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# LAPAROSCOPIC AND OPEN APPENDECTOMY;
## COMPARATIVE OUTCOME

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**ABSTRACT… Objectives:** Objectives of this study are to compare the outcome of the laparoscopic with open appendectomy in terms of postoperative pain, postoperative complications and hospital stay. **Study Design:** Randomized control trial. **Place and Period of Study:** This study was held in Surgical Unit-III, Liaquat University Hospital Jamshoro, from September 2013 to March 2014. **Methodology:** This study comprised of sixty patients admitted via outpatient department, and also through casualty department of LUHMS Jamshoro/ Hyderabad. Cases were categorized into 2 groups. Group-A for open appendectomy and group-B for laparoscopic appendectomy. Comprehensive History was obtained from each patient. Right iliac fossa site was particularly assessed for tenderness assessment at Mc: Burney's point rigidity rebound tenderness and documented through proforma. A comprehensive review was as well performed to observe any co-morbidity. Inclusion criteria comprised of all those patients of acute appendicitis who give written consent for study after counseling, irrespective of their age and sex. Criteria for exclusion included each patient with aspects of specified peritonitis, cases with obvious mass within right iliac fossa as well as cases with pre-operative history of lower abdomen or caesarean section. Outcomes were documented in the term of terms of postoperative pain, postoperative complications and hospital stay and recorded on Performa. Data analyzing was carried out with SPSS software. **Results:** From totally 60 cases in our study 40 patients males (66.67%) and 20 were females (33.33%); with female to male proportion of 1:3. There was an extensive variation in age from 10 to 70 years among both groups. The mean age was 26.78 years. Both groups were symptomatically nearly similar with pain in RIF, pain initiating around umbilicus, nausea, vomiting, anorexia, fever, and modified bowel behavior, in 59 (98.33%), 45 (75%), 50 (83.33%), 35 (58.33%), 25 (41.67%), 22 (36.67%), 20 (33.33%) respectively. Clinical assessment of cases exposed tenderness at Mc Burney's point in 59 (98.33%) cases, muscle guarding in 52 (86.67%) cases, rebound tenderness in 55 (91.67%) cases and fever in 20 (33.33%) patients. Operative period in each group was documented that ranged from 30 to 90 min. in each group. The mean operative period in OA group was 38.90+15.90 where as it was 26.30+12.96 minutes LA group. Post-operative pain severity in each group was documented. Mild pain was found in 5(16.67%) in OA group cases and 21 (70%) in LA group cases was noted, moderate pain in 22(73.33%) OA group cases and 9(30%) LA group cases was noted, severe pain was described by 3 (10%) patients in OA. The period of return to normal activity in open appendectomy ranged from 7-25 days (mean 14.8 days) as contrasted to laparoscopic appendectomy (LA) group where it varied from 7-15 days. **Conclusion:** In conclusion, we exhibited that LA has significant compensations over OA regarding time of hospital stay, post-operative complications & Pain.

**Key words:** Laparoscopic appendectomy, Open appendectomy, Postoperative pain, Postoperative complications, Hospital stay

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## INTRODUCTION

Appendicitis also known as Acute inflammation of the appendix. It is a major surgical emergency.[1,2] There is no age limit, though the highest incidence is seen in the 2nd and 3rd decades[3] with a slight male predominance.[4] Diagnosis is founded upon well-recognized signs, symptoms, as well as physician's practice.[2] The signs & symptoms most prognostic of pain and acute inflammation of the appendix in right lower quadrant(RLQ), or pain about umbilicus and then transferring to RLQ, presenting along with fever, nausea

and vomiting, although this occurs in 70% of cases. On abdominal examination there will be rigidity, tenderness and rebound tenderness in right iliac fossa.[5,6] It is easy to diagnose clinically typical cases of this disease, but diagnosing atypical cases can be quite difficult at times. The preoperative clinical diagnosis is straight forward in 70-80%[7] cases with an overall negative appendectomy rate of 15-25%.[8,9] A high negative appendectomy rate is considered acceptable so as to reduce the perforation prevalence.10 The common conditions that mimic acute inflammation of the appendix comprise pelvic inflammatory disorder (PID), infectious diarrhea (gastroenteritis), and stomach pain of unidentified derivation, UTI, ectopic pregnancy and ovarian follicle ruptured.[6]

