

## Original Research Article

# Laparoscopic appendectomy versus laparoscopic assisted appendectomy: a hospital based comparative study

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### ABSTRACT

**Background:** Laparoscopic appendectomy is more expensive and time consuming as compared to open technique. On the other hand, laparoscopic assisted appendectomy has the advantages of both the open and laparoscopic methods.

**Methods:** This was a prospective comparative study of patients that underwent appendectomy by laparoscopic or laparoscopic assisted techniques.

**Results:** A total of 40 patients were selected for the study. Standard laparoscopic technique was performed in 20 patients and laparoscopic assisted appendectomy was performed in 20 patients. The average operating time was  $25.4 \pm 15$  minutes in laparoscopic assisted appendectomy while it was  $46.20 \pm 10.90$  minutes in standard laparoscopic appendectomy which was statistically significant. Mean hospital stay in group A was  $2.70 \pm 0.70$  and in group B it was  $2.10 \pm 0.70$  which was not statistically significant.

**Conclusions:** The laparoscopic-assisted method of appendix removal can be performed as efficiently as laparoscopically. It is fast and easy to perform, and it is expected to decrease the overall cost of laparoscopic appendectomy.

**Keywords:** Laparoscopy, Appendectomy, Pneumoperitoneum, Trocar, Ports

### INTRODUCTION

Appendicitis is the inflammation of the vermiform appendix.<sup>1</sup> Acute appendicitis is the most common abdominal emergency worldwide, and it is the most common cause of abdominal surgeries in all the age groups.<sup>2</sup> Appendicitis has an overall lifetime risk of 8.6% in men and 6.7% in women.

Traditionally, the treatment for appendicitis has been a right lower quadrant incision with removal of the appendix as described by Charles McBurney in 1889 and 1894.<sup>3</sup> However, during the past decade, the introduction of laparoscopy has changed this approach. The laparoscopic appendectomy has allowed surgeons to

diagnose and also treat appendicitis at the same time. The advantages of laparoscopic appendectomy include less postoperative pain and faster return to work and normal activity.<sup>4</sup> The disadvantages of the laparoscopic procedure are longer operating time and greater cost.<sup>5,6</sup> A technique to reduce operating room time and cost is a combination of the laparoscopic and open technique called the laparoscopic-assisted technique.<sup>7,8</sup> This technique allows surgeons to use the advantages of the laparoscopic method including visual diagnosis, less postoperative pain, and quicker return to work. The laparoscopic-assisted appendectomy requires less operating room time and is less costly than the traditional intracorporeal laparoscopic treatment. It offers the advantages of both the laparoscopic and the open

techniques. The present study was done to assess these conflicts. Our goal was to compare laparoscopic assisted appendectomy with laparoscopic appendectomy and to find out benefits if any.

## METHODS

The present prospective comparative study was done in the Department of Surgery, GMC Rajouri from March 2019 to February 2020. A total of 40 patients were included in the study who underwent appendectomy. The patients were divided into two groups, each group having 20 patients each. In group A, patients were operated by standard laparoscopic appendectomy while in group B, laparoscopic assisted appendectomy was done. A routine work up included the blood counts, serum urea, serum electrolytes, blood sugar, chest radiograph, abdominal radiograph, ultrasound was performed. CT scan was performed in few cases. Surgery was performed within 48 hours of admission.

### Inclusion criteria

All patients with a diagnosis of acute appendicitis based on clinical findings, laboratory tests and imaging results were considered for the study.

### Exclusion criteria

Patients with multiple previous surgeries, suspected perforated appendicitis or peri-appendiceal abscess, appendicular lump, cirrhosis, coagulation disorders and pregnancy and those not fit for general anaesthesia were excluded from the study sample.

In laparoscopic appendectomy after the creation of pneumoperitoneum, three ports were inserted, 10 mm through the infraumbilical area, 5 mm through the suprapubic position and the third port of 5 mm through the left lower quadrant. The camera was inserted through the infraumbilical port. A quick and thorough examination of the abdomen was done to exclude any other pathology.

In laparoscopic-assisted technique, pneumoperitoneum was established by open method. Laparoscope was introduced through 10 mm infraumbilical port and the diagnosis was established. A 10-mm port was placed through the abdomen over the location of the appendix in right iliac fossa. A Babcock grasper was used to clamp the appendix that was then pulled within the trocar port; the pneumoperitoneum was deflated, thus allowing the appendix to be pulled through the incision into the operating field.

