

Minilaparoscopic Appendectomy for Acute Appendicitis

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ABSTRACT

Background: Minilaparoscopic appendectomy for appendicitis is not a well-established procedure. This approach provides less abdominal wall trauma, fewer complications, and excellent cosmetic results. Our aim was to show the feasibility and safety of the minilaparoscopic approach.

Methods: Minilaparoscopic appendectomy was performed in 37 patients. Two 2.2-mm trocars were used to manipulate a 2.2-mm, 0-degree laparoscope and for grasper access. A 5-mm trocar was used for the ultrasonic scalpel.

Results: No deaths occurred. In 3 patients (8%), appendectomy was aborted due to pathology of the ovary. Conversion to the open approach occurred in 2.7% of patients. The average operating time was 34 minutes (range, 15 to 80), and the median length of hospital stay was 1.2 day (range, 1 to 5).

Conclusions: The minilaparoscopic approach a) has the same advantages as the conventional laparoscopic approach in terms of better diagnostic accuracy and safety; b) a low incidence of complications; and c) yields excellent cosmetic results.

Key Words: Minilaparoscopy, Appendicitis.

INTRODUCTION

The role of minilaparoscopic appendectomy for acute appendicitis is not well established. Prospective studies have shown the superiority of laparoscopic appendectomy in the treatment of acute appendicitis.¹⁻⁴ However, this technique has not yet gained widespread acceptance because of its longer operative time and lower cost effectiveness when compared with the open approach. Moreover, although recent retrospective studies have shown that laparoscopic appendectomy is associated with a significantly shorter hospital stay,⁵⁻⁷ other reports demonstrate no significant difference in hospital stay when the laparoscopic and the open approach were compared.⁸

The minilaparoscopic approach is associated with less abdominal wall trauma, a lower infection rate at the trocar site and abdominal wall hernia, and produces excellent cosmetic results. In this study, our goal was to confirm the safety and show the feasibility of the minilaparoscopic approach for the treatment of acute appendicitis.

METHODS

Between May 1999 and June 2001, a minilaparoscopic appendectomy was attempted in 37 patients with a preoperative diagnosis of acute appendicitis and without a previous history of abdominal surgeries.

All patients underwent general anesthesia. Preoperative administration of antibiotics consisted of third-generation cephalosporin. The pneumoperitoneum was created by insertion of a Veress needle through a small incision in the umbilicus. The abdominal cavity was inflated with CO₂ until intraabdominal pressure reached 14 mm Hg. A 2.2-mm trocar was placed laterally to the left rectus abdominis muscle and served to manipulate a 2.2-mm, 0-degree laparoscope. Another 5-mm trocar was placed just below the umbilical crease and was used for the ultrasonic scalpel. A third 2.2-mm trocar was placed suprapubically in the midline and was used for grasper access.

Exploration of the right lower abdominal cavity identified either an inflamed appendix or ruled out appendiceal pathology. In the presence of appendiceal pathology, the appendix was held with an atraumatic grasper and dis-

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sected with a 5-mm ultrasonic scalpel. An Endoloop was positioned at the base of the appendix and tied 1cm distally to its base. The appendix was then dissected by using an ultrasonic scalpel and placed in a sterile 8 and 1/2-size glove finger used as a specimen bag and removed through the 5-mm trocar site. The operative site was subsequently washed with 200 mL of 0.9% normal saline. All specimens were sent to the pathology laboratory for analysis. At the end of the procedure, all trocars were removed and the fascial defect at the 5-mm trocar site was repaired with absorbable sutures. No drains were placed. All skin wounds were closed with Steri-strips, and sterile dressings were applied. Postoperatively, early ambulation and early enteral intake were encouraged. Ketorolac tromethamine (10 mg IV) was administered as needed for pain control. All patients were discharged with written instructions regarding diet, physical activity, use of oral nonsteroidal anti-inflammatory drugs (NSAIDs) for pain control, and follow-up clinic visits were scheduled for 1 week, 1 month, and 6 months postoperatively.

