Port Site Infection after Laparoscopic Appendectomy: Resected Appendix Removal in Glove Versus Direct Removal through Port Site.

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ABSTRACT

Background: Minimal access surgery or laparoscopic surgery(LS) has brought a paradigm shift in the history of surgery and has gain popularity among patients and surgeons in term of early recovery and less complications. The port site infection (PSI) rate of umbilical port is 11% in case of laparoscopic appendectomy.

Objectives: To compare the PSI rate in patients who underwent laparoscopic appendectomy in whom appendix was retrieved in a bag versus those in whom it was extracted directly through port site.

Material & Methods: This randomized control trial was conducted at department of surgery Saidu teaching hospital Swat, in two years. 100 patients who were diagnosed as cases of acute appendicitis were included in study and allocated to group A or B by block technique, keeping the type of appendicitis same in both groups. All patients' underwent 3 ports standard laparoscopic appendectomy. In group A resected appendix was removed after it has been putted in a glove and the glove being closed before removing on umbilical port site while in group B it was removed directly on umbilical port site without covering appendix before removal. Data was collected and analyzed by using SPSS 21.

Results: Average operating time was 55.6 minutes in group A while in group B it was 53.6 minutes. Maximum patients presented with catarrhal appendicitis(62%) followed by suppurative (38%)in both groups A and B.Average hospital stay was 1.8days in group A patients while in group B it was 2.2days (P value 0.04). Port site infection was 4% in group A while 14% in group B patients with P value of 0.0006.

Conclusion: PSI rate is significantly high in those patients in whom resected appendix is removed directly through umbilical port site than those in whom resected appendix was removed after it has been putted in a glove before removing on umbilical port site.

Key Words: *Laparoscopy [MeSH], appendectomy [MeSH], Port site infection.*

This article may be cited as: Abbas S, Zeb J, Nadeem M, Samiullah, Khan AM. Port site Infection after Laproscopic Appendectomy: Resected Appendix Removal in Glove Versus Direct Removal Through Port site.JSMC 2019;9(1):35-7.

INTRODUCTION

Minimal access surgery or laparoscopic surgery(LS) has brought a paradigm shift in the history of surgery and has gain popularity among patients and surgeons in term of early recovery and less complications.[1] Along its brilliant outcomes it has its own package of complications. Port site infection (PSI) is one of the rare and preventable complications of LS. Although increase in sterilization of instruments and operating theaters has decrease the prevalence of surgical site infection but still it prevails.[1] Principles of SSI and PSI are same. Because of early discharge in LS the PSI surveillance had become a challenge[2,3]. The PSI rate of umbilical port is 11% in case of laparoscopic appendectomy [4]and Staphylococcus aureus the commonest causative agent[5].

At the end of laparoscopic appendectomy to retrieve the appendix usually two techniques are practiced. One is to extract appendix via port site incision directly while the second is to put the appendix in a glove and then retrieve it via port site. In order to protect the direct contact of port site and inflamed appendix we use later technique[6]. Moreover we can tie the appendix with an endoloop and the loop is railroaded through the umbilical port[7] other technique is retrograde introduction into the umbilical port and then its extraction[8]. Finger of surgical glove is also use to deliver appendix out of abdomen and to avoid the contact of inflamed appendix with port site incision[9]. In 1040 laparoscopic appendectomy performed in five years showed that the middle finger of surgical glove is quiet enough to retrieve inflamed and even perforated gangrenous appendix[10]. Tools other than gloves like bags, Condoms, zipper-type plastic bags and glove fingers are also tried with limited success[11].

Apparently contact of inflamed appendix on port site at time of retrieval is a cause of port site infection. There is very little data available regarding this statement. We have conducted our study in order to compare the PSI in patients who underwent laparoscopic appendectomy in whom appendix was retrieved in a bag and in whom it was extracted directly through port site.

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Received: August 27th 2018, Accepted: January 07th 2019

