

Retrospective Study of Single Dose of Antibiotic in Laparoscopic Appendectomy

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Abstract

Background: Laparoscopic appendectomy for interval appendix is becoming popular among the surgeon. The aim of this study is whether a single dose of antibiotic in laparoscopic appendectomy is sufficient.

Methods: A case study of 30 cases of laparoscopic appendectomy performed with the use of single-dose per-operative antibiotics in Sri Venkateswara Institute of Medical Sciences, Tirupati, in various surgical units from year 2016 to 2017.

Results: Wound infection is present in 10% of the cases, with none of the patients suffering Grade 3 or 4 wound infections.

Conclusions: It concludes that a single dose of antibiotic is sufficient for patient undergoing laparoscopic appendectomy interval appendix.

Key words: Complications, Infection, Laparoscopic appendectomy, Single dose of antibiotic

INTRODUCTION

The vermiform appendix is a small vermiform tube of length 2–20 cm and average length of 9 cm. The diameter of appendix is about 5 mm. It constantly arises from the site at which the 3 taenia coli converge lies in the right iliac fossa.^[1] The various anatomical positions of the appendix compare the appendix with the hour hand of the clock.^[1]

Retrocecal (12 O' Clock)

This is the most common position accounting for about 65–70% of the cases. The appendix lies behind the cecum or the ascending colon.

Paracolic (11 O' Clock)

The appendix may pass upward and toward the right.

The appendix may pass upward and toward the left. It may point toward the spleen.

Here, it may lie in front of the terminal ileum (pre-ileal) or it may pass behind the terminal ileum (post-ileal).

Promontoric (3 O' Clock)

In this type, the appendix passes horizontally and toward the left, thus pointing toward the sacral promontory.

Pelvic (4 O' Clock)

This is the second most common position of the appendix, accounting for about 20% of the cases. Here, it descends into the pelvis.

Subcecal (6 O' Clock)

It may lie below the cecum and may point toward the inguinal ligament. This position is also known as the mid-inguinal position. In 1886, Fitz R of Boston correctly identified the appendix as the primary cause of right lower quadrant inflammation.^[2]

There is no unifying hypothesis regarding the etiology of acute appendicitis. Decreased dietary fiber and increased consumption of refined carbohydrates may be important.^[3]

Obstruction of the lumen of the appendix is one of the most common inciting events that lead to an attack of appendicitis. Wangenstein extensively studied the

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role of structure and function of the appendix and the role of obstruction in causing appendicitis.^[4] Based on anatomic studies, he postulated that the mucosal folds and the sphincter-like orientation of muscle fibers at the appendiceal orifice make the appendix susceptible to obstruction. The obstruction of the lumen may be caused by many causes, the common ones being:

Faecolith (most common cause), lymphoid hyperplasia, concretions, local edema of the mucosa, stricture, gallstones, external pressure bands and adhesions, twists and strangulation of appendix in hernia sac, foreign bodies, parasites: Pinworms, threadworms, and roundworms, and carcinoma cecum or carcinoid tumors in elderly population (least common).

Obstruction by any of the above causes results in a sequence of events which eventually terminate as an attack of appendicitis. The sequence of events is usually as follows.

Other Inciting Factors

Although appendiceal obstruction is widely accepted as the primary cause of appendicitis, evidence suggests that this may be only one of the many possible etiologies. First, some patients with a faecolith have a histologically normal appendix.^[5] Second, many patients with appendicitis do not have any obstruction. Intraluminal pressure is not elevated in approximately 70% of the patients having non-perforated appendicitis.^[6] In India, dysentery and abuse of purgatives also play a major role in inciting acute appendicitis.

This study is carried out to evaluate that single dose of antibiotic in laparoscopic appendectomy is sufficient in interval appendectomy.

Laparoscopic Appendectomy^[7]

Laparoscopic appendectomy was first reported by the Gynecologist Semm.^[2] The surgeon is standing to the left of the patient with the cameraperson on his right toward the patient's left shoulder. The laparoscopic trolley with monitor and other equipment is set up in front of the surgeon to the patient's right at the level of the umbilicus.

The procedure starts with the patient in the supine position and both hands tucked by the side. The pressure areas are protected, and the patient is secured to the table. Later, the table may have to be tilted in a Trendelenburg and right-side-up position to let the abdominal viscera gravitate away from the right lower quadrant. The primary, 10-mm trocar using an open method is inserted in a supraumbilical position. Two ancillary 5-mm trocars are placed under the vision and directed toward the right iliac fossa, the first one in the suprapubic area (taking care not to injure the dome of the bladder) and the other in the left iliac fossa.