Preoperative exact diagnosis has been big challenge since long time even to the qualified surgeons. A variety of biochemical markers, imaging modalities, and scoring systems followed by an early surgery help to reduce rate of negative appendectomy.[11] These have helped to minimize morbidity and drop in perforation rate from 27% to 12.5%.[12] Females of age of giving birth to child have the highest negative appendectomy proportion of 35-45% because of gynaecological conditions simulating appendicitis.[13]

It is standard therapy of choice for acute inflammation of the appendix, remaining unaffected for a 100 years because of its positive safety and efficacy. LA, initially accomplished by Semm in 1983, has progressively achieved acceptance. Though, there remains ongoing disagreement in literature about the most suitable technique for inflamed appendix removal.

## MATERIAL & METHODS

This study was executed in Surgical Unit-III, LUHMS Jamshoro, from September 2013 to March 2014. The study comprised sixty cases admitted by outpatient department, and also from department of casualty of LUHMS Jamshoro/ Hyderabad. This is a randomized trial study of Open versus laparoscopic appendectomy of cases, who were admitted for acute appendicitis as evaluated by pre-operative diagnostic examination of patients. Cases were divided into two categories. Group-A for OA and group-B for LA. Comprehensive History was obtained from each patient especially with respect to the Pain in RIF, Pain initiating around umbilicus, altered bowel behavior, fever, vomiting, and nausea. Comprehensive Clinical assessment of the case was carried out. Right iliac fossa was particularly scrutinized for evaluation of tenderness and documented in a systematic form. Systemic review was as well performed to observe any co-morbidity. Each patient endured base line as well as particular investigations particularly abdominal ultrasound as diagnostic modality for evaluation of acute inflammation of the appendix. Criteria for inclusion were all those cases who later than counseling for our study provided the written approval, regardless of their sex as well as age admitted in Surgical Unit-III via casualty/ outpatient department and determined as case of acute inflammation of the appendix. Criteria for exclusion incorporated all cases with aspects of generalized peritonitis, cases with obvious mass into right iliac fossa and cases with pre-operative history on cesarean section or lower abdomen. Investigation of all these cases was performed. Outcomes were made available through graphs and tables. Data analysis was carried out through SPSS V.16.0

## RESULTS

The 60 cases of appendicitis were operated for either laparoscopic / open appendectomy. They were categorized in 2 groups;
Group-A for open appendectomy (OA) consisting 30 cases.
Group-B for LA also comprising of 30 patients.

From totally 60 cases in our study 40 patients males (66.67%) and 20 were females (33.33%); with female to male proportion of 1:3. There was an extensive variation in age from 10 to 70 years among both groups. Mean age was 26.78 years (Table-I).

Symptoms in both groups of patients were pain in RIF in 59 (98.33%), pain around umbilicus in 45 (75%), nausea in 50(83.33%), vomiting 35(58.33%), anorexia in 25(41.67%), fever in

22(36.67%) and altered bowel habits in 20 (33.33%) (Table-II).

| Age of patients Years | No. of patients | (%) |
|---|---|---|
| 10-20 years | 14 | 23.33% |
| 21-30 years | 26 | 43.33% |
| 31-40 years | 6 | 10% |
| 41-50 years | 5 | 8.33% |
| 51-60 years | 7 | 11.67% |
| 61-70 years | 2 | 3.33% |

