Comparision of laparascopic versus open appendectomy in rural teaching hospital of Telangana

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ABSTRACT

Background: Laparoscopic Appendectomy [LA] is widely practiced than Open Appendectomy [OA] for the management of acute appendicitis1. It is still unclear in rural settings which procedure is more preferable.

Aims and Objectives: The current study was done to compare the safety and the advantages of both the procedures in rural settings of Telangana state.

Material and methods: One hundred and eighty patients were randomly divided into two groups, OA [Open Appendectomy group] and LA [Laparoscopic Appendectomy] group. Socio demographic parameters, primary outcome measures of the patients such as post operative pain, wound infection, hospital stay, operative duration, cost of the procedure were collected and analyzed. Percentages were calculated for categorical data, numerical data was represented using mean ± S.D. Chi square test was used for comparing categorical and numerical variables.

Results: After randomization, 90 patients were in group OA, 90 patients were in group LA. The mean duration of surgery was 32.67 ± 5.229 in OA and 47.25± in LA, pain scores were less in LA than OA. Cost of the surgery was more in LA [mean average Rupees 21,453] over OA [mean average Rupees 12,865].

Conclusion: LA is safe and superior to OA with respect to lesser pain in postoperative period, less wound infection, earlier return of bowel sounds, short hospital stay and better cosmetic look. The cost of the procedure has big impact over patient's socioeconomic conditions in rural parts which should be addressed by health care providers.

Keywords: Open appendectomy, laparoscopic appendectomy, cost of surgery,

INTRODUCTION

Among abdominal surgeries, acute appendicitis is the most common with a life time incidence between 7 and 9 % and appendectomy is one of the most common surgical procedures[1].

Open Appendectomy (OA) performed through the right lower quadrant incision was first described by Charles Mc Burney in 1894 and has been safe and effective till date[2,3]. The quest for newer techniques had helped in evolution of minimally invasive laparoscopic techniques.

In 1981, Semm, a German gynecologist performed the first laparoscopic appendectomy[4]. Laparoscopic appendectomy has gained popularity in recent years and has become one of the most performed procedures using the laparoscope globally [5].

The present study was done to compare the results of open appendectomy with laparoscopic appendectomy in terms of duration of operation, post operative pain, wound infection rate, hospital stay and cost of the procedure in rural parts of Telangana state.

MATERIALS & METHODS

This prospective study was done in Department of General surgery in a rural medical college, from October 2011 to September 2013. The study protocol was submitted to ethics committee of the hospital where the study was conducted and approval was taken. The total study sample consisted of 180 subjects. These subjects were randomly divided into two groups of 90 each on random basis. One group underwent open appendectomy and other group underwent laparoscopic appendectomy. It was a randomized comparative study.

The study sample age was between 15- 60 years and both the sexes were included in the study. The diagnosis of appendicitis was made on the Mantrel's Scoring[6].

The following patients were excluded from the study: if the diagnosis of appendicitis was not clinically established, Perforated appendix, Appendicular mass, appendiceal abscess, Meckel's diverticulitis, Past history of abdominal surgeries, Contraindication to general anesthesia, pregnancy.

Written informed consent was taken. General examination done, physical examination with necessary investigations like complete blood examination, ultrasound abdomen and other routine investigations were done.

After confirmation of the diagnosis, cases were posted for open or laparoscopic appendectomy as per randomized allocation of 2 groups.

Patients were operated by two consultant senior surgeons under spinal anesthesia. General anesthesia was reserved for uncooperative patients. LA was performed through a three port technique and OA was performed through Mc Burney incision[6].

Intra operative parameters like operative time, intra operative complications and reasons for conversion of laparoscopy to open appendectomy were noted.

Post operative parameters like post operative pain, post operative ileus, wound complications like dehiscence, seroma formation, surgical site infections duration of hospital stay was checked.

Pain was analyzed using Visual Analog Scale clinically. Visual Analogue Scale[7] (VAS) is a measuring instrument that subjectively measures the amount of pain that a patient feels. Scores range from 0 to 10 and are interpreted as "no pain" to "worst possible excruciating pain". In the present study, pain was qualitatively stratified into scores of 0-4 as mild and scores of 5-10 as moderate to severe, according to Visual Analog Scale.

Each patient's hospital bill was examined with help of billing section with their IP number at the time of discharge. All the data was entered into pre-structured proforma and results were analyzed.

STATISTICAL ANALYSIS

The data was analyzed using the statistical package for social sciences (SPSS 11.0]. Continuous variables such as age, hospital stay, and operative time were presented as mean ± SD, while the categorical variables such as gender and post operative complications were expressed with frequency and percentages using 95% confidence intervals. Student's t test was used to compare the means of the continuous variables, while the categorical variables were compared by using Chi-square or Fishers exact test as appropriate. Probability equal or less than 0.05 [p<0.05] was considered significant.

RESULTS

A total of 180 patients were included in the study after meeting the criteria for study. The mean age of the patients was 26.08 ± 8.51 years in OA group and 25.52 ± 10.42 years in LA group. In OA group, there were 54 males and 36 females with male to female ratio [1.5: 1], whereas in LA group there were 63 males and 27 females with male to female ratio of [2.3:1].The two groups were comparable in terms of age, sex and WBC count as depicted in Table 1 .

Negative appendectomy rate from post operative findings was 3 [3.61] in OA and 12[15.38] in LA groups respectively. As shown in table 2, the mean operative duration was 32.67 ± 5.22 min and 47.25± 4.29 min in LA groups (p <0.001). (Table 2)

Decreased incidence of severe pain was observed in LA group than in OA group [p<0.0124]. There was earlier return of bowel sounds in LA group [44.67 hours] than in OA group [53.33 hours] [p<0.028]. (Table 2).

