



Comparison of the Laparoscopic Versus Open Appendectomy in the Gujarat : A Retrospective Study

KEYWORDS

Appendix, Surgery, Laparoscopy, Open surgery

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Introduction:

The appendix is a blind-ended tube connected to the cecum, from which it develops embryologically. The cecum is a pouch like structure of the colon, located at the junction of the small and the large intestines. The term "vermiform" comes from Latin and means "worm-shaped".¹

The human appendix averages 9 cm in length but can range from 2 to 20 cm. The diameter of the appendix is usually between 7 and 8 mm. The appendix is usually located in the lower right quadrant of the abdomen, near the right hip bone.² The base of the appendix is located 2 cm beneath the ileocecal valve that separates the large intestine from the small intestine. Its position within the abdomen corresponds to a point on the surface known as McBurney's point. The appendix is connected to the mesentery in the lower region of the ileum, by a short tube known as the mesoappendix.³

An appendectomy is the surgical removal of the vermiform appendix. This procedure is normally performed as an emergency procedure, when the patient is suffering from acute appendicitis. However, a 12-hour delay had no effect on outcomes, in a large retrospective study.⁴

Appendectomy may be performed laparoscopically (in minimally invasive surgery) or as an open operation. Laparoscopy is often used if the diagnosis is in doubt, or if it is desirable to hide the scars in the umbilicus or in the pubic hair line. Recovery may be a little quicker with laparoscopic surgery; the procedure is more expensive and resource-intensive than open surgery and generally takes a little longer, with the (low in most patients) additional risks associated with pneumoperitoneum (inflating the abdomen with gas).⁵ Advanced pelvic sepsis occasionally requires a lower midline laparotomy.⁶

Appendicitis is one of the most common surgical problems. One out of every 2,000 people has an appendectomy sometime during their lifetime. Treatment requires an operation to remove the infected appendix. Traditionally, the appendix is removed through an incision in the right lower abdominal wall.⁷

In most laparoscopic appendectomies, surgeons operate through 3 small incisions (each ¼ to ½ inch) while watching an enlarged image of the patient's internal organs on a television monitor. In some cases, one of the small openings may be lengthened to complete the procedure.⁸

Results may vary depending upon the type of procedure and patient's overall condition. Common advantages are:

Less postoperative pain, May shorten hospital stay, May result in a quicker return to bowel function, Quicker return to normal activity, Better cosmetic results.⁹

Open appendectomy has been a well-established and widely performed operation indicated for patients with AA. Open appendectomy carries minimal risk and has an extremely short length of hospital stay. Open appendectomy is indicated when the surgeon or patient prefers an open procedure to a laparoscopic procedure, or when the laparoscopic approach is contraindicated. Developing preoperative criteria is crucial in deciding the ideal operative approach for individual patients with AA. Young age (pediatric patients), morbid obesity, and pregnancy are no longer specific indications for an open procedure.^{10, 11}

With the increased interest and fascination with this laparoscopic technique, researchers have been studying the outcomes of both the laparoscopic and open appendectomies in order to establish a comparison between the two techniques. The main aim of this study was to investigate the differences between open and laparoscopic appendectomy (LA) in the management of acute appendicitis.

Materials and Methods

This study was conducted at city of bhuj, Gujarat. Data for all patients who underwent open or laparoscopic appendectomies between January 2009 and December 2009 were retrieved from the database. A total of 215 patients underwent appendectomies of which 135 were laparoscopic procedures, and the remaining 80 were open procedures. The decision of the method of appendectomy was entirely controlled by the operating surgeon's preference. The operating surgeons included in this study ranged from the junior residents to the consultants. Based on our inclusion and exclusion criteria, 175 patients met the inclusion criteria and were included in this study. Patients included in this study had a definitive clinical diagnosis of acute appendicitis, with an American Society of Anesthesiologists (ASA) score of 1, with no underlying comorbidities. On the contrary, a total of 25 cases were excluded from the study based on an ASA score of greater than 1, a negative diagnosis such as a ruptured ovarian cyst, and conversion of a laparoscopic procedure to an open one. A total of 15 files were not retrieved from the medical records due to technical difficulties.

