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# Study on Laparoscopic versus Open Appendectomy: A Hospital Based Study.

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## Abstract

**Background:** The putative advantages of the laparoscopic approach are quicker and less painful recovery, fewer postoperative complications and better cosmesis. It allows better assessment of other intra-abdominal pathologies. **Subjects and Methods:** A total of 56 patients were included in the study during this period, according to the inclusion and exclusion criteria. Out of this 56 patients, 28 underwent an open appendicectomy, 28 underwent a laparoscopic appendectomy. **Results:** Average age of patients undergoing LA was 24.3 years while it was 26.2 years for those undergoing OA. The operative duration was initially longer in the LA group as compared to that in the OA group but with the learning curve it decreased to less than that of OA; The use of analgesics, average hospital stay and return of bowel movements was better in case of LAas compared to OA. **Conclusion:** The Laparoscopic appendectomy is equally safe, and can provide less postoperative morbidity in experienced hands, as open appendectomy.

**Keywords:** Appendicitis, Laparoscopic and Open Appendectomy.

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## Introduction

Appendicitis is a common surgical emergency. Appendectomy is standard treatment for appendicitis. McBurney described the operative technique for right iliac fossa pain using Gridiron incision in 1894. This remained the technique for appendectomy and did not change much until almost a century later, when in 1983, Semm described the first Laparoscopic appendectomy.[1-5] But as McBurney"s operation is well tolerated with less co-morbidity the benefits of laparoscopic appendectomy have been difficult to establish. The putative advantages of the laparoscopic approach are quicker and less painful recovery, fewer postoperative complications and better cosmesis.[6] It allows better assessment of other intra-abdominal pathologies. But because the validity of these points remains unconvincing and also because of shortage of laparoscopic sets in some hospitals, laparoscopic appendectomy is not practiced widely. Twenty years later laparoscopic appendectomy is all set to become the choice of therapeutic modality.[7] The aim of this study was to evaluate comparatively laparoscopic and open appendectomy in the treatment of appendicitis in terms of hospital stay, post-operative analgesia, post-operative recovery.

## Subjects and Methods

This present study was conducted in the Department of Surgery, Govt. Medical College Srinagar, India during the period from August 2008 to December 2013. A total of 56 patients were included in the study during this period, according to the inclusion and exclusion criteria. Out of 56, twenty eight (28) patients underwent an open appendectomy, twenty eight underwent a laparoscopic appendectomy. Demographic data, clinical features, investigations, technique, post operative pain, post operative use of analgesia, complications, scar size, return of bowel movements, starting of oral liquids, hospital stay, functional index, time to subjective full recovery and days of sick leave have been documented. And outcome has been recorded in a predesigned case record form. Return to normal activity and work was determined by questioning during postoperative clinic. Following the calculation of the sample size, this study was conducted in which 56 patients were equally distributed in equally in two treatment groups – OA and LA group. Clinically confirmed case of appendicitis means an Alvarado score of 7 or more or an equivocal score (5-6) with sonological evidence. Both emergency and elective cases were included in the study. Cases were allocated into open and laparoscopic groups based on surgeon preference.

## Results and Discussion

A total of 56 patients were included in the study during this period, according to the inclusion and exclusion criteria. Out of this 56 patients, 28 underwent an open appendectomy, 28 underwent a laparoscopic appendectomy. [Table-1] shows the average age of patients undergoing LA was 24.3 years while it was 26.2 years for those undergoing OA. [Table-2] shows the operative time was 12 minutes longer initially in the LA group as compared to that in the OA group but with time and learning curve this time gradually reduced to less than open surgery time. The difference of the mean time ultimately depends upon the experience of the surgeon the learning curve. LA was associated with early return of bowel movements, lesser analgesia use minimal wound infections and early discharges from hospital and early return to activity. Our study was comparable with the following series of articles with respect to the operative duration.[8,11,13,14]

[Figure 1] shows the Postoperative pain. It has been shown that those patients who underwent successful laparoscopic appendectomy have a better postoperative recovery. The reduced trauma to the abdominal wall is a very significant factor in postsurgical discomfort. The better mobility of the abdominal musculature and the earlier ambulation, reduce the risk of the early postoperative complications of pneumonia and embolism. Patients had less postoperative pain with LA than OA during 1st week postoperatively. Patients subjected to OA had more postoperative pain at 28 days after operation measured by VAS. 24 h after surgery pain scores were 3.71 in LA and 4.23 in OA. After 3 days average VAS scores were 1.74 for LA and 1.94 for OA. After 1 week, in LA group VAS was 1.06 and 1.22 in OA group. Thereafter it was not significant. Patients undergoing OA had low but persistent postoperative pain 4 weeks postoperatively but this may well be of no clinical significance given the values are low.

