Original Article

Laparoscopic Appendicectomy in All Benign Pathologies of the Appendix: A retrospective study

Md. Ezharul Haque Ratan[1], Hasina Alam[2]

Abstract:

Background: *Acute appendicitis is one of the most common surgical conditions and urgent appendicectomyis recommended and practiced for more than 100 years[1,2]. McBurney's appendicectomy by an open muscle splitting technique was the gold standard surgical procedure[1]. Laparoscopic appendicectomy (LA) is gaining popularity since 1987. But this new technique has a longer learning curve and requires expensive equipment (high capital investments).The aim of this study was to ascertain the generalizability of this novel procedure when appendicectomy is indicated.*

Method: *This study was done over a period of six years in BIRDEM. Between March 2010 to February 2016, all consecutive cases of Laparoscopic appendicectomy was selected for the study. Operation was performed under general anaesthesia using standard three puncture technique. After the procedure all resected specimen was sent for histopathology.*

Result: *Laparoscopicappendicectomy was attempted in 113 patients, 57(50.4%) female and 56(49.6%) males. Mean age of the patients were 35.2 years and ranged from 5 to 65 years. Laparoscopicappendicectomy was performed in emergency basis in 102(90%) due to acute appendicitis, gangrenous appendix, perforated appendix or appendicular abscess. Eleven patients (10%) underwent elective surgery due to interval appendicectomy, mucocole of appendix, incidental appendicectomy. The most common indication for laparoscopic appendicectomy in this series was acute appendicitis (62%). Only one patient (<1%) had to be converted to an open appendicectomy due to injury to caecal wall. There was no peri-operative mortality in this series. Hundred and five patients (93%) weredischarged in lessthan 24 hours of surgery and seven (6%) within 48 hours of surgery after removal of intrabdominal drain. Follow-up period was one month to two years.*

Conclusion: *All the advantages of laparoscopy are well applied in laparoscopic appendicectomy. Morbidity, mortality and conversion rate came down to a minimum with time and experience. Hence laparoscopic appendicectomy should be the procedure of choice when appendicectomy in indicated.*

Key Words: *Appendix, Laparoscopic appendicectomy, Intracorporeal knot.*

Introduction

Acute appendicitis is one of the most common surgical conditions and urgent appendicectomyis recommended and practiced for more than 100 years[1, 2]. McBurney's appendicectomy by an open muscle splitting technique was the gold standard surgical procedure in acute appendicitis until recent development of minimal invasive surgery [1].

1. Dr. Md. Ezharul Haque Ratan, MS (General Surgery), Associate professor, Surgery, Ibrahim Medical college and BIRDEM General Hospital, Shahbagh, Dhaka-1000, Bangladesh
2. Dr. Hasina Alam, FCPS (General Surgery), Registrar Surgery, Ibrahim Medical college and BIRDEM General Hospital, Shahbagh, Dhaka-1000, Bangladesh

Corresponding Author:

Dr. Md. Ezharul Haque Ratan
MS (General Surgery)
Associate professor, Surgery
Ibrahim Medical College and BIRDEM
Room no-445, BIRDEM General Hospital
Shahbagh, Dhaka-1000, Bangladesh
Tel : +88 01711172547
Email: ezhar65@gmail.com

Though classic open appendicectomy (OA) through McBurney's incision is simple, quick and efficient procedure which can be performed by most surgeons, laparoscopic appendicectomy (LA) is gaining popularity since the 1st reported case done by Schreisen in 1987. Published data indicates that this new approach is safe and feasible[3-7]. Advantages of LA over OA are many including: (1) Reduced pain in terms of severity and duration, (2) Shorter hospital stay and faster recovery and return to everyday activities, (3) Lower incidence and decreased severity of SSI, (4) Improved cosmetic outcome, (5)Decreased incidence of adhesion related complications and incisional hernias[1,8-13]. LA provides better diagnostic accuracy in the wound, hence reduce the number of negative appendicectomies. It provides effective treatment of gynecological diseases at the same time[6]. LA is of special value in obese patients[14, 15]. Like OA, LA is also safe in the second trimester of pregnancy[16]. Due to these advantages, laparoscopic appendicectomy gained popularity among patients. Conversely, adoption of this new technique among surgeons has not been universal due to longer operation time in the learning curve,more expensive equipment (high capital investments) and concerns regarding possible increase in intra-abdominal abscess rate [17-19].

