Outcome of Laparoscopic Versus Open Appendicectomy: An Experience from BIRDEM General Hospital

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Abstract

Aims: The aims of the study were to compare the safety and benefits of laparoscopic versus open appendicectomy.

Methods: This cross-sectional study was done in BIRDEM General Hospital from June 2005 to December 2006.Seventy patients with acute appendicitis were included in this study, half underwent laparoscopic procedure and half open conventional procedure.We evaluated the length of hospitalization, postoperative morbidity (pain, wound infection, chest complication, paralytic ileus),cosmesis and return to normal activity among two methods of operations.

Results: The duration of surgery in open group was 30 to 70 minutes with a mean duration of 47.57 minutes. In case of laparoscopic group the mean duration was 38.71 minutes with a range from 30 to 60 minutes. In open group 28 cases (80.0%) required opioid for satisfactory pain relief whereas in laparoscopic group only 9 (25.71%) cases required opioid. Gross infection with pus collection occurred in 2 (5.7%) cases in open appendicectomy (OA) group and none inlaparoscopic appendicectomy (LA) group. Post-operative hospital stay in open group ranged from 2 to 18 days with a mean of 6.74 days. For laparoscopic group the duration was 1 to 5 days with a mean of 2.31 days. Patients in open procedure returned to normal activity within 11-23 days with a mean of 15 days and in lap group the figures were 2-15 days and 6 days respectively. In open group 65.71% (n=23) were satisfied with the scar they had whereas 91.4% (n=32) were satisfied with their scar in lap group.

Conclusion: The study indicates that the laparoscopic appendicectomy is feasible and safe for majority of patients with acute appendicitis.

Key words: Appendicitis, appendicectomy, laparoscopy.

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Introduction

The history of appendicitis is at least as old as history of mankind. Galen of the second century (A.D.) differentiated the disease between surgery and medicine. Appendicitis was recorded in medical literature for the last 500 years. Acute appendicitis remains the commonest cause of acute abdominal emergency from childhood to early adult life. The first appendicectomy was performed in 1736 by Claudius Amyand, Surgeon of St. Georges Hospital, London, UK.[1]Appendicectomy is one of the most common emergency abdominal operations. Conventional open operation is the treatment of choice for more than a century.[2,3] In open operation postoperative complications are, however not infrequent, especially wound infection, circumscribed peritonitis, early postoperative bowel obstruction, intraperitonial adhesions, infertility in females and subsequent right inguinal hernia.[4] This approach also requires a relatively long hospital stay and delays to normal activities.[5]

Laparoscopic appendicectomy was first described in 1983 by Kurt Semm[5], a gynecologist from Kiel, Germany. He used laparoscopy for chronic appendicitis, but until 1990, the method was not used for treating acute appendicitis. The advantages of laparoscopic procedure are decreasewound infection[4], reduce morbidity, shorter postoperative hospital stay and more rapid return to regular activities. Laparoscopy allows detail abdominal and pelvic examination, particularly valuable in young women with diagnostic dilemma. Though an invasive procedure, it causes minimum intraperitoneal adhesions,

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better cosmesis and patient's satisfaction.[6] Some authors considered laparoscopic apendicectomy for trainees and residents as a useful training tool in laparoscopic procedure[7,8]. In our country, laparoscopic appendicectomy was introduced in 1994. Since then it has been gaining acceptance and practiced in different medical institutes and privatemedical centers in Dhaka as well as other parts of the country. Some surgeons practice the procedure routinely in all cases of appendicitis.

Many surgeons questioned the benefits of minimal access technique over a minor operation like open appendicectomy. Still in a number of patients with acute appendicitis, laparoscopic appendicectomy cannot be performed as an emergency procedure because of difference of opinion among the surgeons. The drawback in practicing laparoscopic surgery among the junior surgeons and trainees is lack of adequate training. Limited experience, inadequate standardization of the technique, inadequately trained personnel at emergency situation, operating room cost and initial capital cost for the set-up have also been implicated as other limiting factors.

Materials and Methods

It was a cross-section observational study of 70 patients of acute appendicitis, half underwent laparoscopic procedure and half open conventional procedure in BIRDEM General Hospital. The study period was June 2005 to December 2006.Patients were well matched with regard to age, sex, stage of appendicitis, duration of symptomsand preoperative hospital stay. All the patients were collected in random fashion. Preoperative diagnosis of co-morbidity, acuteappendicitis with generalized peritonitis or appendiceal abscess, patients with acute appendicitis also had undergone operation for other conditions in addition to appendicectomy and history of major abdominal surgery were excluded in this study.

