

A Novel Approach to Minimally Invasive Management of Sigmoid Volvulus

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Abstract- Resection is the most common treatment choice for sigmoid volvulus, a common complication in our region. A new minimally invasive technique for sigmoid resection with local anesthesia was done in this study. This method is invented to avoid general or regional anesthesia in high-risk patients. Nineteen patients were evaluated and then 14 were enrolled in this study. Sigmoidectomy with a left lower quadrant incision was performed and demographic data, the length of hospital stay, complications and procedure time were recorded. The mean age of participants was 65.68, and the male to female ratio was 1:2.7. The mean duration of the operation was 91.42 min. Complications include one case each of wound hematoma and wound infection. The intraoperative pain score was 1.2/10 and postoperative pain score was 2.35/10. The mean hospital staying was 8.3 days. By meticulous patient selection, sigmoidectomy under local anesthesia for sigmoid volvulus could be a surgeons' armamentarium in special situations.

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Introduction

Volvulus is a common disease in developing countries and is especially widespread in Iran. The kinds of treatment normally used include laparotomy along with resection, laparotomy plus mesosigmoidoplasty and other minimally invasive techniques (1-9). Today, minimally invasive surgery is fast growing, and so abdominal surgeons are learning towards adopting this procedure. The reasons for adopting this technique are a patient comfort, pain reduction after surgery and speedy patient recovery (1). In this study, a minimally invasive method for colon surgery in sigmoid volvulus has been examined, and the results are reported as a case-series.

Materials and Methods

In the present research, after conducting some preliminary diagnostic measures, patients with acute sigmoid volvulus, provided that they did not have any symptoms indicative of peritonitis and colon gangrene, were included in our study and detorsion of their volvulus was attempted through rigid

rectosigmoidoscopy. Next, a rectal tube was inserted in their anus and placed in the rectosigmoid colon to prevent volvulus in later days. The patients were then admitted to the hospital and were scheduled to have sigmoidectomy within a few days. For a more accurate assessment of the colon anatomy and to be certain that there was no concurrent pathology, a barium enema was done before the surgery. Patients' informed consent was obtained, and the mechanical preparations and the administration of prophylactic antibiotics based on guideline were performed. The patients underwent sigmoid resection under local anesthesia. The exclusion criteria were complicated sigmoid volvulus (perforation or gangrene), inability to manage acute volvulus with rigid sigmoidoscopy in the primary stage, high BMI>30 and previous major abdominal surgery that may let to adhesion bond and patient refuse the plan. So the informed consent was taken from all patients.

Surgical technique

About 15 minutes before the operation, 1 mg of intravenous midazolam was injected and during the

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entire operation, the anesthetist monitored the cardiopulmonary status of the patients. With the help of a monitor, the level of consciousness of patients was recorded according to the bispectral index; patients were at the conscious level range of 89-96. Every 10 min, patients were asked if they were pain-free, so in the case of any probable complications, necessary measures could be taken. During the entire operation, the maintenance fluid used was half-normal saline, which was prepared in accordance with the condition of the patients. Under local anesthesia (4 mg/kg dose of lidocaine) a 7-8 cm horizontal incision was made in the left lower quadrant (LLQ) area of the abdomen (Figure 1). For complete anesthesia, when making incisions in each of the anatomic layers of the abdominal wall, a little lidocaine was infiltrated. After opening the peritoneum, the surgeon entered two fingers into the abdomen in order to touch and identify the sigmoid, which was in the rectal tube. Then, the surgeon brought the intestine out of the abdominal wall opening (Figure 2). At this stage, some lidocaine was infiltrated in the mesosigmoid to make the operation completely painless. The resection of sigmoid was attempted out outside of the abdomen (Figure 3), and the two ends of the intestine were anastomosed end to end. After reconstruction of the mesosigmoid defect, the intestines were returned to the abdomen. At this stage, some lidocaine was injected into the abdominal wall in layers, and the abdominal wall was reconstructed anatomically. To manage post-operative pain, 2 mg of morphine was injected intravenously. Patients were ambulated one day after the surgery and then afterward a liquid diet was initiated. The patients were discharged from the hospital within the next few days after undergoing this food regimen and assurance of their full recovery.



Figure 1. Under local anesthesia (4 mg/kg dose of lidocaine) a 7-8 cm horizontal incision was made in the left lower quadrant (LLQ) area of the abdomen.



Figure 2. The surgeon brought the intestine out of the abdominal wall opening.