However, laparoscopic appendicectomy was attempted in all

the cases in this series. All patients presented either through out-patient department or through emergency department with benign appendiceal pathology as acute or interval state. The aim of this study was to ascertain the generalizability of this novel procedure when appendicectomy is indicated.

Methods

This study was done over a period of six years (March 2010 to February 2016) in Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM), a tertiary hospital dealing mostly with diabetic patients. 115 laparoscopic appendicectomies were done during this time period. But two patients were dropped from our study as their histopathology revealed appendicular malignancy. The rest 113 patients, presenting with a variety of acute or recurrent appendicular pathology in interval state, underwent laparoscopic appendicectomy, proved as benign appendicular pathology at histopathology and were included in this study. Preoperative evaluation was done clinically. Abdominal ultrasonogram or CT-Scan was done in selected cases with diagnostic dilemma. All the patients were asked to void just before entering into operation theatre. They were placed supine with a head and left down tilt. The surgeon stood to the left of the patient and camera assistant stood on the left of the surgeon. Monitor was on the right side of the patient. Laparoscopic appendicectomy was performed under general anaesthesia using standard three puncture technique. Pneumoperitoneum was established by placement of a veress needle umbilically. One 10mm trocar was placed in umbilicus under direct vision. Another 10mm trocar was placed into suprapubic region in the midline and a 5mm trocar was placed at McBurney's point. Suprapubic port was used as the camera port and others as working ports.The whole abdominal cavity was inspected.The appendix was identified by manipulation and picked up by grasping the mesoappendix. A window was created in the mesoappendix at the base of the appendix.The base of the appendix was ligated by intracorporeal knot using 1-0 chromic catgut, contents milked up distally, and metallic large clip applied. The appendix was then divided between ligature and clip. The cut ends were touched and cleaned withpovidone iodine soaked rolled gauze piece.The mesoappendix was dissected using electrocoagulation keeping close to the wall of the appendix and secured with hem-o-lok at the distal end. Slim appendix was removed through 10 mm cannula. Perforated, gangrenous and swollen appendixwere brought out through umbilical port keeping inside a sterile "glove- finger". A drain was placed only in case of appendicularabscess. In thecase of retrocaecalappendix, the caecum was mobilized with electrocauteryalong thetoldline, reflecting up and to the left to expose the appendix. Perforation or gangrene close to the caecum was managed by intracorporeal suture of the wall of the caecum. Fascial closure of the umbilical port with an absorbable suture was performed in all patients. Each of the skin incisions were approximated with an absorbable subcuticular stitch.

Results:

Laparoscopic appendicectomy was attempted in 113 patients, 57(50.4%) female and 56(49.6%) males from March 2010 to February 2016. Mean age of the patients were 35.2 years and ranged from 5 to 65 years. 46 (40.7%) were diabetic patients and 67(57.3%) were non-diabetic. Laparoscopic appendicectomy was performed in emergency basis in 102(90%) due to acute appendicitis, gangrenous appendix, perforated appendix or appendicular abscess. Eleven patients (10%) underwent elective surgery due to interval appendicectomy, mucocole of appendix, incidental appendicectomy. The indications for laparoscopic appendicectomy for this series are summarized in Table I. All the cases were performed by a single surgeon. Only one patient (<1%) had to be converted to an open appendicectomy due to injury to caecal wall during separation of adhesion in an interval appendicectomy. The tear was repaired through a right illac fossa incision with an ileostomy through the same incision. Patient recovered uneventfully and the stoma was closed two months later. There was no intraoperative complication in the remaining cases. Major postoperative complication occured in none. Three patiens developed umbilical port discharge in post operative period. Two of them were managed with empirical antibiotic and local wound care and the remaining one patient needed antibiotic according to culture and sensitivity report. There was no peri-operative mortality in this series. Hundred and five patients (93%) were discharged in less than 24 hours of surgery and seven (6%) within 48 hours of surgery after removal of intrabdominal drain. A total of 27 (24%) patients had prior abdominal surgery (Table II).

