

Comparison of Laparoscopic and Open Appendectomy in Terms of Surgical Site Infection

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ABSTRACT

Objective: To compare the laparoscopic and open appendectomy in terms of surgical site infection.

Study Design: Retrospective study

Place and Duration of Study: Department of Surgery Unit-2, Ghulam Muhammad Mahar Medical College Hospital Sukkur from 1st January 2019 to 31st December 2020.

Methodology: One hundred patients who were further divided in two groups with 50 patients each were enrolled after clinical confirmation of appendicitis. Group A was operated through open surgery method while Group B was operated laparoscopically. The data regarding hospital stay, duration of surgery and surgical site infection through both techniques was compared and data analyzed.

Results: The mean age of patients was 26.5±5.5 years males with a percentage of 76% where as only 24% of the study cases were females. Patients undergoing laparoscopy were having reduced prevalence of surgical site infection as 10% than who underwent open surgery. Among the 26.54% of reported co-morbidity cases as well, there were 65% those who has surgical site infection with open surgery protocol.

Conclusion: Laparoscopic surgery technique is highly efficient in reducing surgical site infection in comparison to open surgery method.

Keywords: Appendectomy, Open surgery, Laparoscopic, Surgical site infection

INTRODUCTION

Appendectomy is globally most frequently required surgical procedure comprising of surgical removal of the inflamed infected appendix.¹ In cases where surgery is required for any invasive procedure the risk of infection at the site of surgery escalates. However, this risk can be managed by applying least invasive procedure with high consideration of biosafety.² The surgical technique of appendectomy can be opted by different methods. It could either be performed by the open surgical method or through laparoscopic method.³ Within these two operating methods the preferred surgical technique is laparoscopic.^{4,5} The reason for opting laparoscopic has been mostly reported as minimal incision-site, reduced time of recovery as well as decreased post-operative pain and wound infection.⁶

Appendicitis can occur at any time in life and therefore is not age restricted. In cases where appendicitis occurs at elderly ages an increased association has been observed with the comorbidities. Patients having comorbidities as diabetes are at higher risk of surgical site infection with slower wound healing than those patients having no co-morbidity. A diabetic patient has a imbalances chemotactic and reduced leukocyte and macrophage production at the surgical site.^{7,8} Similarly, those patients who are hypoxic have also reduced wound healing and results in surgical-site infection. Wound drainage for a longer period also results in surgical site infection.^{9,10}

In this study a comparison of open surgical procedure with the laparoscopic procedure is made for evaluating the appropriateness of a surgical technique in reducing surgical site infection. This study will benefit in better management and treatment of appendicitis patients with providing a more appropriate surgical technique for appendectomy.

MATERIALS AND METHODS

This retrospective study was conducted at Department of Surgery Unit-2, Ghulam Muhammad Mahar Medical College Hospital, Sukkur from 1st January 2019 to 31st December 2020 and a total of 100 patients were enrolled. An informed consent was taken from each study enrolled case. Patients who either walked in the emergency or came through medical clinics were enrolled as study

case after their complete clinical examination and total leucocyte count (TLC) blood testing. Ultrasonography was also conducted through Doppler machine, however clinical symptoms were considered as most reliable tool for identification of appendicitis. The age of the patients was between 15-50 years. Those patients who were admitted with perforation in appendix were not included in the study. Demographic details as age, BMI, clinical symptoms, type of surgical procedure, duration of surgery, infection at the surgery site and related co-morbidities were recorded on a well-structured questionnaire. Total number of patients was divided into two groups with each group having 50 patients each. The Group A was those which were operated through open surgical technique while group B were operated through laparoscopy. Cefazolin in IV was administered pre-operative half hour. Three port were created for laparoscopic appendectomy consisting of 10 mm working-port below umbilicus, 3 mm video-port via suprapubic areas and another working-port inserted between two ports. Post mesoappendix dissection a division of appendiceal vessel through cauterizing was performed. Appendix base was divided through clips and end loops usage. McBurney's-paramedian or mid-line incision was placed in open surgery procedure. Warm saline was used in both types of surgeries. Inside the Douglas pouch drains were inserted. Antibiotics in IV were delivered to each patient with careful consideration of patient's appendix culture results. An amount of drain less than 50 ml was considered as cut point for removal of drainage. Data was analyzed by using SPSS version 26.0 where Chi square test and 't' test was applied for statistical analysis having a p-value of <0.05.

