

## Demographical Evaluation of Laparoscopic versus open Appendectomy at Tertiary Care Teaching Hospital

Arshad Hussain Abro, Ahmed Hussain Pathan, Nawaz Ali Dal, Abdul Aziz Laghari, Kamran Hyder Abbasi, Shayan Qasim, Jamrose Durrani

### ABSTRACT

**OBJECTIVE:** To document the demographical evaluation of laparoscopic versus open appendectomy at tertiary care teaching hospital.

**PATIENTS AND METHODS:** This is comparative study was carried out in Surgical Unit-II, Liaquat University Hospital Jamshoro, Sindh, Pakistan from 21<sup>st</sup> November 2012 to 3<sup>rd</sup> February 2016 after the approval from Ethical review committee. During period of the study sixty patients admitted through the outpatient department, as well as from casualty department of Liaquat University Hospital Jamshoro / Hyderabad were enrolled. Results were prepared with the help of tables and graphs. Data was analyzed through SPSS software.

**RESULTS:** Out of 60 patients, 40 were males (66.66%) and 20 females (33.33%); with male to female ratio of 2:1. The mean age for both groups was 26.78 years, ranging from 10 to 70 years. Symptoms of patients in both groups were almost identical comprising of pain in right iliac fossa in 59 (98.33%), pain starting around umbilicus in 45 (75%), nausea in 50(83.33%), vomiting 35(58.33%), anorexia in 25 (41.66%), fever in 22(36.66%) and altered bowel habits in 20(33.33%).

**CONCLUSION:** The laparoscopic appendectomy has significant advantages over open appendectomy with respect to length of hospital stay, discharge from hospital, and postoperative in-hospital complications & morbidity.

**KEYWORDS:** Laparoscopy, Appendectomy, Postoperative complications.

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### INTRODUCTION

The appendix is a small, tube-shaped pouch attached to large intestine and located in the lower right side of abdomen, and appendicitis is the most common cause of surgical abdomen in all age groups.<sup>1,2</sup> Approximately 7%-10% of the general population develop acute appendicitis with the maximal incidence being in the 2nd and 3rd decades of life; whereas an appendectomy, the surgical removal of the appendix and a common emergency surgery that's performed to treat appendicitis.<sup>3-4</sup>

Briefly, the pathophysiology and progressive timeline of acute appendicitis are attributed as luminal obstruction causing distention, ineffective venous and lymphatic drainage, bacterial invasion and perforation with associated leakage of contents into the peritoneal cavity.<sup>5-8</sup>

Open appendectomy has been the treatment of choice for more than a century and the procedure is standardized among surgeons.<sup>9</sup> Encouraged by the

success of laparoscopic cholecystectomy, which has become the gold-standard treatment for gallstone disease in a short span of time, laparoscopic surgery has gained its popularity and found application in almost every surgical specialty.<sup>10-12</sup> Laparoscopic appendectomy has been shown to be feasible and safe in randomized comparisons with open appendectomy.<sup>13</sup> Laparoscopic appendectomy has improved diagnostic accuracy along with advantages in terms of fewer wound infections, less pain, faster recovery and earlier return to normal activity.<sup>14</sup> On the contrary, laparoscopic appendectomy consumes more operating time and is associated with increased hospital costs.<sup>15, 16</sup> No consensus exists as to whether laparoscopy should be performed in selected patients or routinely for all patients with suspected acute appendicitis.<sup>18</sup> Keeping in mind this background and the fact that studies comparing laparoscopic and open appendectomy are fewer in developing countries, this observational study was carried out to document the

demographical evaluation in both procedures in terms of hospital stay, operating time, postoperative pain, morbidity and time to resume normal activity.

**PATIENTS & METHODS**

After approval from research ethical committee, this comparative observational study was carried out in Surgical Unit-II, Liaquat University Hospital Jamshoro, Sindh, Pakistan from 21<sup>st</sup> November 2012 to 3<sup>rd</sup> February 2016. Patients admitted through the outpatient and casualty department of Liaquat University Hospital Jamshoro / Hyderabad, diagnosed after pre-operative workup as acute appendicitis (n=60) were enrolled for this study. Clinical history recorded with special regard to the pain in right iliac fossa (RIF), pain starting around umbilicus, nausea, vomiting, fever and altered bowel habits. Clinical examination performed to elicit tenderness at RIF, systemic examination done to exclude any co-morbidity. After base line investigations, ultrasound abdomen done in every case to add in the clinical diagnosis. Patients presenting with features of generalized peritonitis, patients with palpable mass in right iliac fossa and patients with history of previous operation on lower abdomen or cesarean section were not considered for this study. All those selected for this study through purposive non-probability sampling were allotted to two techniques on alternate basis in two groups. Group A for open appendectomy and group B for laparoscopic appendectomy. Follow up of all these patients was done for up to 6 months. All data was entered in a specified proforma designed for this purpose. Data entered and analyzed through SPSS software version 16.0. Results presented as tables and graphs.