A 10-mm, 30 laparoscope is used for the procedure and changed to a 5-mm laparoscope at the stage of specimen extraction through the 10-mm umbilical trocar. A diagnostic laparoscopy of the entire abdomen is performed including assessment of the degree of contamination with purulent fluid, if present. Laparoscopic grasping forceps are introduced through both the trocars. In cases when the appendix is normal, the cecum, small intestine including its mesentery, and the pelvic organs (in women) are carefully examined to look for other pathologies.

The omentum covering or attached in the region of the right iliac fossa is gently teased away to expose the appendix. If the appendix is not readily visualized, the cecum is grasped and manipulated and the taenia coli are traced toward the base of the appendix.

The tip of the appendix is held by a grasper, and mesoappendix is dissected by electric cautery up to the base of appendix. Then, two tie of thick absorbable suture material is applied, first is at the base of the appendix, and the second one is at 0.5 cm above the first one. Appendix is cut at 0.5 cm above the second tie.

The specimen is delivered out from 10 mm port. Thorough wash with a mixture of normal saline and povidone-iodine solution is given in right iliac fossa. Checked for any active bleeding. Then, all the ports are removed. Sheath in 10 mm port site is sutured by non-absorbable suture, and the skin of the three-port site is sutured by non-absorbable suture material. Clean and sterile dressing applied over stitch line.

Patients of laparoscopic appendectomy are kept postoperatively in ward for 2 days and then send home and call on the 7th post-operative day for stitch removal.

METHODS

A retrospective study of 30 cases of laparoscopic appendectomy performed with the use of single-dose per-operative antibiotics in our hospital in various surgical units from the year 2016 to 2017.

We have included cases of interval laparoscopic appendectomy and selected cases of emergency laparoscopic appendectomy excluding those whose per-operative findings were perforated appendix, gangrenous appendix, lump formation, peritonitis, and mucocele of appendix.

Inclusion Criteria

The following criteria were included in the study:

- Patient who underwent planned laparoscopic appendectomy

- Patient who underwent emergency laparoscopic appendectomy excluding those whose per-operative findings were perforated appendix, gangrenous appendix.

Exclusion Criteria

The following criteria were excluded from the study:

- Patient those who went emergency laparoscopic appendectomy having perforated appendix, gangrenous appendix
- Patient undergoing open standard appendectomy
- Patient on multiple dose of antibiotic
- Pregnant female.

These patients are given single dose of piperacillin and tazobactam 4.5 g i.v. start after induction of the patient.

The patient came for the interval appendectomy, and few cases of the acute appendicitis were included in this study. Patient previously managed conservatively for the acute appendicitis came for interval appendectomy after 1½ months. These patients were undergoing laparoscopic appendectomy. All routine investigations, blood reports, and ultrasound of abdomen were done. After that, patient post for the laparoscopic appendectomy.

RESULTS

This study of 30 cases of laparoscopic appendectomy was performed in Sri Venkateswara Institute of Medical Sciences, Tirupati, AP, in various surgical units using single dose antibiotic. This study included cases of interval laparoscopic appendectomy as well as cases of emergency laparoscopic appendectomy excluding those whose per-operative findings were perforated appendix and gangrenous appendix. Following conclusions are made:

- Appendicitis is most common in the 2nd and the 3rd decades of life
- Appendicitis is more common in the male than in female
- Most common symptom of acute appendicitis is pain in right iliac fossa, the second most common being vomiting
- The average operating time is around 35 min.
- The incidence of prolonged post-operative pain is low; most patients had post-operative pain for 1 day.
- Reducing the post-operative hospital stay helps to reduce the chance of wound infection.
- Wound infection is present in 10% of the cases, with none of the patients suffering Grade 3 or 4 wound infections.
- Thus, it can be concluded that laparoscopic appendectomy is safe and effective alternative to open surgery. It can be done with the use of single-

dose antibiotic in a selected group of patients if certain criterions are fulfilled.

- Restricting the unnecessary use of antibiotic would definitely help to reduce the emergence of resistant strains of micro-organisms.
- The rate of infusion site thrombophlebitis is reduced, and thus the associated pain and morbidity are also less.
- The post-operative hospital stay of the patients decreases.
- Reduced post-operative stay helps to reduce the rate of hospital-acquired infections.
- It also reduces the cost of treatment to patients as well as decreases the economic burden on society.

DISCUSSION

In general, the incidence of appendicitis is higher in the male than in the female. This is reflected in our study where 73.66% of the cases are males. However, the role of laparoscopy is more important in the female since it helps to visualize and also deal with any diseases of the female pelvic organs in the same setting, since in many of such cases, a correct preoperative diagnosis may be impossible or extremely difficult [Table 1].