Table-I. Distribution According To Age n=60
Means Age 26.78 years

| Symptoms of patients | No. of patients | (%) |
|---|---|---|
| Pain in RIF | 59 | 98.33% |
| Pain starting around umbilicus | 45 | 75% |
| Nausea | 50 | 83.33% |
| Vomiting | 35 | 58.33% |
| Tenderness at Mc Burney's | 59 | 98.33% |
| Guarding | 52 | 86.67% |
| Rebound tenderness | 55 | 91.67% |
| Fever | 20 | 33.33% |

Table-II. Clinical examination of patients n=60

Post-operative pain severity in each group was noted. Mild pain in OA group was in 5(16.66%) cases and in LA group was in 21 (70%) cases, Moderate pain was observed in OA group in 22(73.33%) cases and in LA group in 9(30%) cases, severe pain was described by 3(10%) patients in OA (Table-III).

Common complications observed in our study were wound infections 3(10%) cases in OA VS 2 (6.67%) patients in LA group), Abdominal collection 2(6.67%) patients in OA VS 0(0%) patients in LA group), Ileus 1(3.33%) patients in OA VS 0(0%) patients in LA group), Residual abscess 0(0%) patients in OA VS 0(0%) patients in LA group), Intestinal obstruction from adhesion (26.66%) cases in OA VS 0(0%) cases in LA group) and Right inguinal hernia 1(3.33%) cases in OA VS 0(0%) cases in LA group). (Table-IV).

The period of in-hospital stay ranged from 1 to 4 days. It was pro-longed about 2-3 days in 28(93.33%) of OA cases as contrasted to LA patients where totally 30(100%) were discharged within 2nd days. The in-hospital mean stay in OA group was 2.01+0.90 days and LA group was 1.07+0.88 days. Table-V.

| Pain | O.A Group n=30 | | L.A Group n=30 | (%) |
|---|---|---|---|---|
| | No: of Patients | % | No: of Patients | % Age |
| Mild | 5 | 16.67% | 21 | 70 % |
| Moderate | 22 | 73.33 % | 9 | 30 % |
| Severe | 3 | 10 % | 0 | 0 % |
| Total | 30 | 100% | 30 | 100% |

Table-III. Showing Severity of Postoperative Pain n=60

| Complications | O.A Group | | L.A Group | (%) |
|---|---|---|---|---|
| | No: of patients | % Age | No: of Patients | % Age |
| Wound infections | 3 | 10 % | 2 | 6.67 % |
| Abdominal collection | 2 | 6.67% | 0 | 0% |
| Ileus | 1 | 3.33 % | 0 | 0 % |
| Residual abcess | 0 | 0 % | 0 | 0 % |
| Intestional obstruction | 2 | 6.67 % | 0 | 0 % |
| Incisional hernia | 0 | 0 % | 0 | 0 % |
| Right inguinal hernia | 1 | 3.33 % | 0 | 0 % |

Table-IV. Post-Operative Complication n=60

| Hospital Stay | O.A Group | | L.A Group | (%) |
|---|---|---|---|---|
| | No: of Patients | % Age | No: of Patients | % Age |
| 1 day | 1 | 3.33 % | 10 | 33.33 % |
| 2 day | 21 | 70 % | 20 | 66.67 % |
| 3 day | 7 | 23.33 % | 0 | 0 % |
| 4 day | 1 | 3.33 % | 0 | 0 % |
| Total | 30 | 100% | 30 | 100% |
| Mean | 2.01 | 1.07 | 0 | 0 % |
| Std. Deviation | 0.90 | 0.88 | 0 | 0 % |

Table-V. Hospital Stay n=60

## DISCUSSION

Acute inflammation of the appendix is the commonest surgical state that comes across in emergency room. Initial appendix descriptions dates to the 16th century. In this study sex proportion exhibited majority of men. From totally 60 cases 40 were men (66.66%) and 20 women (33.33%); with female to male proportion of 1:2. Though the male to female ratio given by Muhammad A[14] was 1.3:1.

The age varied 10 to 70 years comprising 26.78 years of mean age. The top age observed in this study was 2nd and 3rd decade which is corresponding to the study of Jan H where top prevalence was seen in 3rd decade.[15] However Khanzada TW[16] showed age varied from 15 to 65 years with a median age of 28 years.