All patients were operated under general anaesthesia. Conventional open appedicectomy was performed through Lanz incision. For laparoscopic procedure CO_2 pneumoperitoneum was created through verres needle. The laparoscopewas introduced through a 10 mm trocar port in the lower portion of the umbilicus inserted through a vertical incision. After exploration of the general peritoneal cavity similar port was inserted in the suprapubic area and a 5 mm trocar port in right iliac fossaexactly over the base of the appendix. Laparoscope was transferred to suprapubic port and the umbilical port was used as the main working port. Appendicular artery was dissected and divided between haemostatic clips. The appendix was secure at the base with intra corporial ligature and divided between it.Per-operative antibiotics were administered routinely. Preoperative findings, operative procedure including findings, duration and postoperative outcome were recorded. Following variableshospital stay, postoperative morbidity (pain, wound infection, chest complication, paralytic ileus), cosmesis and return to normal activitywere compared betweenlaparoscopicand open procedure.

Results

According to the preset criteria a total of 85 cases of acute appendicitis were enrolled for the study during the specified period. Among them 15 cases were excluded at different stages of management. Out of rest 70 cases, 35 underwent open appendicectomy(OA) and 35 underwent laparoscopic appendicectomy (LA). Of the total 35 cases of open procedure 12 (34.3%) were male and 23 (65.7%) were female. In laparoscopic procedure group 10 (28.6%) were male and rest 25 (71.4%) were female.Majority of the patients seek surgical assistance either within 24 hours or 24 to 48 hours after the onset of symptoms whereas only a few reported after 48 hours.The pre-operative hospital stay of majority of the patients in both groups is 24 hours or less than that.

Table-I

Operative Findings in Acute Appendicitis

Operative findings	Open appendicectomy		Lap. appendicectomy	
	n	%	n	%
Non-obstructive	2	5.7	2	5.7
Obstructed	21	60.0	23	65.7
suppurative				
Gangrene	7	20.0	6	17.1
Perforated	5	14.3	4	11.4
Total	35	100	35	100

The duration of surgery in open group was 30 to 70 minutes with a mean duration of 47.57 minutes. In case of laparoscopic group the mean duration was 38.71 minutes with a range from 30 to 60 minutes. Majority of the cases were acute suppurative appendicitis. Few of the cases involved distal appendix only. Most of the cases of perforated appendix were associated with peri-appendicular collection of luminal contents and exudates. The faecolith impaction was the most frequently detected cause of obstruction at the site of division of appendix. Cases with absolutely normal looking appendix or apparently normal appendix with some other pathology were excluded from the study.

Patients' severity of pain especially in the first 24 hours was scored by visual analogue score- patients were asked to mark their pain score on a 10 cm scale ranging from 0= no pain to 10= worst pain imaginable. Initially all patients were tried with NSAIDs in the form of rectal suppository/ injection or injectable opioid whenever needed. In open group 28 cases (80.0%) required opioid for satisfactory pain relief whereas in laparoscopic group only 9 (25.71%) cases required opioid. Minor wound infection in the form of mild inflammation with pain and serous collection was noted in both groups in small number of cases: Open group - 4 (11.4%) cases and laparoscopic group- 3 (8.6%) cases. These were managed by aspiration or limited opening of incision. Gross infection with pus collection occurred in 2 (5.7%) cases in OA group and none in LA group. These cases needed wide opening of skin and subcutaneous incision, regular dressing and debridement followed by secondary closure.

Post-operative hospital stay in open group ranged from 2 to 18 days with a mean of 6.74 days. For laparoscopic group the duration was 1 to 5 days with a mean of 2.31 days. Patients in open procedure return to normal activity within 11-23 days with a mean of 15 days and in lap group the figures were 2-15 days and 6 days respectively.Cosmetic outcome was determined by patients' observation of their wound and marking their position on a scale (visual analogue scale- VAS). In open group 65.71% (n=23) were satisfied with the scar they had whereas 91.4% (n=32) were satisfied with their scar in lap group.