RESULTS

The study population consisted of 37 patients, of which 7 were males and 30 were females. The average age of the patients was 26 years (range, 7 to 48). Minilaparoscopic appendectomy was initially attempted in 37 patients; however, it was only completed in 31 (84%). In 2 patients (5.3%), the procedure was completed with the conventional laparoscopic approach, because both patients had a perforated appendix. Both patients were operated on with larger trocars and instruments because this made it safer to manipulate and resect the appendix and to wash the abdominal cavity. In 1 patient (2.7%), the procedure was converted to an open approach through a midline incision due to diffuse fecal peritonitis as a consequence of a ruptured appendix. In 3 patients (8%), an appendectomy was not performed because of pathology confined to the ovary. No deaths have occurred. One wound infection occurred at the umbilical trocar site, which was treated conservatively. During the extraction of the specimen through the 2.2-mm umbilical trocar, the specimen bag ruptured and the inflamed appendix contaminated the abdominal wall.

Of the 31 patients, four patients (13%) had a normal appendix, 26 patients (84%) had acute appendicitis, and 1 patient (3%) had a perforated appendix. The average operating time was 34 minutes (range, 15 to 80), and the median length of stay was 1.2 days (range, 1 to 5). Postoperative pain management consisted of 2 doses of 10 mg

of ketorolac tromethamine given intravenously. In all patients, wounds resulting from trocar placement healed well.

DISCUSSION

Previous studies have confirmed the superiority of laparoscopic appendectomy in the treatment of acute appendicitis.^{1,8-11} It is associated with decreased postoperative pain, a shorter length of hospitalization, a faster return to normal activity, an early resumption of dietary intake, and fast resolution of postoperative ileus.^{10,12} However, this technique has not yet gained widespread acceptance because of its longer operative time and higher cost compared with the open approach. In a prospective, randomized study of 50 patients, Minnè et al¹³ showed that the laparoscopic approach did not offer any improved benefits compared with the open approach for the routine patient with acute appendicitis. Nevertheless, we believe that the laparoscopic approach allows good exploration of the abdominal cavity and may be helpful in ruling out different pathological states. In our experience, minilaparoscopic exploration of the abdominal cavity diagnosed pathology of the ovary in 8% of patients. In addition, the laparoscopic approach to acute appendicitis is safer in fertile women. It has been shown that 80% of women who underwent an open appendectomy, compared with 10% of women treated with laparoscopic appendectomy, may develop adhesions that in fact may be responsible for the infertility or chronic abdominal pain, or both.¹⁴

Based on our experience, the procedure was completed with the conventional laparoscopic approach in 2 patients (5.3%) because of a perforated appendix. We have learned that it was safer to insert bigger trocars and instruments to manipulate and resect the appendix, and also wash the abdominal cavity. We believe that converting to conventional laparoscopy was not a technical regression because the outcome did not differ from the outcome in those who underwent the minilaparoscopic appendectomy. Our conversion rate is similar to that described by most authors.^{11,15,16}

It is generally true that the cost of laparoscopic appendectomy is higher than that of open appendectomy. Although shorter hospitalization, less pain medications, and better patient compliance are well-established benefits associated with laparoscopic treatment, the financial burden associated with it in the long-term is also well established. Sterile use of finger cut gloves instead of sterile specimen containers and use of nondisposable trocars and instruments may contribute greatly to the reduction in cost. The

ultrasonic scalpel is an essential tool that possesses great advantages. It can be used multiple times; it is versatile and can be used for other minimally invasive procedures, thus lowering its overall cost. It minimizes the use of clips and sutures, therefore reducing operating time.

The benefits of the laparoscopic approach in terms of better diagnostic accuracy and safety, especially for women of childbearing age, outweighs the disadvantage of a longer average operative time of about 17 minutes.^{9,17} In terms of advantages associated with the use of the minilaparoscopic approach, a reduction in abdominal wall trauma and a decrease in the number of complications, such as infection of the trocar site and abdominal wall hernia have been reported elsewhere.^{18–20} Moreover, the smaller dimension of the trocars accounts for approximately a 70% reduction in postoperative pain, compared with that for the conventional laparoscopic approach.²¹

We have not observed abdominal wall hernia after the minilaparoscopic appendectomy. One patient, however, developed a wound infection at the umbilical trocar site that resulted from direct contact of the inflamed appendix with the abdominal wall after rupture of the finger bag. To avoid such a complication in the future, we modified the technique by extracting the bag through the 5-mm suprapubic incision, and since then no similar complications have occurred. Postoperative pain was controlled well with small doses of intravenous analgesics. The wounds from trocar placement healed well, and the general condition of all patients was excellent at 6-month follow-up.

CONCLUSION

This study shows that the minilaparoscopic approach has the same advantages as the conventional approach in terms of better diagnostic accuracy and safety, especially for women of childbearing age. In addition, it has a very low incidence of complications

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