

Single Incision Laparoscopic Assisted Appendectomy: Experience in Paediatric Patients

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Abstract

Background: Laparoscopic appendectomy is considered as a superior alternative to open appendectomy. Usual laparoscopic appendectomy is performed with the three port system. In this study, we performed a unique single transumbilical incision two-port laparoscopic assisted appendectomy with the aim to reduce postoperative complications as well as improving cosmesis and patients' satisfaction. **Methods:** From January 2010 to December 2011, 136 patients were admitted with clinically diagnosed acute appendicitis and were randomly assigned to single transumbilical incision two-port laparoscopic assisted appendectomy. **Result:** Transumbilical single incision two-port laparoscopic assisted appendectomy was attempted in all patients (52 males and 84 females) with an average age of 8.5 years. Transumbilical single incision two-port laparoscopic-assisted appendectomy was successfully completed in 134 patients. In two patients, another additional port was required due to sever adhesion of the appendix. Mean operation time was 25.2 min (range, 17–38), and mean postoperative hospital stay was 2 days (range 1–3). Postoperative complications were negligible. **Conclusion:** Transumbilical single incision two-port laparoscopic-assisted appendectomy appears to be a feasible and safe technique for the treatment of acute appendicitis in the paediatric setting. It allows nearly scar less abdominal surgery. **Key words:** Laparoscopy; Appendectomy; Single incision.

INTRODUCTION

Laparoscopic surgery is becoming a popular treatment option for appendicitis because it offers various benefits like better visualization, reduction of negative appendectomy, reduces postoperative pain, decrease hospital stay, and improve cosmesis.¹⁻³

In 1987, Schriber first reported laparoscopic appendectomy for the treatment of acute appendicitis.^{4,5} Since then several variation in laparoscopic appendectomy have been performed.⁶ Single incision laparoscopic surgery has been described since late 1990 and beginning with appendectomy. In recent years several technical refinements have been proposed and performed to achieve further improvement in postoperative outcome.⁷ To perform laparoscopic appendectomy most of the conventional procedure needed 3 or 4 incisions and complicated steps were required.^{6,8} In order to reduce the number of incisions and ports, operative time, postoperative pain, port site complication, and also to increase simplicity, early mobilization, early return to normal activities, improve cosmesis as well as patients

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compliance; single incision laparoscopic appendectomy is the attractive alternative to conventional multi port laparoscopic appendectomy.^{6,7,9,10}

In transumbilical single incision two-port laparoscopic assisted appendectomy, through a single incision on umbilicus (10 mm) two trocar (5 & 3 mm) are introduced and after laparoscopic skeletonization appendix is brought out through umbilical port^{5,8} and appendectomy is then completed outside the abdominal wall, using conventional technique.^{5,6,8} Single incision laparoscopic assisted appendectomy is new technique that has now been used in many centres as gold standard for appendectomy.¹¹

In this paper we are presenting our experience and assessments of the feasibility of using transumbilical single incision two-port laparoscopic assisted appendectomy to treat appendicitis in the paediatric population.

PATIENTS AND METHODS

From January 2010 to December 2011, transumbilical single incision two-port laparoscopic assisted appendectomy was planned for 136 patients that were admitted in paediatric surgery department with right lower abdominal pain suggestive of acute appendicitis. All patients were evaluated clinically and undergone laboratory investigations. Exclusion criteria were as follows: (1) Alvarado score <7; (2) Patients with complicated appendicitis with generalized peritonitis; (3) Appendicular lump or abscess formation; and (4) history of previous laparotomy. Patients received prophylactic antibiotics intravenously at the induction of anaesthesia, and standard postoperative protocol followed for all patients. All patients underwent surgery after obtaining informed written consent. In this study, all operations were performed by qualified laparoscopic surgeon.

Operative Technique

The umbilical region was kept clean preoperatively. The surgeon and the assistant stood on left side of the patient with the monitor placed on the opposite side. After general anaesthesia, access was gained via 1 cm itraumbilical incision (Figure 1) with prolene stay suture on either side of the incision. After creating pneumoperitoneum with pressure

between 8 and 10 mm of Hg, by Veress needle, a 5-mm trocar was inserted at the upper edge of the incision. A 5-mm 30 degree telescope was used to complete a full abdominal examination. After that another 3 mm trocar was inserted through the fascia at the lower edge of the incision (Figure 2).