Table II

Analgesic Required for Pain Relief

Analgesic	Open appendicectomy		Lap. appendicectomy		*p* value
	n	%	n	%	
Opioid (Pethidine/Tramadol)	28	80.0	9	25.71	<0.01
NSAIDs	7	20.0	26	74.29	
Total	35	100	35	100	

Table III

Wound Infection

Extent/Severity	Open appendicectomy		Lap. appendicectomy		*p* value
	n	%	n	%	
No infection	29	82.9	32	91.4	
Minor infection	4	11.4	3	8.6	<0.01
Gross suppuration	2	5.7	0	0	
Total	35	100	35	100	

Table IV

Comparison between Open versus Laparoscopic appendicectomy in different variables

Observation	Open appendicemy	Lap. appendicemy	*p* value
Duration of operation Mean±SD (mins)	47.57±12.33	38.71±8.77	0.001
Post-operative Hospital Stay Mean±SD (days)	6.74±4.47	2.31±1.08	<0.01
Return to normal activity Mean±SD (days)	15±2.90	6±2.71	<0.001

Table V

Cosmetic Outcome

Cosmetic outcome	Open appendicectomy		Lap. appendicectomy		p value
	n	%	n	%	
Satisfied	23	65.71	32	91.40	
Not satisfied	12	34.29	3	8.60	<0.05
Total	35	100	35	100	

Discussion

In this cross section observational study 70 patients with acute appendicitis underwent appendicectomyin BIRDEM General Hospital and the study period was one and half years (June 2005 to December 2006). Different data have been analyzed to observe the outcome of laparoscopic appendicectomy (LA) in comparison to open appendicectomy (OA). From the analysis and observation the benefits of LA over OA were assessed in order to validate the use of LA as a procedure of choice in the management of acute appendicitis.

The highest incidence of acute appendicitis in the study was between age ranges of 21 to 40 years. In this study duration of operations were 30 to 70 minutes (mean=48 minutes) in OA and 30 to 60 minutes (mean=39 minutes) in LA group. In LA group most cases clustered around 35 to 40 minutes duration. In both groups those with recurrent acute attack, perforation or gangrene took longer duration for operation. A review article of 21 different reports of randomized study of LA and OA, most of them in early learning period, showed that mean time of operation for LA in these studies was 67 minutes.[9]

Per-operatively most of the appendices in our study were found suppurative appendicitis while other appendices were gangrenous appendicitis, perforated appendicitis and non obstructive/catarrhal appendicitis in descending order of frequencies. Gangrenous appendicitis was found commonly in elderly patients while perforated appendicitis was found in children and aged groups in both OA and LA. Almost similar data was published in 2000 in a study by Kang.[9]

In my study 80% (n=28) cases in OA group required opioid analgesic (Pethidine or Tramadol) for satisfactory pain relief and remaining 20% (n=7) were satisfied with NSAIDs (Diclofenac or Ketorolac) in early post-operative period especially in the first 24 hours. In LA group only 25.71% (n=9) required opioids whereas 74.29% (n=26) were comfortable with NSAIDs. Published data also suggested that pain was significantly less in LA group in early postoperative period, resulting in less use of analgesics.[2,10]

Post-operative wound infection in LA group was significantly lower in my study with 8.6% (n=3) developed mild inflammation with seroma in umbilical wound. Almost similar proportion (11.4%, n=4) of minor infection occurred in OA group. In addition, 5.7% (n=2) in OA group developed severe wound infection requiring much effort to control, increased hospital stay and ended up with ugly scar. Wound infections commonly occurred in those with perforated appendicitis.

In OA group, post-operative hospital stay was 2 to 18 days with a mean duration of 6.74 days whereas in LA group the figures are 1 to 5 days with a mean of 2.31 days. In OA group majority of the cases left hospital in 2 to 4 days; those with wound collection or infection took longer time. In LA group, most of the patients went home in a day or two.

Patients follow up was scheduled at 15th and 30th POD. They wereassessed clinically followed by specific questions regarding return to normal activities and their satisfaction with the wounds they had. Patients in OA group returned to their normal activities from 11 to 23 POD (mean=15 days) and that of LA group from 2 to 15 POD (mean=6 days). In OA group, most of the patients returned to work in 9 to 15 days while those with wound infection took much longer duration. In LA group, most of the patients started normal activities in 5 to 7 days. Cosmetic outcome was determined by patients in VAS. Significant (p-value <0.05) proportion of patients in LA group were satisfied with their scar. Another study by Prado and associates also showed better cosmetic appearance in LA group.[11]

Conclusion

This study indicates thatlaparoscopic appendicectomy is the technique of choice in our environment, regardless of the type of acute appendicitis, being performed by skilled surgeons, as it has emerged as a safe and cost-effective technique by reducing length of hospital stay and morbidity rates.

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