

ORIGINAL ARTICLE

Association of Wound Infection with Various Surgical Technique Applied for Appendectomy in Diabetic and Hypertensive Patients

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ABSTRACT

Background: Perforated appendix in diabetic as well as hypertensive patients is associated with elevated risks of postoperative infectious complications such as wound infection and intra-abdominal abscess.

Objective: To identify better appendectomy procedure for diabetic and hypertensive patients.

Study Design: Randomized Controlled Trial

Place and Duration of Study: Department of Surgery, Unit I, Bahawal Victoria Hospital Bahawalpur from 10th October 2020 to 9th April 2021.

Methodology: Ninety eight patients meeting the criteria of perforated appendix were divided in two groups; one group consisted of 49 patients who were managed by open surgical procedure. Second group was consisted of 49 patients who were managed by laparoscopic surgical procedure. Patient outcomes in-terms of wound infections, operative time and duration of surgery was assessed.

Results: Mean age of patients was 25.49±6.03 years. There were 17 hypertensive while 15 diabetic patients. Wound infection was seen in 21% and 28% open surgery diabetic and hypertensive patients respectively in comparison to 10% and 8% in laparoscopic appendectomy diabetic and hypertensive patients respectively (p<0.001).

Conclusion: Laparoscopic appendectomy (LA) is associated with significantly lower rates of post-operative wound infections and shorter hospital stay in comparison to open appendectomy in diabetic and hypertensive patients of perforated appendicitis.

Key Words: Perforated appendix, laparoscopic, open appendectomy.

INTRODUCTION

Appendectomy is a standard management protocol in acute appendicitis cases. It is considered as one of the major emergency surgery required worldwide.¹ Any surgery requiring a cut escalated chances of wound infection at incision site. Removal appendix can be operated by two different surgical methods. One is classical open surgery approach whereas other is laparoscopic procedure. Laparoscopic surgical operation has overcome open surgeries internationally due to many reasons.²⁻⁵ Small incision site, less recovery time and post operative pain are a few of such reasons. In addition to this literature also supports the fact that laparoscopic surgeries decrease the chance of wound infection.⁶

Appendectomy is required in any age group depending upon their appendicitis status. Many of the patients running in emergency for appendectomy are associated with co-morbidities history. Diabetes mellitus one of the common co morbidity found in appendicitis patients. Patients with diabetes mellitus have reduced leukocyte functioning. The metabolic deformities of diabetes patients results into insufficient transfer of neutrophils and also macrophages to the wound site, along with impaired chemotaxis.^{7,8} These cellular variations predisposes individuals to high risk of wound infection. Similarly hypertensive patients have reduced oxygen flow resulting in decreased wound healing time. These patients have also escalated risk of extended wound discharge after a surgical procedure than their normotensive counterparts. Patients with extended wound drainage are at larger threat for infection.⁹

The present study was conducted to investigate the association of wound infection with appendectomy conducted by open surgery verses laparoscopic procedure; for better hospital care and recovery of patient without any further complications.

MATERIALS AND METHODS

This randomized controlled trial was conducted at Department of Surgery, Unit I, Bahawal Victoria Hospital Bahawalpur in collaboration with Sheikh Zayed Medical Complex, Lahore from 10th October 2020 to 9th April 2021 and comprised 98 patients. Male and female patients (14-40 years) meeting the criteria of perforated appendix presenting in emergency were included. Patients other than perforated appendix were excluded.

Informed written consent was taken from each patient and recorded age, gender, height, weight, BMI, duration of symptoms, hypertension, diabetes and smoking. Patients were divided in two groups through randomized sampling. One group consisted of 49 patients who were managed by open surgical procedure. Second group was consisted of 49 patients on whom laparoscopic surgery was performed. Thirty minutes prior to surgery patient was administered cefazolin.

Three different port sides including 10 mm of working port under umbilicus, a 3mm port for camera under suprapubic region and another 3mm port was inserted between two other ports for working. The aspirated complete intraabdominal pus was cultured. Appendiceal vessels were cauterised, clipped and divided post mesoappendix dissection. Appendix base area was

separated between endoloops and clips. The removed specimen was then placed in a recovery bag keeping biosafety SOPs under consideration. Considering open surgery incision was given at McBurney's, midline or paramedian area. Appendectomy under both type of procedures was established through the peritoneal lavage with the assistance of abundant amount of warm saline prior to wound closure. The results obtained from cultures were used for antibiotic preference. Drainage fluid amount lower than 50ml/day with a non pus clear solution was considered standard for removal of drain. Patient outcome wound infection, operative time and duration of study was assessed as per operational definition.