RESULTS

The mean age was 26.5±5.5 years with a range between 15-45 years. Majority of the patients were males with a percentage of 76% where as only 24% of the study cases were females. The mean patient's height was as 165.32±8.61 cm with a minimal range as 143 cm while a maximal range as 190 cm. The average weight was noted as 68.03±9.98 Kg with a minimal as 46 Kg while a maximum as 100 Kg. Body mass index showed 24.80±2.31 kg/m² mean value in the present study (Table 1).

The mean symptoms duration showed that patients who underwent open surgery had a mean 3.3±1.8 days clinical

symptoms history while the maximum time of these symptoms lasting was reported as one day in open surgery patients and up to 8 days in laparoscopic cases. The mean operative time was much higher in laparoscopic surgery cases with a higher number of comorbidity cases in open surgery (Table 2).

The patients undergoing laparoscopy were having reduced prevalence of surgical site infection than who underwent open surgery. Among the 26.5% of reported co-morbidity cases as well, there were 65% those who has surgical site infection with open surgery. Statistically significant ($P < 0.05$) difference was found (Fig. 1).

Table 1: Demographic information of the patients (n=100)

Variable	No.	%
Gender		
Males	76	76.0
Females	24	24.0
Age (years)	26.5±5.5	
Height (cm)	165.32±8.61	
Weight (kg)	68.03±9.98	
Body mass index (kg/m ²)	24.8±2.31	

Table 2: Comparison of open and laparoscopic duration of symptoms, hospital stay and operative time (n=100)

Characteristic	Open surgery	Laparoscopic Surgery	P value
Symptom (days)	3.3±1.8	2.62±1.4	0.49
Hospital stay (days)	6.69±1.6	5.6±2.1	0.53
Operative time (min)	37±10.3	48±11.6	0.001
Complications	30	23	0.68

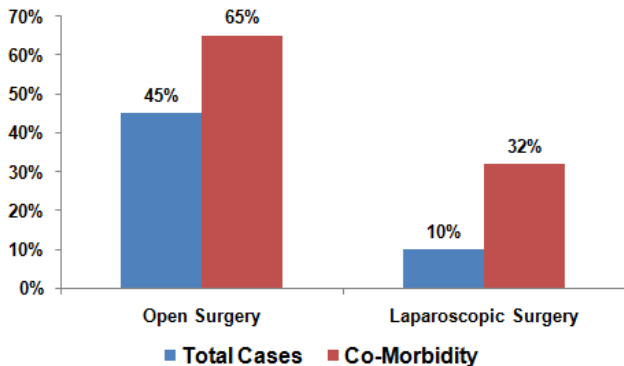


Fig 1: Surgical site infection prevalence in open and laparoscopic surgeries

DISCUSSION

The present study was a competitive study between two operating procedure for analyzing the best operating procedure for appendectomy. The operating technique was opted in relevance with reduced surgical site infection formation. This study registered various age patients which suggested that males have a higher risk of formation of appendicitis than females. Males are more prone towards appendicitis due to their life style and dietary habits than females as reported earlier in research.¹¹ Moreover, younger age boys and males have higher risk of appendicitis than females of the similar age groups.¹² Research within recent years has shown that higher basal metabolic index is significantly related with the longer duration of hospital stay and wound infections than normal BMI. In the cases where high BMI patients were involved the recommended procedure for operation in laparoscopic with less invasive in nature.¹³

Laparoscopic technique is a better method of operation than open surgery in reducing surgical site infections. In patients where co-morbidities are also presented this technique becomes highly potent and efficient than open surgery as such patients have poor healing time and increased risk of surgical site infections.¹⁴⁻²⁰ In the present research similar findings were observed where a significant reduction in surgical site infection was noticed in

laparoscopic surgical techniques in comparison to open surgery method.

CONCLUSION

Laparoscopic surgery technique is highly efficient in reducing surgical site infection in comparison to open surgery methods which have higher risk of surgical site infection especially in patients suffering from co-morbidities.

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