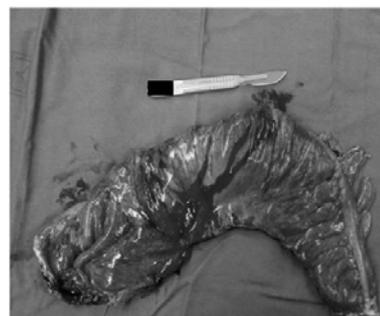


Figure 3. The resection of sigmoid was attempted out outside of the abdomen

Results

Nineteen patients visited the surgery emergency room of Ghaem and Mehr hospitals between the years 2006 and 2011. Three of these patients were eliminated from the study because they had BMIs above 35. One other patient was not included in the study, as this patient could not endure the entire surgical and anesthetic process. Another patient was excluded from the study due to widespread adhesions due to previous operations. Hence, fourteen patients, of whom 11 (78%) were males and 3 females (22%), participated in our study. The mean age of the patients was 65.85. The duration of the surgery lasted on average 91.42 ± 20.65 min. Mean pain level was estimated based on the visual analog scale (1.2/10 points peri-operative), which, when estimated based on this same scale post-operatively was 2.35/10. The mean time taken for the patients to return to work was 17.5 ± 2.5 days. The total mean length of stay (LOS) in the hospital was 12.1 ± 6.4 days, and the average hospital stay post-operative was 8.3 ± 5.8 days. The duration of the post-operative ileus, which ends with the first instance of passing intestinal gas and stool, was 51.4 ± 11.5 hours. The amount of bleeding during the operation was on average about 67.8 ± 17.7 cc, which was estimated based on the weight of gases contaminated with blood. The average length of the

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sigmoid, which was resected based on the surgeon's opinion, was 14.66 ± 3.8 cm.

Complications

Two patients (14%) were repatriated with complaints of an infection of their lesion and so were given appropriate treatment. They recovered without the need for another surgery. Furthermore, one (7%) patient suffered from pneumonia post-operative but made a complete recovery through medication.

Short-term, one-month follow-up of the patients did not show any cases of anastomosis leakage or colonic fistula. During the long-term, six-month follow-up of the patients, no instances of anatomic obstruction or further volvulus were observed.

Discussion

Today, surgeons are leaning towards minimally invasive methods (1-9). As a result, colon surgery is now done routinely through laparoscopic methods, which have brought about excellent results. Generally speaking, minimally invasive surgery aims at reducing post-op pain and ensuring the speedy recovery of the patients and occurrence of fewer complications of lesions in comparison with open surgery (1). However, these methods have certain disadvantages as well, the main argument being the higher cost of performing these surgeries compared to open surgery. Nevertheless, with the reduction of length of hospital stay, total costs will be approximately the same as those of open surgery (1). Moreover, colon surgery with laparoscopy entails complete anesthetization of patients, and it is not possible to use the laparoscopic technique with local anesthesia. On the other hand, patients suffering from sigmoid volvulus are usually elderly and are likely to have cardiopulmonary or other diseases, which make surgery under anesthesia too hazardous. Therefore, a method which can eliminate the background conditions of the patients' suffering from sigmoid volvulus, including long sigmoid, seems to be an ideal method. The present study was an investigation of an economical method of performing colectomy in patients with sigmoid volvulus. The results of the surgery were very satisfactory and considering postoperative pain; patients expressed very high satisfaction. In comparison with laparoscopic methods, this surgery is less expensive, and the length of hospital stay is almost the same. In a study done by Vwstuebez *et al.*, investigating sigmoidectomy with the SILS method in patients with diverticulitis, they

concluded similar results as those in our study regarding the length of hospital stay and operation duration (1). The literature that we have surveyed has shown the same results; moreover, there are many statistical similarities between these different studies (7-9). However, unfortunately, most of these studies are limited to case reports and case series, and there have not been any researches done on large numbers of participants.

In addition, most studies have been conducted on the diverticular sigmoid, while the present study investigated the volvulus sigmoid, which is a rather common disease in occidental countries. It seems that the spread of this disease is less common in other parts of the world compared to our region. Therefore, this method of surgery can be used for patients needing sigmoidectomy with non-malignant causes, such as volvulus sigmoid. Obviously, in malignant cases, due to the need for lymphadenectomy and a more thorough examination of the abdominal cavity, surgical methods with general anesthesia and a larger incision are recommended. This method is less costly and can especially be suitable in developing countries, where volvulus sigmoid is more widespread. To the best knowledge of the researcher, there have not been any similar studies previously conducted, and this kind of surgery is, in its own way, considered to be an innovative procedure of sigmoid colectomy.

Conducting sigmoidectomy under local anesthesia and with an LLQ horizontal incision after sigmoid detorsion was an appropriate method for our patients in need of sigmoidectomy due to volvulus sigmoid. It is a less costly procedure, has a similar convalescence period and fewer complications in comparison with other methods. Moreover, this method could be an alternative approach in special situations.

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