Wound infection rate was less in LA group 12 [13.33%] than in OA group 21 [23.33%] [p>0.118]. The total duration of hospital stay was less in LA group [mean 4.3 days] than in OA group [mean 6.27 days] [p>0.351]. The cost of LA group was higher than in OA group [average cost Rupees 21,453 vs. 12,865] [[p>0.214]. (Table 2)

Table no 1 Demographic parameters N = 180

S.no	Parameter	OA n= 90	LA n = 90	P value
1	Age [years]	26.08 ± 8.51	25.52 ± 10.42	0.721
2	Sex [male/ female]	54 / 36 [1.5 :1]	63 / 27 [2.3 :1]	0.488
3	T WBC (cells / cu.mm)	15000 ± 463.9	14313 ± 313.1	0.474

Table no 2: Comparison of primary outcomes measures

S.no	Outcome measures	OA n=90	LA n=90	P value
1	Duration of surgery Range [in min] Mean	30 -60 32.67 ±5.229	30-75 47.25 ± 4.291	**0.0148**
2	Post operative pain Scores 0-4 Scores 5 -10 Mean	84 5 3.23 ± 0.157	87 3 2.70 ± 0.167	**0.0124**
3	Time taken to return of bowel sounds (in hours)	53.33 ± 1.34	44.67 ± 1.474	**0.028**
4	Wound infection	21[23.33 %]	12 [13.33 %]	**0.118**

DISCUSSION

In recent years, LA is being widely used than OA due to acceptable consistent positive results and cosmetically acceptable incision.

The clinical presentation of acute appendicitis can overlap significantly with other clinical conditions and only 60% of them have classical presentation[8]. The misdiagnosis is more in women, due to the gynecologic pelvic diseases and female functional abnormalities. In atypical presentations, diagnostic laparoscopy should be considered early due to its easy availability, less mortality, excellent diagnostic yield and low morbidity[9]. An early diagnosis with prompt surgery is the preferred treatment for preventing complications such as perforation.

Operative duration was significantly longer in LA compared with OA, which is consistent with other studies[10, 11.] The difference of the mean time ultimately depends upon the experience of the surgeon, team competence and facilities available. LA takes more operative time due to few extra steps like setup, insufflations, trocar insertion and diagnostic laparoscopy before operating.

Post operative pain was less in LA group due to less invasive nature. Similar findings were noted in other studies[12, 13, 14.]

Early return of bowel sounds and early return to physical activity is seen in LA group, similar findings were seen in Cochrane colorectal cancer group[15]. Fast resumption to normal diet is definitive advantage due to minimal handling of bowel. In the current study early return of bowel sounds was seen in LA group than in OA group, which is consistently seen with other studies [2, 12.]

Wound infection impacts quality of life and causes convalescence causing inconvenience to the patient. The reduced wound infection and paralytic ileus is beneficial in many ways like less pain, early oral intake, early mobilization and reduced hospital stay. In the current study wound infection was less in LA group than in OA group [13,14,15.]

Hospital stay is also influenced by insurance systems, existing health care policies, social standards. Our study was comparable with existing literature regarding less hospital in LA group than in OA group. [Table no 3]

Table no 3 DURATION OF HOSPITAL STAY

S.No	Study	OA	LA
1	Present study	9.27 ± 0.452 days	4.30 ± 0.24 days
3	B V Goudar et al[12]	4.25 ± 0.67 days	2.9 ± 0.54 days
5	Adrian et al[16]	5 days	2.2 days
7	O J Mc Ahena et al [17]	4.8 days	2.2 days

The current study is first of its kind to compare the average expenditure incurred for the surgical procedure in both groups in rural settings. OA group patients had spent less amount for hospital compared to LA group [OA Rs 12,865, vs. LA Rs 21,453] [P<0.214]. This cost implication had an adverse impact on taking of LA over OA in rural settings. Similar findings were replicated in other studies across the globe. [Table no 4]

Table no 4 COST OF SURGERY

S.No	Study	OA	LA
1	Present study- Median cost [in Rs] Range	8,800 5000 – 10,000	6,033 5000 – 8,000
2	Heikken et all[18]	1700 $	4600 $
3	Mc Cahill LE et al[19]	1300 $	3000 – 3600 $

In our study, LA could be safely performed in 96% cases .The rate of conversion was 3.33 %, this was due to dense adhesions and gangrenous base. Compared to existing literature the current study has less conversion rate.

CONCLUSION :

Our study concluded that in rural settings, change in surgical approach in managing suspected appendicitis, is needed. Both the procedures are safe and effective. Despite prolonged operative time and cost of surgery, LA was found superior than OA with respect to postoperative pain, early mobilization, wound infection, hospital stay and cosmetic point. Laparoscopic appendectomy though having improved diagnostic ability, cost of the procedure has big impact over patients socioeconomic conditions in rural parts which should be addressed by health-care sectors and providers serving the society.

LIMITATIONS AND FUTURE DIRECTIONS

The study because of its limited sample size, data cannot be extrapolated and cannot be applied over general population. The choice of surgical modality should be finally decided by both patient and treating surgeon.

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How to cite this article : Shailaja A, Jayaram A. Comparision of laparascopic versus open appendectomy in rural teaching hospital of Telangana. Perspectives in Medical Research 2019; 7(1):45-48.

Sources of Support: Nil,Conflict of interest:None declared.