs of peritonitis and gangrene, an initial attempt at non-surgical treatment by enema, sigmoidoscopy, colonoscopy or insertion of a large caliber rectal tube is justified [7]. Colonoscopic or sigmoidoscopic decompression with or without rectal tube is the best initial treatment choice. It allows visual assessment of the viability of the mucosa, but is unsuccessful in nearly 30% of cases [8]. In any case, surgical treatment is the ultimate treatment following effective detorsion of the volvulus, if other treatments have failed, or when there are signs of peritonitis or colonic ischemia/necrosis, because mortality is higher mortality for recurrent volvulus [9].

If peritonitis or colonic necrosis is present, a Hartmann resection is usually performed. In contrast, resection with immediate anastomosis represents the ideal therapeutic choice for non-complicated volvulus after reduction and decompression [10]. However, the best surgical technique has not been defined and the low number of cases makes it difficult to perform a prospective comparative study. We decided to retrospectively compare two different treatment options.

The surgical service at the Pitié-Salpêtrière Hospital has opted for primary open surgical approach that allows the volvulus to be externalized and detorsed followed by resection and side-to-side stapled anastomosis [11]. The surgical service at the Lariboisière Hospital has opted for an initial laparoscopic approach, reputed to cause less morbidity, with intracorporeal resection and stapled anastomosis.

Our goal was to compare the risks of morbidity and mortality for the two techniques as well as their results with regard to the risk of recurrence in the medium term.

Patients and methods

We retrospectively collected pre-operative and post-operative demographics, clinical data, and risk factors for mortality (AFC criteria) [12], on all patients who had undergone surgical resection followed by immediate anastomosis for sigmoid volvulus, whether emergency or scheduled, over a 10-year period at La Pitié-Salpêtrière Hospital and over a 7-year period at Lariboisière Hospital. We defined a procedure as urgent if performed during hospitalization for an acute episode. The team at La Pitié opted for an initial open surgical approach consisting of externalization of the volvulus with resection and latero-lateral stapled anastomosis (Open Group) while the Lariboisière team used an initial laparoscopic approach with resection and stapled EEA anastomosis unless conversion was necessary

(Laparoscopy Group). We compared these two surgical techniques through the evaluation of post-operative morbidity (Clavien-Dindo classification of surgical complications), the anastomotic leak rate, long-term complications, recurrence rate and mortality [13]. The Dindo-Clavien classification of complications allows analysis of even small numbers of patients because it is based on treatment need and disease-related organ dysfunction (Table 1).

For each patient in both groups, we assessed the mortality risk for colorectal surgery according to AFC criteria: age > 70 years, neurological co-morbidities, weight loss > 10%, emergency surgery. For patients with no risk factors the mortality risk is < 1%, versus 2% for one risk factor, 9% for two risk factors, 16% for three factors and 50% for patients with four risk factors [12]. To compare the two groups, we used the Chi² test; statistical significance was defined as a *P* value < 0.05.

Surgical technique

Open group: segmental resection of the sigmoid loop with stapled anastomosis via open laparotomy approach [11]

The patient is positioned supine. The operator stands on the left side with the first assistant facing him. The incision in the left iliac fossa is the mirror image of the classic McBurney muscle splitting incision. The external oblique fascia and internal oblique muscle are incised parallel with their fibers, and the peritoneum is incised between the rectus sheath and the internal oblique muscle. The redundant sigmoid loop is externalized and detorsed if necessary. The line of division of the sigmoid mesentery must lie above the level of the skin surface, to allow easy performance of the anastomosis. A stapled side-to-side colo-colic anastomosis (functional end-to-end) is performed. The insertion holes of the GIA stapler are resected with the specimen. The anastomosis is completed by application of a linear stapler. Hemostasis along the staple line is performed with 3-0 polyglactin (Vicryl) suture and the end of the side-to-side anastomosis is reinforced with two sero-muscular sutures. The mesocolic defect was not closed.

Laparoscopy group: laparoscopic approach with resection and stapled anastomosis

The patient is positioned supine with legs apart. The operator stands to the patient's right with the first assistant on his/her left side. An open supraumbilical Hasson approach is used for insertion of the first laparoscopic trocar and two 5 mm trocars are placed in the right subcostal area and left iliac fossa with a 12 mm trocar in the right iliac fossa. The mesentery is divided after coagulation using an ultracision instrument out to the rectal wall at the sites chosen for transection. The rectum is divided using an Endo GIA stapler. The sigmoid mesocolon is divided with multiple applications of an ultracision instrument up to the colonic wall at the site chosen for proximal colonic division. The specimen is extracted through a small incision at McBurney's point extending from one or the other side of the 12 mm trocar incision. The mesocolon is divided after ligature with 2-0 vicryl. A colotomy allows insertion of a circular stapler anvil. The proximal and distal colon are returned to the abdominal cavity. After re-insufflation and final peritoneal lavage, the

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