MATERIAL AND METHODS

This randomized control trial was conducted at department of surgery Saidu teaching hospital Swat, Pakistan from February 2016 to January 2018.100 patients who were diagnosed as cases of acute appendicitis, age between 15-55 years and had no comorbidities were selected randomly, while those age less than 15years, diabetics, immunocompromized, who were on immunosuppressant drugs those who had any contraindication to pneumoperetonium like coronary artery disease, COPD, respiratory distress and those in whom perforated appendix or impending perforation was suspected were excluded from the study. All sample patients were allocated to group A or B by block technique, keeping the type of appendicitis same in both groups A and B. All patients underwent standard laparoscopic appendectomy, with 10mm supraumblical port, 10mm left iliac fossa port and another 5mm suprapubic port. Appendectomy was performed by the same surgeon in all patients. In group A resected appendix was removed after it has been putted in a glove and the glove being closed before removing on umbilical port site while in group B it was removed directly on umbilical port site without covering appendix before removal. Patients were examined for port site infection after one week. Patients were asked to report early if any port site infection develop. A dose of second generation cephalosporin was given intravenously to all patients at time of anesthesia. Patients were followed for 10 days. Those who develop erythema, painful wound swelling with purulent discharge at port site were considered as port site infection. Data was collected by resident on duty using pre designed questionnaire including questions of interest and analyzed by using SPSS 21. Categorical variables were expressed in frequency and percentages while continuous in mean and standard deviation.

RESULTS

In group A 60% patients were male, 40% females while in group B 56% male and 44% females. Maximum age was 55years, minimum 18 years in group A while maximum of 51 and minimum of 15years in group B. Average operating time was 55.6minutes in group A with minimum of 30minutes and maximum 88 minutes while in group B average operating time was 53.6 minutes with minimum of 25 and maximum of 85 minutes details are given in table:1. Maximum patients presented with catarrhal appendicitis followed by suppurative and perforated appendicitis in both groups A and B.

In group A patients had minimum hospital stay of 1 and maximum of 4 days while in group B patients it was 1 and 6days days respectively (P value 0.04). There was a significant difference between port site infection rate in both groups 4% in group A while 14% in group B patients (P value 0.006).

DISCUSSION

In our study we had more male population in either group i.e 60% in group A and 56% in group B with female population of 40% in group A and 44% in group B. Other studies also recorded most patients in younger age group with maximum age upto 80years. But anyhow age of the patient is not related to infection rate at port site.[12] We had noted an overall infection rate of 18% as a whole with 14% in group B and 4% in group A. Different studies had shown different infection rate.[13, 14, 15] A study conducted at Egypt recorded an infection rate of 15% after laparoscopic appendectomy. [16] Hamzaoglu et al. reported an overall infection rate of 11% after laparoscopic appendecectomy.[4]

Table:1. Comparison of variables among both groups

Variables		Group A	Group B
Mean Age(in years)		21.5±6.8	25.3±7.2
Gender	Male	30(60)	28(56)
	Female	20(40)	22(44)
Type of appendicitis	Catarrhal appendicitis	31(62)	31(62)
	Suppurative appendicitis	19(38)	19(38)
Mean operating time(in minutes)		55.6±7.4	53.5±6.8
Average Hospital stay (in days)		1.8±1.1	2.2±1.4
Port site infection		2(4)	7(14)

*() shows percentage

Maximum patients presented with catarrhal appendicitis followed by suppurative in both groups i.e. 62% and 38% respectively. We had an average hospital stay of 1.8% in group A and 2.2days in group B patients. We have noted port site infection of 4% in group A while14% in group B, so port site infection rate was significantly high in those in whom resected appendix was removed directly on umbilical port site without covering appendix before removal than those in whom resected appendix was removed after it has been putted in a glove and the glove being closed before removing on umbilical port site compared to those. Ahmad at el. Reported port site infection rate in patients undergone laparoscopic appendectomy comparing removal in a reusable bag to direct extraction of resected appendix through port site. They noted median age of 21years, 58.3%males, 41.7%females, mean operating time of 55.7 minutes and port infection rate of 1.7% in the group in whom appendix was removed using a reusable retrieval bag and median age of 25years, 53.3% males, 46.6% females, mean operating time of 57minutes and port infection rate of 13.3% in the group in whom appendix was removed directly through port site without using a retrieval bag. So this study is also in accordance with ours and supports most of our finding as the author had also significant increase port site infection rate in those in whom resected appendix was removed without using a retrieval bag after laparoscopic appendectomy.[16]

CONCLUSION

There is significantly high infection rate is in those patients in whom resected appendix was removed directly on umbilical port site without covering the appendix before removal than those in whom resected appendix was removed after it has been putted in a glove and the glove being closed before removing on umbilical port site.

Conflict of Interest

Authors declare no conflict of interest.

Acknowledgment

The appreciation of this whole research work goes to our kind supervisor Dr. Mohammad Zarin, consultant surgeon, Department of surgery Khyber teaching hospital, Peshawar.

Authurs Contribution

Shah Abbas: Conception and design of study.

Junaid Zeb: Statistical expertise, abstract and article writing.

Muhammad Nadeem: Collection and assembly of data.

Syed AsadMaroof, Farooq Khan, Shahid Alam: Drafting of the article.

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