**Table 1: Age and sex incidence in present study.**

| Parameters | Laparoscopic appendicectomy group(n=28) | Open appendicectomy group(n=28) |
|---|---|---|
| Age in years | 24.3 (14-42) | 26.2 (15-46) |
| Male (%) | 13(46.4) | 12(42.9) |
| Female (%) | 15(53.6) | 16(57.1) |

**Table 2: operative duration.**

| Authors serial No. | Operative time(Mean difference) |
|---|---|
| Hensen et al 1996[8] | 23 min [63 versus 40 min] |
| Katkhouda N et al. 2005[9] | 20 min [80 versus 60 min] |
| Jamy et al 2006[10] | 20 min [80 versus 60 min] |
| Khalil J et al 2011[11] | 16.1 min[47.54 versus 31.36 min] |
| B V Gaudar et al 2011[12] | 23 min[72.5 versus 49.2 min] |
| Present study | 12 min[70 versus 58 min] |

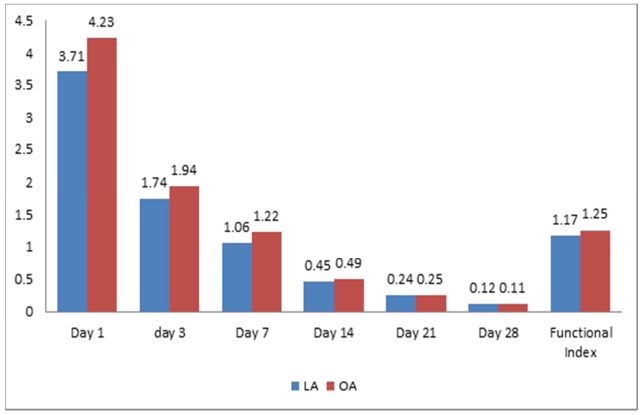


**Figure 1: Visual analogue scale and functional index**

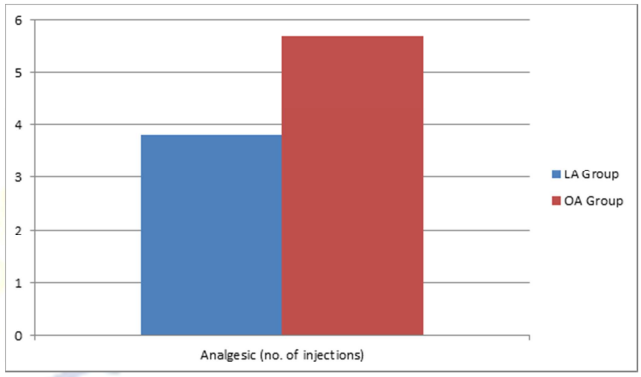


**Figure 2: Analgesic requirement**

[Figure 2] shows the analgesic requirement for postoperative pain relief in LA was about 3.8 inj. doses compared to 5.7 inj. doses in OA group. [Table2] also shows the Functional index measured at 1 week was 1.17 in LA and 1.25 in OA which was quite insignificant.

**Table 3: Outcome.**

| Variables | Laparoscopic appendicectomy group(n=28) | Open appendicectomy group(n=28) |
|---|---|---|
| Return of bowel activities | 0.73 days | 1.71 days |
| Starting of oral liquids | 0.73 days | 1.71 days |
| Wound related complications | 6.69 % | 17.7 % |
| Scar size (cm) | 2.10 | 6.12 |

[Table 3] shows the return of bowel peristalsis in LA group was 0.73 days while 1.71 days in OA group. Staring of oral liquids was earlier in LA group than in the OA group. Oral fluids were started in 0.73 days in LA and in 1.71 days in OA patients. Wound related complications, were seen more in the OA group. Wound infection regarding skin was almost negligible in LA, as the appendix was pulled into the trocar before removing. This maneuver minimizes the chances of wound infection to the skin. The risk of wound infection is less in laparoscopic appendectomy compared to the open procedure. Incidence of 6.69% in the LA group as compared to 17.7% in OA group. Complications commonly

seen were wound gaping, seroma, cellulites and fat necrosis. Scar size was more in patients who underwent OA as compared to LA. Regarding cosmetic benefit, most patients in the LA group were highly satisfied by their scar size (almost hidden) as compared to the OA group.