Finally, a total of 120 laparoscopic and 55 open appendectomies were included in the study. The three parameters measured in this study were 1) operative time 2) hospital stay, 3) postoperative complications. The data were collected from the patient's progress sheets. The length of the

operation was obtained from the operative notes.

Results

A total of 175 patients underwent appendectomy during the study period. Of these surgeries, 120 were performed laparoscopically and 55 by open surgery based on the operating surgeon's preference. Average age and male:female ratios were similar in both groups [Table 1].

In the laparoscopic group, two patients developed complications. One patient had an intrabdominal abscess formation, while the other patient developed a pelvic collection. In the open group, two patients also had postoperative complications. One had a liver abscess formation, while the other case developed a surgical site infection [Table 2].

Table 1: Profile of the patient.

	Laparoscopic	Open
Average Age	32 years	22 years
Male:Female Ratio	64:56	33:22
Body Mass Index	24	21

Table 2: Comparisons of variables of two groups.

	Laparoscopic	Open
Mean operating time	84	65
Hospitalization days	2	2
Post-operative complication	3.2%	6.4%

Discussion

It is generally believed that minimally invasive surgeries result in less postoperative pain, fewer complication rates, and shorter recovery periods in comparison to open procedures. Appendicitis is one of the most common surgical problems.¹² In most laparoscopic appendectomies, surgeons operate through 3 small incisions (each ¼ to ½ inch) while watching an enlarged image of the patient's internal organs on a television monitor. In some cases, one of the small openings may be lengthened to complete the procedure.¹³

Over the past decade, the outcomes of laparoscopic appendectomies have compared favorably to those for open appendectomies because of decreased pain, fewer postoperative complications, shorter hospitalization, earlier mobilization, earlier return to work, and better cosmesis.¹⁴ However, despite these advantages, efforts are still being made to decrease abdominal incision and visible scars after laparoscopy. Recent research has led to the development of natural orifice transluminal endoscopic surgery (NOTES). However, numerous difficulties need to be overcome before a wider clinical application of NOTES is adopted, including complications such as the opening of hollow viscera, failed sutures, a lack of fully developed instrumentation, and the necessity of reliable cost-benefit analyses.¹⁵

The advantage of LA over the open procedure was supported by several studies. For instance, a metaanalysis had shown that LA results in earlier resumption of normal activity, less postoperative complications, and a longer operative time. Nowzaradan et al., concluded that laparoscopic appendectomies resulted in less postoperative pain, shorter hospitalization, and earlier return to normal activities. This conclusion was established following a retrospective review of 43 patients diagnosed with acute ap-

pendicitis that underwent LA. On the contrary, a number of other studies have shown that LA has marginal advantages, which are not statistically significant. As a result of this lack of consensus, this study was designed to compare the postoperative outcomes of both procedures in clinically diagnosed acute appendicitis.¹⁶

Both patient groups were comparable with respect to age and male:female ratio. In addition, each of the patients had ASA I without any additional comorbidity. These characteristics were essential so that the results obtained reflect the effects of the two surgical techniques without any interference from the patient's health condition, which could have potentially changed the outcome. Total operative time in this study was longer in the laparoscopic than in the open group. Our finding is in agreement with other studies showing similar operation times that is statistically significantly different. The difference in time seen can be attributed to several factors. LA consists of additional steps of operation such as insufflation, setting up the instruments, and making ports under direct vision.

The surgeons in this study had a stronger preference for the laparoscopic technique due to its multiple advantages. They believe that laparoscopy serves as a diagnostic tool in addition to its therapeutic use. They also believe that LA has the advantage of identifying the position of the appendix with greater precision due to the better visualization of the abdominal contents. Also in case of spillage, wash and irrigation is more safe and simple in the laparoscopic procedure. In conclusion, the overall results showed no significant difference between the laparoscopic and OAs, except for the operating time that was significantly shorter in the OAs.

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