### **Original Research Article**

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# Retrospective study of single dose of antibiotic in laparoscopic appendicectomy

## Shubham Ramnabhai Kotwal<sup>1\*</sup>, Jayeshkumar S. Jadav<sup>2</sup>

<sup>1</sup>Department of General Surgery, GMERS Medical College, Himmatnagar, Gujarat, India

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#### \*Correspondence:

Dr. Shubham Ramnabhai Kotwal, E-mail: Shubhamkotwal51@gmail.com

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#### **ABSTRACT**

**Background:** Laparoscopic appendicectomy for interval appendix is becoming popular among the surgeon. Aim of the study is whether a single dose of antibiotic in laparoscopic appendicectomy is sufficient.

**Methods:** A case study of 30 cases of laparoscopic appendicectomy performed with the use of single dose peroperative antibiotics in Guru Gobind Singh Hospital, Jamnagar in various surgical units from year 2015-2016.

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

**Conclusions:** It conclude that a single dose of antibiotic is sufficient for patient undergoing laparoscopic appendicectomy interval appendix.

Keywords: Complications, Infection, Laparoscopic appendicectomy, Single dose of antibiotic

#### INTRODUCTION

The vermiform appendix is a small vermain tube of length 2-20 cm, of average length is 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.<sup>1</sup> The various anatomical positions of the appendix, comparing the appendix with the hour hand of the clock.<sup>1</sup>

#### Retrocaecal (12 O'clock)

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

#### Paracolic (11 O'clock)

The appendix may pass upwards and towards the right.

#### Pre-ileal and post-ileal (2 O'clock)

The appendix may pass upwards and towards the left. It may point towards 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 towards the left, thus pointing towards 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.

<sup>&</sup>lt;sup>2</sup>Department of General Surgery, Government Medical College, Surat, Gujarat, India

#### Subcaecal (6 O'clock)

It may lie below the caecum and may point towards 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.<sup>2</sup>

There is no unifying hypothesis regarding the aetiology of acute appendicitis. Decreased dietary fibre and increased consumption of refined carbohydrates may be important.<sup>3</sup>

Obstruction of the lumen of the appendix is one of the most common inciting events that lead to an attack of appendicitis. Wangensteen extensively studied the role of structure and function of the appendix and the role of obstruction in causing appendicitis. Based on anatomic studies, he postulated that the mucosal folds and the sphincter-like orientation of muscle fibres 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 oedema of the mucosa, stricture, gall stones, external pressure bands and adhesions, twists and strangulation of appendix in hernia sac, foreign bodies, parasites: pinworms, thread worms, round worms; carcinoma caecum or carcinoid tumours 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 aetiologies. First, some patients with a faecolith have a histologically normal appendix.<sup>5</sup> Second, many patients with appendicitis do not have any obstruction. Intra-luminal pressure is not elevated in approximately 70 % of the patients having non-perforated appendicitis.<sup>6</sup> 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 laparoscoic appendicectomy is sufficient in interval appendicectomy.

#### Laparoscopic appendicectomy<sup>7</sup>

Laparoscopic appendectomy was first reported by the Gynecologist Semm K.<sup>2</sup> The surgeon is standing to the left of the patient with the cameraperson on his right towards 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 supra-umbilical position. Two ancillary 5-mm trocars are placed under vision and directed towards 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 via 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 caecum, small intestine including its mesentery and (in women) the pelvic organs are carefully examined to look for other pathology.

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 caecum is grasped, manipulated and the Taenia coli are traced towards the base of the appendix.

The tip of the appendix is hold by a grasper and mesoappendix is dissected by electric cautery up to base of appendix. Then two tie of thick absorbable suture material is applied, first at base of appendix and 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 mixture of normal saline and povidone iodine solution is given in right illiac 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 appendicectomy are kept post operatively in ward for two days and then send home and call on 7<sup>th</sup> post-operative day for stitch removal.

#### **METHODS**

A retrospective study of 30 cases of laparoscopic appendicectomy performed with the use of single dose per-operative antibiotics in our hospital in various surgical units from year 2015-2016.

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

#### Inclusion criteria

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

#### Exclusion criteria

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

These patients are given single dose of piperacillin and Tazobactum 4.5 gm i.v. stat after induction of the patient.

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

#### RESULTS

In this study of 30 cases of laparoscopic appendicectomy performed in Guru Gobind Singh Government Hospital in various surgical units using single dose antibiotic. This study included cases of interval laparoscopic appendicectomy as well as cases of emergency laparoscopic appendicectomy excluding those whose per operative findings were perforated appendix, gangrenous appendix. Following conclusions are made:

- Appendicitis is most common in the 2<sup>nd</sup> and the 3<sup>rd</sup> decade of life
- Appendicitis is more common in the male than in the 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 minutes.
- Incidence of prolonged post-operative pain is low; most patients had post-operative pain for one day.

- Reducing the post-operative hospital stay help 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 appendicectomy is safe and effective alternative to open surgery. It can be done with the use of single dose antibiotic in 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 thrombo-phlebitis is reduced, and thus the associated pain and morbidity is 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

Generally, 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).

Table 1: Sex incidence.

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

In the present study, 23 planned laparoscopic appendicectomy and 07 emergencies laparoscopic appendicectomy are taken. Patient which were managed conservatively when presented with acute episode of attack of appendicitis, called for interval appendicectomy after one and half month. From that, 13.04% patient has wound infection which are operated in emergency condition with acute appendicitis (Table 2).

Table 2: Type of operation.

Type of operation	Planned (interval appendicectomy)	Emergency
No. of patient	23	07
SSI	00	03

In the present study, patient which are presented with acute appendicitis are having clinical feature of fever, nausea, vomiting and pain in right iliac fossa. They are operated for emergency laproscopic appendicectomy. Of these, 6.67% patient presented with fever, 16.67% presented with nausea and vomiting and 23.34% having pain in right iliac fossa (Table 3).

Table 3: Clinical features.

Clinical features	No. of patient	Percentage
Fever	02	6.67
Nausea/vomiting	05	16.67
Pain In RIF	07	23.34

All of the patients had a preoperative stay of only 1-2 days. Increasing the hospital stay has been shown to increase the risk of post-operative wound infection. Hence preoperative 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 postoperative wound infection (Table 4).

Table 4: Pre-operative stay.

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

<sup>\*</sup>SSI: Surgical site infection

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

**Table 5: Condition of appendix.** 

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

<sup>\*</sup>SSI: Surgical site infection

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 out 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 shot Ampicillin plus sulbactam in laparoscopic appendicectomy in city hospital, Nottingham, England was 8% of infection.<sup>8</sup> In study of Agakhan Hospital, wound infection rate was 8.5%. Chang, Lee and others reported a wound infection rate 8.9% for laparoscopic surgery after giving prophylactic antibiotic peroperatively. This is almost equal to our infection rate (10%) (Table 6).<sup>9</sup>

Table 6: Wound score.

No. of patients with infection	on Wound score $(n = 3)$
2	Grade 1
1	Grade 2

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

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

Table 7: Swab culture of wound.

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

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 7<sup>th</sup> day for stitch removal.

**Table 8: Post-operative hospital stay.** 

Stay in days	Case (n = 30)	SSI	Percentage
1	18	1	5.55
2	12	2	16.67
Total	30	3	10

The remaining required hospitalization. In the present study, three fifth of the patients required hospitalization for only one 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 study of Agakhan Hospital, post-operative hospital stay was 2.2 days (Table 8). <sup>10</sup>

#### **CONCLUSION**

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

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