**RESULTS**

The 60 cases of appendicitis selected for this study were equally distributed to group A where open appendectomy was performed and group B where laparoscopic appendectomy was performed. Out of 60 patients, 40 were male (66.66%) and 20 patients were female (33.33%); with male to female ratio of 2:1 (Table I). The mean age of all patients was 26.78 years ranging from 10 to 70 years. (Table II). Symptoms of patients in both groups 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(41.66%), fever in 22(36.66%) and altered bowel habits in 20(33.33%) (Table III) Operative time in both groups was recorded. Operative time ranged from 30 minutes to 90 minutes

in both groups. The mean time in open appendectomy (OA) group was 38.90 ±SD15.90 minutes and for laparoscopic appendectomy (LA) group it was 26.30 ±SD12.96 minutes. (Table IV). The duration of hospital stay varied from 1 to 4 days. It was longer about 2-3 days in 46(93.33%) of OA patients as compared to LA cases where majority 30(100%) were discharged within 2nd days. The mean hospital stay in OA group was 2.01 ±0.90 days and LA group was 1.07 ±0.88 days. Mild pain was felt in 5(16.66%) patients of open appendectomy group and 21 (70%) patients of laparoscopic appendectomy group, Moderate pain was reported by 22(73.33%) patients of OA group and 9(30%) patients of laparoscopic appendectomy group, severe pain was described by 3 (10%) patients in open appendectomy.

In our study the period of return to normal activity was defined as duration in days post operatively when patient himself or herself felt fit to do routine physical work and it started from day of operation and included the period of hospital stay and period which patient stayed in his or her home. The period of return to normal activity in open appendectomy ranged from 7-25 days (mean 14.8 days) while in laparoscopic appendectomy it ranged from 7-15 days (mean 9.8 days). The post operative follow up was for up to 6 months.

**TABLE I: GENDER DISTRIBUTION**

Gender			
Male		Female	
No: of Patients	% Age	No: of Patients	% Age
40	66.66%	20	33.33%

Male: Female Ratio = 2:1

**TABLE II: AGE DISTRIBUTION**

Age of patients Years	No. of patients (n=60)	Percentage (%)
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	11.66%
61-70 years	2	3.33%

Means Age 26.78 years

**TABLE III: SYMPTOMS OF PATIENTS**

Symptoms of Patients	No. of patients (n=60)	Percentage (%)
Pain in RIF	59	98.33%
Pain starting around umbilicus	45	75%
Nausea	50	83.33%
Vomiting	35	58.33%
Anorexia	25	41.66%
Fever	22	36.66%
Altered bowel habits	20	33.33%

**TABLE IV: OPERATIVE TIME**

Operative time	O.A Group		L.A Group	
	No: of Patients	% Age	No: of Patients	% Age
30 Minutes	6	16.66 %	13	43.33%
45 Minutes	16	53.33%	10	33.33%
60 Minutes	5	16.66 %	6	20 %
75 Minutes	2	6.66 %	1	3.33%
90 Minutes	1	3.33 %	0	0 %
Total	30	100%	30	100%
Mean Operative Time	38.90		26.30	
Std. Deviation	15.924		12.960	

**DISCUSSION**

Acute appendicitis is the most common surgical condition encountered in emergency room. The first descriptions of the appendix date to the sixteenth century. Although first sketched in the anatomic notebooks of Leonardo da Vinci around year 1500, the appendix was not formally described until 1524 by da Capri and in year 1543 by Vesalius. Perhaps the first description of a case of appendicitis was by Fernel in 1554. First recorded appendectomy was performed by Amyand in 1736, when he operated on a boy with an enterocutaneous fistula within an inguinal hernia. On exploration of the hernia sac, he discovered appendix, which had been perforated by a pin resulting in a fecal fistula<sup>18</sup>.

In our study sex ratio showed predominance of male. Out of 60 patients 40 were male (66.66%) and 20 female (33.33%); with male to female ratio of 2:1. However the male to female ratio reported by

Muhammad A<sup>19</sup> was 1.3:1.

The age ranged from 10 to 70 years with mean age of 26.78 years. The peak age seen in our study was 2<sup>nd</sup> and 3<sup>rd</sup> decade of life which is comparable to the study of Jan H where peak incidence was seen in the 3<sup>rd</sup> decade of Life<sup>20</sup>. However Khanzada TW showed age range from 15 to 65 years with a median age of 28 years<sup>21</sup>.

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<sup>22</sup> pain in right iliac fossa was found in 98.27% of patients, anorexia in 86.20% patients, vomiting 68.96% and fever in 43.10% patients.