In this study the pain in right iliac fossa was the main presenting symptom seen in 59 (98.33%) patients, where as other symptoms included pain around umbilicus in 45 (75%), nausea 50 (83.33%), vomiting 35 (58.33%), anorexia 25 (41.66%), fever 22 (36.66%) and altered bowel habits in 20 (33.33%) patients. However in study of Soomro BA[17] pain in right iliac fossa was observed in 98.27% of cases, anorexia in 86.20% patients, vomiting 68.96% and fever in 43.10% patients.

The clinical factors were additionally supported by clinical examination which exhibited tenderness at Mc Burney's point in 59 (98.33%) cases, guarding in 52(86.66%) cases, rebound tenderness in 55(91.66%) cases and raised temperature 20(33.33%) of cases. Clinical examination findings given by Paulson EK[18] et al in their study, shows Rebound tenderness in 63%, guarding in 39 to 74% and raised temperature in 67% of patients.

The operative period in this series was significantly prolonged in OA group. The operative time mean for open appendectomy group was 38.90+15.90 min and for laparoscopic appendectomy 26.30+12.96 min with range of 30 to 90 min in both groups. The median operative time given by Swank HA[19] in group OA (55 minutes) was significantly less as compare to laparoscopic group (70 minutes). This is conflicting to present study which exhibited longer operative period in OA group as compared LA group.

In this study most of cases (83.33%) of OA group had moderate to severe pain and delayed recovery as compared to LA group where 30 % pain was mild to moderate with rapid recovery and premature mobilization and thus less requirement of postoperative analgesia. Some has been given in other studies where also LA have least surgical stress and postoperative pain, rapid recovery and before time gut motility and feeding.[20]

In this study the incidence of postoperative complications was found higher in OA as compared to LA group. The wound infection observed in OA group (10%) was almost double than LA group (6.66%). Whereas other complications like abdominal collection OA (6.66%) V/S LA (0.00%) paralytic Ileus OA (3.33%) V/S LA (0.00%), Intestinal obstruction due to adhesion OA (6.66%) V/S LA (0.00%) and right inguinal hernia OA (3.33%) V/S LA (0.00%) were

also found more in OA group. However in the study of Marzouk M[21] like our study the wound infection was found more in OA (7.6%) than LA (0.00%) group whereas Intraabdominal infection was seen higher in LA (2.7%) as compared to OA (2.5%) group.

The in-hospital time in our study varied from 1 to 4 days in each group with mean hospital stay of 2.01+0.90 days in OA group and 1.07+0.88 days in LA group. It is analogous to other studies offered by various authors report median hospital stay for 2-5 days irrelevant of open or laparoscopic procedure. Also current chart reviews or retrospective cohort studies have found shorter hospital stay in LA as compared to open appendectomy.[22,23] Whereas retrospective studies has reported in significant differences.[24,25]

In our study the period of return to normal activity was defined as duration in days postoperatively when patient him or herself felt fit to do routine physical work and it started from day of operation today of return to normal work. The period of return to normal activity in open appendectomy ranged from 7-25 days (mean 14.8 days) while in LA it ranged from 7-15 days (mean 9.8 days). Total return period to work and normal activity is lesser in LA as contrasted to OA cases which is as well encouraged by further studies published in literature.[26,27]

## CONCLUSION

In conclusion, we exhibited that LA has significant benefits over OA regarding period of hospital stay postoperative morbidity rate of regular discharge, and duration of return to normal work. Our findings can possibly have considerable health care connotations, not only leading to clinical case benefit, however also declining hospital costs. Though, all features of OA and LA should be compared, together with postoperative pain, life quality of patient, days missing from work, costs of procedures, over all costs, and long-lasting complications. LA has definitive and significant advantages over OA and rapid recovery towards normal life without increasing morbidity.



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## PREVIOUS RELATED STUDY

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