The operating table was tilted to 30 degree Trendelenburg position and rotated up to 40 degree on left side to allow adequate exposure. Then laparoscopic grasper or non-crushing Babcock forceps was introduced in to the abdomen and right lower abdominal quadrant was explored (Figure 3). The appendix was identified, located, and tip of the appendix was grasped (Figure 4) and gently moved towards the umbilicus and subsequently delivered through the umbilical wound (Figure 5). During exteriorization process the intra peritoneal pressure was brought down to zero by allowing the gas to leak out. Coalescence of both trocar sites in one incision allows less difficult extraction of appendix.

Once the appendix was visible through umbilical incision, it was grasped by the traditional atraumatic forceps before laparoscopic forceps was released (Figure 6). An

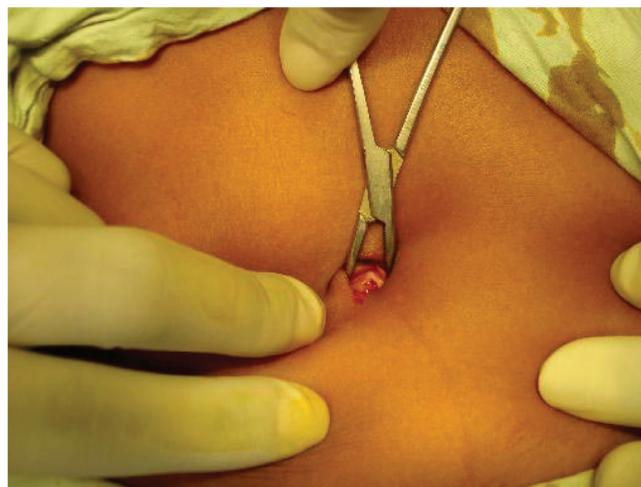


Figure 1: Small incision through umbilicus

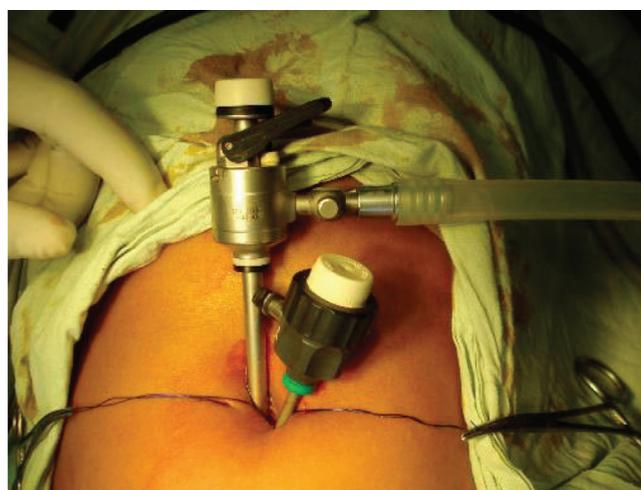


Figure 2: Two trocar through single incision



Figure 3: Laparoscopic appendectomy in progress



Figure 6: Extra-peritoneal vision of appendix



Figure 4: Tip of the appendix was grasped



Figure 7: Appendix after appendectomy

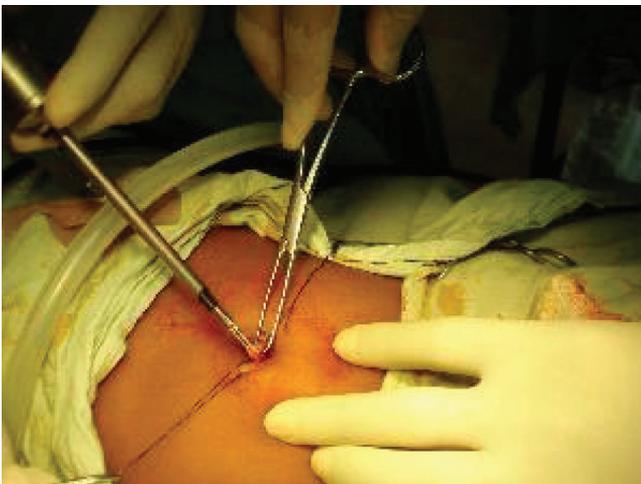


Figure 5: Appendix is delivering through umbilicus



Figure 8: Immediate postoperative scar

extracorporeal appendectomy was then easily performed under direct vision.

Then appendiceal stump was drooped back into the peritoneal cavity.