The clinical parameters were further supported by clinical examination which revealed tenderness at Mc Burney's point in 59 (98.33%) patients, guarding in 52 (86.66%) patients, rebound tenderness in 55(91.66%) patients and raised body temperature in 20(33.33%) of cases. Findings of clinical examination reported by Paulson EK<sup>23</sup> et al, includes rebound tenderness in 63%, guarding in 39 to 74% and raised body temperature in 67% of cases.

The operative time in this series was significantly longer in open appendectomy group. The mean operative time for open appendectomy group was 38.90±15.90 minutes and for laparoscopic appendectomy it was 26.30±12.96 minutes with range of 30 to 90 minutes in both groups. The median operative time given by Swank HA<sup>24</sup> in the open appendectomy (55 minutes) group was significantly shorter than in the laparoscopic group (70 minutes). This is opposite to present study which shows longer operative time in open appendectomy group as compared laparoscopic appendectomy group.

In our study majority of cases (83.33%) of open appendectomy group felt moderate to severe pain and late post operative recovery as compared to laparoscopic appendectomy group where 30 % felt mild to moderate pain with quick recovery and early mobilization and therefore less need of postoperative analgesia. These finding are in agreement with the finding reported by De U<sup>25</sup>.

In current study the incidence of postoperative complications was higher in open appendectomy as compared to laparoscopic appendectomy group. The wound infection observed in open appendectomy group (10%) was almost double than that in laparoscopic appendectomy group (6.66%). Whereas other complications like abdominal collection open appendectomy (6.66%) V/S laparoscopic appendectomy (0.00%), paralytic ileus open

appendectomy (3.33%) V/S laparoscopic appendectomy (0.00%), Intestinal obstruction due to adhesion open appendectomy (6.66%) V/S laparoscopic appendectomy (0.00%) and right inguinal hernia open appendectomy (3.33%) V/S laparoscopic appendectomy (0.00%) were also found more in open appendectomy group. However in the study of Marzouk M<sup>26</sup> like our study the wound infection was found more in open appendectomy (7.6%) than laparoscopic appendectomy (0.00%) group whereas Intra abdominal infection was seen higher in laparoscopic appendectomy (2.7%) as compared to open appendectomy (2.5%) group.

The hospital stay in this study ranged from 1 to 4 days in both groups with mean hospital stay of  $2.01 \pm 0.90$  days in open appendectomy group and  $1.07 \pm 0.88$  days in laparoscopic appendectomy group. It is comparable to other studies given by different authors report median hospital stay of 2-5 days irrespective of laparoscopic or open procedure. Also recent retrospective cohort studies or chart reviews have found shorter hospital stay in laparoscopic appendectomy as compared to open appendectomy.<sup>27-30</sup>

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 laparoscopic appendectomy it ranged from 7-15 days (mean 9.8 days). Over all time of return to normal activity and work is shorter in laparoscopic appendectomy as compared to open appendectomy patients as mentioned in earlier studies.<sup>31, 32</sup>

## CONCLUSION

We concludes that laparoscopic appendectomy has significant advantages over open appendectomy with respect to length of hospital stay postoperative morbidity, discharge from hospital, and duration of return to normal work. However, to increase confidence, all aspects of laparoscopic appendectomy and open appendectomy must be compared, including postoperative pain, patient's quality of life, days away from work, procedural costs, total costs, and long-term complications must be compared on with large sample size.

## ABBREVIATIONS

LA: Laparoscopic appendectomy  
OA: Open appendectomy  
RIF: Right iliac fossa.  
SD: Standard deviation  
SPSS: Statistical Package for the Social Sciences

VS: Versus

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*AUTHOR AFFILIATION:*

**Dr. Arshad Hussain Abro** (Correspondence Author)

Assistant Professor, Department of Surgery  
Liaquat University of Medical & Health Sciences  
(LUMHS), Jamshoro, Sindh-Pakistan.  
Email: drahabro@hotmail.com

**Dr. Ahmed Hussain Pathan**

Assistant Professor, Department of Surgery  
LUMHS, Jamshoro, Sindh-Pakistan.

**Dr. Nawaz Ali Dal**

Senior Registrar, Department of Surgery  
LUMHS, Jamshoro, Sindh-Pakistan.

**Prof. Abdul Aziz Laghari**

Professor, Department of Surgery  
LUMHS, Jamshoro, Sindh-Pakistan.

**Dr. Kamran Hyder Abbasi**

PG, Department of Surgery  
LUMHS, Jamshoro, Sindh-Pakistan.

**Dr. Shayan Qasim**

Brandon Regional Hospital, Brandon, Florida.

**Dr. Jamrose Durrani**

LUMHS, Jamshoro, Sindh-Pakistan.