**Table 4: Post□operative recovery**

| Variables | Laparoscopic appendicectomy group(n=28) | Open appendicectomy group(n=28) |
|---|---|---|
| Hospital stay | 2.25 days | 3.5days |
| Full recovery | 6.57 days | 8.9days |
| Sick leave | 6.56 (3-7) days | 8.26(7-14)days |

[Table 4] shows Postoperative recovery and the hospital stay was 2.25 days in LA group while it was 3.5 in the OA group. Thus increase in length of hospital stay in OA was reduced significantly in LA. Time to full recovery was 6.57 days in LA group while 8.9 days in OA. Thereby recovery in LA was earlier than OA group. Sick leave taken by patients in LA group was 6.56 days and 8.26 days for patients in OA group. In the last two and half decades, LA has gained a lot of popularity around the world. Laparoscopy is the most preferred surgical procedure for gastro oesophageal reflux disease and gall stone disease. Similarly, the same procedure is widely applied for appendectomy. In spite of a lot of case series and a large number of randomized clinical trials over more than two and half decades, the benefits of LA over AP are still controversial.[15-17] The results of our trial clearly demonstrated the superiority of laparoscopic appendectomy over open appendectomy regarding the postoperative pain, hospital stay, the functional status and the complication rates. An early diagnosis with prompt surgery is the preferred treatment option for preventing complications such as perforation that can lead to an increase in the morbidity.Minimal invasive surgery requires extra skills orientation and technical knowledge. So, the results of many studies were influenced by the experience and technique of the surgeons.

The hospital stay in our study was less in LA than in OA and this was similar to the findings of other reported series.[10,18] Li et al,[19] meta analyses (2010) showed a lot of controversies in the hospital stay before the year 2000, but after that, it became more significant. This discrepancy may be due to the learning curve body habitus of patients and appendiceal pathology.[20] Patients with complicated appendicitis were most likely to require an extended hospital stay. An early return to full activity one week before in the LA group was observed in the study and it was comparable with the findings of other reported series.[9,21] This was supported by the Cochrane Colorectal Cancer Group.[10] Minimal trauma and less pain following LA allowed an early recovery. Fast resumption of a normal diet in LA was another added advantage due to the minimal handling of the bowel. Patients had less post□operative pain with LA than OA during 1st week post□operatively. Patients subjected to OA had more post□operative pain at 28 days after operation. This was measured by VAS. 24 h after surgery pain scores were 3.71 in LA and 4.23 in OA. After 3 days average VAS scores were 1.74 for LA and 1.94 for OA. After 1 week, in LA group VAS was 1.06 and 1.22 in OA group. Thereafter it was not significant. Patients undergoing OA had low but persistent post□operative pain 4 weeks post□operatively but this may well be of no clinical significance given the values are low. The pain was significantly less in the LA group [Figure 1] in our study. Meta analyses by Li et al,[19] in 2010 also supported this study, mainly due to the less invasive nature of the procedure. This study was not blinded and so the assessment of the pain may not be so accurate. Many literature searches and meta analyses showed that there was a risk of intra-abdominal abscess.[19,22-24] but we did not have any intra-abdominal abscesses in our study. Kathouda et al,[8] believed that mastery of the learning curve and the use of standard guide lines definitely reduced the incidence of the intra-abdominal abscesses. The reduced wound infection and the post-operative paralytic ileus can be beneficial in so many ways: less pain, an early oral intake and early mobilization, all resulting ultimately in a reduced hospital stay. In our study, the post-operative complications were 6.69% in the LA group as compared to 17.7% in the OA group.[14,25] This study was comparable to other reported series.[26,27]

## Conclusion

In conclusion, the Laparoscopic appendectomy is equally safe, and can provide less post□operative morbidity in experienced hands, as open appendectomy. Despite a prolonged operative time, LA was found to be superior to OA with respect to the postoperative pain, hospital stay, early recovery, wound infection and return to normal activity.

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