A brief re-insufflations of the abdomen was done for final inspection, peritoneal toileting, and suction. Wound was closed in layers by vicryl.

RESULTS

Transumbilical single incision two-port laparoscopic assisted appendectomy was attempted in 136 patients. There were 52 male and 84 female patients with an average age of 8.5 years (range, 4–13). Pathologic examination showed acute appendicitis in 128 cases (84.3%) and out of them gangrenous appendicitis was found in 3 cases. Eight cases (6.2%) revealed normal appendix. The various position of appendix were as follows: pelvic type 68 cases (50%), retrocolic type 44 cases (37.5%), paracolic type 20 cases (9.3%), and post ileal type in 4 cases (3.2%).

Transumbilical single incision two-port laparoscopic assisted appendectomy was successfully done in 134 cases (98.5%) and in 2 cases (1.47%), the operation was converted to the conventional three port laparoscopic appendectomy due to adhesion.

Mean operation time was 25.2 min (range. 17–38) and mean postoperative hospital stay was 2 days (range, 1–3). All patients were brought back to follow-up clinic at the end of the week, then at 4 and 8 weeks. Postoperative port-site infection occurred in 4 (2.9%) cases and treated successfully with conservative treatment. There was no wound infection or any episode of small bowel obstruction occurred in any patients. The operative findings, operative time, and other clinical details are shown in Table 1.

DISCUSSION

Since the beginning of laparoscopic appendectomy, there has continued to be a debate because of its higher cost, longer operating time^{12,13} and the fact that the combined length of the three incisions required for trocars equal the length of an open appendectomy incision. On the other hand, the open appendectomy, by virtue of its small incision, is a form of minimal access surgery. But several studies have demonstrated that the laparoscopic appendectomy resulted in an excellent exploration of the abdominal cavity, less pain, shorter hospital stay, early return to normal activity, less surgical site infection and better cosmesis.^{1–3}

We restricted the incision to the umbilicus for better cosmesis. In our experience 98.5% appendectomies were completed by using two trocars through single incision. There was a good correlation between preoperative diagnosis and post operative findings. In fact the number of normal appendices was low (6.2%).

The possibility of exploring abdominal cavity is one of the advantages of laparoscopy. Laparoscopy is not only useful for the identification and easier management of an ectopic appendix,^{8,14} but also to discover associated extra-appendiceal lesion. In 2 cases of normal appendix we looked for any ovarian pathology, gut adhesion or Meckel's diverticulum that might be the cause of right lower abdominal pain. Post-operative recovery was excellent in our series. We started oral feeding after 12 hours of operation in all cases. Hospital stay was shorter and almost all patients were discharged within 24–48 hours.

Transumbilical single incision two-port laparoscopic assisted appendectomy patients showed a more rapid return to normal work. On an average the children were able to return to unrestricted activities 7 days after operation. This advantage is unique because of no trocar was inserted in to the abdomen through the muscles.

Table 1: Showing different parameters in this series

Variables	Number	
No. of patients (136)	Male	52 (38.2%)
	Female	84 (61.7%)
Age	Average	8.5 years
	Range	4–13 years
	Pelvic	68 (50%)
Position of appendix	Retrocaecal	44(37.5%)
	Para colic	20(9.3%)
	Post ileal	4(3.2%)
Condition of appendix	Appendicits	128(96.8%)
	Normal	8(3.2%)
Operation time	Average	25.2 mins
	Range	17–38 mins
Hospital stay	Average	2 days
	range	1–3 days

From an aesthetic point of view the transumbilical incision was particularly very difficult to visualize at follow-up clinic. This is an obvious advantage, especially for the adolescent females.

However, there are few major difficulties with this new technique. As instrument and camera are inserted through the same incision, the ability to triangulate the instrument around the target is lost. External instrument clashing is another problem. In our experience this led to an initial significant increase in the operation time. With increasing exposure to the technique, operating time has been reduced significantly. Further instrumental improvements may help to reduce operating in future.

CONCLUSION

We reported our experience of transumbilical single incision two-port laparoscopic assisted appendectomy and it is feasible and safe and has become the procedure of choice for cases of acute uncomplicated appendicitis. Laparoscopic exploration of abdominal cavity may be carried out in all patients with suspected acute appendicitis. Our study shows that it is a viable alternative to open surgery and conventional three trocar laparoscopic technique for the treatment of acute uncomplicated appendicitis.

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