Discussion:

Laparoscopic appendicectomy is rapidly replacing open appendicectomy as a procedure of choice when appendicectomy is indicated. Ventham et al reported that laparoscopic appendicectomy rate increased from 2.5% in 2003 to 78% in 2010 in a district general hospital in Fife, Scotland[2], which is comparable to other published report[7]. This retro-spective study was done in BIRDEM hospital, which deals with most of the diabetic patients of the country. All patients presenting with benign appendiccaecal pathology were included and subject to laparoscopic appendicectomy. The mean age of the patients is much higher among diabetic patients both in male and female when compared to non-diabetic patients with an almost equal sex distribution.

Acute appendicitis appeared to the most common diagnosis followed by complicated cases like gangrenous appendix, perforation of the appendix and appendicular abscess in that order. Incidental appendicectomies, once very popular, is much decreased now a days (Table I). Inability to create a safe pneumoperitoneum remained only absolute contraindication for laparoscopic appendicectomy[20]. We were fortunate enough to perform pneumoperitoneum in all the cases, even in those with previous surgery (Table II). Most conversions to open procedure occur for bleeding[16]. Again bleeding is most common from mesoappendix and retroperitoneum during

dissection of an inflamed appendix[1]. We also faced bleeding most commonly from those structures. Suction to clear and identify bleedings points, local pressure with instruments and ciggerete shaped rolled gauge piece and finally coagulation of the point by applyinghaem-0-lok were used to achieve control of bleeding. In only one case, conversion toan open procedure was needed, due to injury to caecum, during interval appendicectomy. Chronically inflamed densely adhesent caecal wall gave up during blunt gauge dissection.

The incidence of intra-abdominal abscess after laparoscopic appendicectomy is variable in different Literatures[9,18,21]. However complicated cases of appendicitis are associated with increased incidence of abscess irrespective of method of appendicectomy[10,22,23]. In this series we did not face such complication. The reason behind may be placement of a drain following endobag removal of specimen with faecolith and profuse normal saline irrigation of the involved surgical field in complicated cases. Published data suggested that endostapla was associated with increased incidence of intraabdominal abscess in paediatric patients[24]. Our technique of intracorporeal ligation with chromic catgut for stump control did not create any stump related or infective problem. Length of hospital stay and incidence of umbilical wound infection in this series were comparable to other studies[2, 25.] There was no perioperative mortality and none needed readmission. Nobody returned with port hernia during follow-up period.

There are some limitation of the study like: (1) A retrospective study is the weakness of the series, (2) Patient cohort was not fairly large, (3) Single surgeon from a single institute was involved. The strength of the study is, inclusion of all cases of benign appendicular disease where appendicectomy was indicated, irrespective of clinical state or image findings. So, it increased the generalizability of the results.

Conclusion:

The advantages of laparoscopy- reduced tissue trauma and less organ handling hence milder post-operative pain, faster recovery and shorter hospital stay, lower risk of wound infection and early return to everyday activities, are well applied in laparoscopic appendicectomy. Morbidity, mortality and conversion rate came down to a minimum with time and experience even in complicated appendiceal condition including retrocaecal position, gangrene, perforation and abscess. Hence laparoscopic appendicectomy should be the procedure of choice when appendicectomy in indicated.

Table-II

Prior Abdominal Procedure (n=27)

Indication	Frequency
Caesarean section	**14**
Abdominal hysterectomy	**6**
Cholecystectomy	**3**
Diagnostic laparoscopy	**2**
Laparotomy	**2**

Table-I

Indications forLaparoscopic Appendicectomy (n=113)

Indications	Frequency	Percentage
Acute Appendicites	**70**	**62%**
Gangrenous Appendicites	**15**	**13%**
Perforated appendicitis	**10**	**9%**
Interval Appendicites	**9**	**8%**
Appendicitis alucum	**7**	**6%**
Mucocele of the appendix	**1**	**1%**
Incidential	**1**	**1%**

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