The mesoappendix was dissected and vessels were ligated as in the traditional open technique. The appendiceal stump was then ligated. Once the appendix was removed, the caecum and appendiceal stump were placed within the abdomen after touching it with

Povidine-iodine swab and also the port site. The abdomen was again insufflated to check for hemostasis. Thorough peritoneal lavage was performed in all cases of peritonitis. When required, the right iliac fossa port was used for inserting the intra-abdominal drain. The trocars were removed and the fascia and peritoneum were closed.

Statistical analysis was conducted with the help of Microsoft excel and SPSS software and expressed as mean±SD. Chi square test was applied and p value <0.05 was considered significant.

## RESULTS

The present prospective comparative study was done in the Department of Surgery, GMC Rajouri from March 2019 to February 2020. A total of 40 patients were included in the study who underwent appendectomy. The patients were divided into two groups each group having 20 patients each. In group A, patients were operated by standard laparoscopic appendectomy while in group B laparoscopic assisted appendectomy was done.

The age of patients varied from 6 years to 45 years in both the groups. The mean age of the patient in laparoscopic group was 31.25±10.2 whereas mean age in laparoscopic assisted appendectomy was 28.60±9.20 (Table 1). Number of males in group A were 16 and females were 4; whereas in group B, number of male patients were 12 and number of females were 8 (Table 2).

**Table 1: Mean age of patients in both the groups.**

Variables	Group A	Group B
Mean age (years)	31.25±10.2	28.60±9.20

**Table 2: Sex differences in both the groups.**

Sex	Group A	Group B
Male	16	12
Female	4	8

**Table 3: Duration of surgery and hospital stay.**

Variables	Group A	Group B	P value
Mean duration of surgery (minutes)	46.20±10.90	25.4±15	0.001
Hospital stay (days)	2.70±0.70	2.10±0.70	0.070

The duration of surgery in group A was 46.20±10.90 minutes whereas in group B it was 25.4±15 minutes which was statistically significant (p value <0.05). Mean hospital stay in group A was 2.70±0.70 and in group B it was 2.10±0.70 which was not statistically significant (p value >0.05) (Table 3).

## DISCUSSION

The introduction of laparoscopic surgery has had a great impact in many areas of general surgery. Laparoscopic appendectomy has not been accepted by surgeons as quickly because of the longer operating time and greater cost of the laparoscopic technique when compared with the open technique. However, patients suffer less postoperative pain and have shorter hospital stays with the laparoscopic technique when compared with the open technique.

The laparoscopic assisted technique has an advantage over the open technique in that it can be utilized as a diagnostic tool as well. The laparoscopic assisted method is initially used to visualize the appendix, and thus diagnose appendicitis. In our study, the mean age of the patient in laparoscopic group was  $31.25 \pm 10.2$  whereas mean age in laparoscopic assisted appendectomy was  $28.60 \pm 9.20$ . Results were similar to a study done by Nicholson et al who showed mean age in laparoscopic group of  $36 \pm 18.2$  years and in laparoscopic assisted group of  $23.2 \pm 15.2$  years.<sup>9</sup>

The duration of surgery in group A was  $46.20 \pm 10.90$  minutes whereas in group B it was  $25.4 \pm 15$  minutes which was statistically significant (p value  $< 0.05$ ). Similarly, a study done by Nicholson et al showed mean duration of surgery of  $88.9 \pm 24.0$  minutes in laparoscopic group while it was  $70.3 \pm 17.4$  minutes in laparoscopic assisted group.<sup>9</sup> Another study done by Misauno et al showed surgery time of 60 minutes in laparoscopic group while it was 33 min in laparoscopic assisted group.<sup>10</sup> Mean hospital stay in group A was  $2.70 \pm 0.70$  and in group B it was  $2.10 \pm 0.70$ . Similarly, a study done by Aditya et al showed mean duration of hospital stay of 2 days.<sup>11</sup>

## CONCLUSION

The laparoscopic-assisted method of appendix removal can be performed as efficiently as laparoscopically, it is fast and easy to perform, and it is expected to decrease the overall cost of laparoscopic appendectomy.

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