In the present study, 23 planned laparoscopic appendectomy and 7 emergencies laparoscopic appendectomy are taken. Patients who were managed conservatively when presented with acute episode of attack of appendicitis called for interval appendectomy after 1 ½ months. From that, 13.04% of patients has wound infection who are operated in emergency condition with acute appendicitis [Table 2].

In the present study, patients who are presented with acute appendicitis are having clinical feature of fever, nausea, vomiting, and pain in the right iliac fossa. They are operated for emergency laparoscopic appendectomy. Of these, 6.67% of patients are presented with fever, 16.67% presented with nausea and vomiting, and 23.34% having pain in right iliac fossa [Table 3].

Table 1: Sex incidence

Sex	Case n=30 (%)
Male	23 (76.66)
Female	7 (23.34)
Total	30 (100)

Table 2: Type of operation

Type of operation	Planned (interval appendectomy)	Emergency
Number of patient	23	07
SSI	00	03

Table 3: Clinical features

Clinical features	Number of patient (%)
Fever	02 (6.67)
Nausea/vomiting	05 (16.67)
Pain in RIF	07 (23.34)

Table 4: Pre-operative stay

Day	Case (n=30)	SSI (%)
1	7	0 (0)
2	23	3 (13.04)
Total	30	3 (10)

*SSI: Surgical site infection

Table 5: Condition of appendix

Condition of appendix	Case (n=30)	SSI (%)
Normal	16	1 (6.25)
Tip adherent	1	0 (0)
Tip inflamed	9	0 (0)
Mildly inflamed	4	2 (50)
Total	30	3 (10)

*SSI: Surgical site infection

All of the patients had a pre-operative stay of only 1–2 days. Increasing the hospital stay has been shown to increase the risk of post-operative wound infection. Hence, pre-operative stay should be kept to minimum, only enough for the patient to become slightly familiar with the surroundings and the staff. This is of great use in the post-operative period.

Those patients who could not be accommodated on the operating lists soon after admission were usually sent home after the required investigations and then called back on the day before surgery. Reducing the hospital stay preoperatively definitely reduces the risk of post-operative wound infection [Table 4].

In the intraoperative findings, 54% were normal appendix, 3% had adherent tip, 30% had inflamed tip, and 13% were mildly inflamed [Table 5].

Only 10% of the patients had wound infection. None of the patients had any sort of discharge (Grade 3 or 4 wound infections) or wound gap. 2 of the 3 patients having wound infection had only erythema which was cured without the use of any antibiotics.

The only patient with Grade 2 wound infection had mild tenderness and required the use of oral antibiotics. The stitch removal was delayed for 2 days in this case.

Foster and others conducted a study of the role of single dose ampicillin plus sulbactam in laparoscopic

Table 6: Wound score

Number of patients with infection	Wound score (n=3)
2	Grade 1
1	Grade 2

Table 7: Swab culture of wound

Culture	Case n=03 (%)
Negative	2 (6.66)
Positive	1 (3.34)

Table 8: Post-operative hospital stay

Stay in days	Case (n=30)	SSI (%)
1	18	1 (5.55)
2	12	2 (16.67)
Total	30	3

appendicectomy in city hospital, Nottingham, England, was 8% of infection.^[8] In a study of Agakhan Hospital, wound infection rate was 8.5%. Chang *et al.* reported a wound infection rate 8.9% for laparoscopic surgery after giving prophylactic antibiotic per-operatively. This is almost equal to our infection rate (10%) [Table 6].^[9]

In the present study, 3 patients who suffered from wound infection were subjected to culture examination to find the causative organisms. 2 of the 3 patients had wound cultures negative for any organisms; the only single patient infection had *Escherichia coli* identified from her culture examination.

It was sensitive to ciprofloxacin, and the infection responded to a 3-day course of oral ciprofloxacin 500 mg bd. In this case, the stitch removal was delayed by 2 days [Table 7].

Most of the patients were kept in the hospital only till they required injectable analgesics for pain relief. As soon as they were relieved of pain and passed stool or flatus and started taking orally, they were sent at home. They were then called back on the 7th day for stitch removal.

The remaining required hospitalization. In the present study, three-fifth of the patients required hospitalization for only 1 post-operative day, and among them, only one patient get infected (5.55%) for 2 days and infection rate among them is 16.67. In a study of Agakhan Hospital, post-operative hospital stay was 2.2 days [Table 8].^[10]

CONCLUSION

It concludes that a single dose of antibiotic is sufficient for patient undergoing laparoscopic appendicectomy interval appendix.

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