Data was statistically analyzed by SPSS version 23. Independent t test was used for quantitative variables and their mean and standard deviation were also calculated. The variables included age, height, weight, body mass index (BMI), duration of surgery and hospital stay. Frequencies were calculated by chi square for qualitative variables such as gender, hypertension, diabetes, smoking, by chi square test.

RESULTS

There were more male patients as compared to females. There were 81 (82.65%) males and 17 (17.34%) female patients. Hypertension was found in 17 (17.35%) and diabetes was found in 15 (15.31%) patients. The mean age was 25.49±6.03 years, mean height was 165.32±8.61 cm, mean weight was 68.03±9.98 Kg, mean body mass index

(BMI) was 24.80±2.31 kg/m², mean duration of symptoms was 2.61±1.38 days, mean hospital stay was 5.57±1.90 days and mean operative time was 40.28±11.07 minutes respectively (Table 1).

It was observed that patients with laparoscopic surgery had less frequency of wound infection in diabetics as well as hypertensive and smoker patients in comparison with open surgery appendectomy patients, statistically significant (P<0.05) difference was found (Fig. 1).

The recovery rate and duration of hospital stay for diabetic hypertensive and smoker patients were also compared within open vs laparoscopic surgery. It was observed that laparoscopic surgery had a significant decreased amount of hours stay and recovery time in reference to open surgery method (Table 2).

Table 1: Descriptive statistics of the patients

Variable	Mean±SD
Gender	
Male	81 (82.65%)
Female	17 (17.34%)
Hypertension	15 (17.35%)
Diabetes	15 (15.31%)
Height (cm)	165.32±8.61
Weight (kg)	68.03±9.98
BMI (kg/m ²)	24.80±2.31
Duration of symptoms (days)	2.61±1.38
Hospital stay (days)	5.57±1.90
Operative time (minutes)	40.28±11.07

Table 2: Association of recovery time and duration of surgery in diabetes and hypertensive patients with open vs laparoscopic surgery patients

Variable	Hospital Stay (hr)		Duration of surgery (hr)	
	Open surgery	Laparoscopic surgery	Open surgery	Laparoscopic surgery
Diabetes	7.0±1	4.3±0.82	35.2±5.6	42.6±13.1
Hypertension	5.92±1.1	4.75±1.5	37.69±10.55	55.25±9.6
Smoking	6.67±1.6	4.0±1.53	38.93±9.5	40.57±13.1

P<0.05

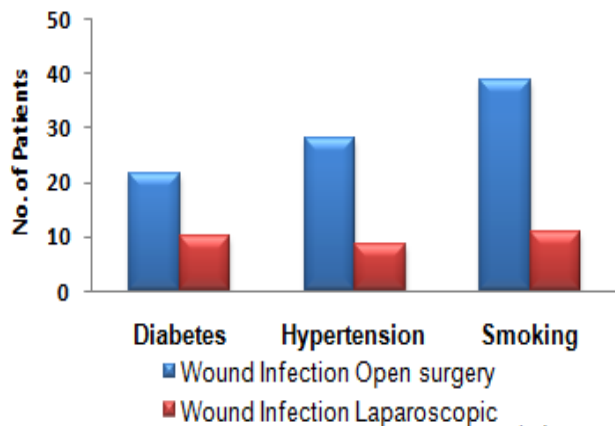


Fig. 1: Association of wound infection in diabetes and hypertensive patients with open vs laparoscopic surgery patients

DISCUSSION

In the present study a comparison and risk assessment between open and laparoscopic appendectomy in diabetic as well as hypertensive patients was done. A higher

number of male than female patients were enrolled in the study showing unequal gender distribution of appendicitis between male and females. Similar has been reported in other studies.¹⁰ Other literature also supports the fact that younger age is more prone for appendicitis cases than elderly.¹¹ This is comparable to the present study.

The role of BMI in duration of hospital has been studied extensively. It is reported that high BMI patients suffers from longer hospital stay after appendectomy. However the duration could be decreased by opting laparoscopic technique than open surgery method.¹² These result correlates with the present study.

Many studies have reported that laparoscopic procedure is a better choice in patients with diabetes or hypertension¹⁰⁻¹⁷ as also reported in present study, however there is still some literature which debate on no effect of laparoscopic method on wound infection formation in diabetic patients.¹⁸ Wound infection is the major complexity of diabetic patients.¹⁹⁻²⁰ Despite the debate this study clearly reported laparoscopic procedure to be much more appropriate in diabetic and hypertensive patients in every aspect in comparison with open surgery appendectomy.

CONCLUSION

Laparoscopic procedure secures diabetic and hypertensive patients from getting wound infection in comparison with open surgery method.

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