

Incidence of Surgical Site Infections in patients undergoing appendicetomy

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INTRODUCTION

Appendicitis, it is an inflammation of the appendix, which is also one of the most common cause of pain abdomen and acute abdomen. This is also one of the most frequent reasons for an emergency abdominal surgery in the world.¹ Appendicitis remains the most common surgical emergency after traumatology and most frequent cases performed in surgical emergency after trauma cases are appendicitis. The incidence of appendicitis is very high in young population and is approximately 233/100,000 in general population and most cases occur in the 10 to 19 year age group. Its incidence is also higher in males as compared to females which is 1.4:1, the lifetime incidence of appendicitis is 8.6% in males as compared to 6.7% for females², and another study revealed that annual cases in operation theatre related to appendix reach up to 300000. Most of the appendix related surgeries are being performed in emergency settings³.

The appendix is considered as true diverticulum from the wall of cecum which is different from acquired diverticulum in a regard that acquired diverticulum consist only part of layers which form enteric wall while appendix contains all the component of gut wall that includes, mucosa, submucosa, muscularis, and the serosal covering⁴.

Majority of appendicectomies in emergency settings are being performed through open techniques in our region while some elective appendicectomies are being performed through laparoscopic techniques which has led to decrease in surgical site infections (SSIs), length of hospital stay, and cost of operation.^{5,6} Postoperative wound infection remains a threat, especially in complicated appendicitis like gangrenous and perforated, and also in those patients who are fatty and they have some chronic illness like diabetes mellitus, chronic asthma with steroids intake. The incidence of wound infection can be reduced by the use of prophylactic antimicrobial therapy, good sterilization and disinfection, effective hemostasis, prevention of contamination of incision and by adhering to standards of care and proper tissue handling during the surgical procedures⁷.

Recent data which is published in different papers indicate that incidence of infection after

appendicetomy is 2.8% in laparoscopic appendicetomy and 4.6% in open appendectomies in South east Asia⁸ and 7.2%, 6.2%, and 5.9% in South America⁹, China¹⁰ and Sweden¹¹, respectively. There is also published data regarding the incidence of surgical site infection in different healthcare facilities across Pakistan¹¹. The Government facilities usually provide care without any cost to all the patients presenting to them regardless of their Religion, Cast and economic status. The majority of patients belong to lower middle socioeconomic class, mainly male population and aged 15–50yrs. As appendectomy is frequently performed operation in our hospital so we have decided to conduct this study to have some local data which can be compared with national and international studies. This will help us to improve our quality of care in DHQ teaching Hospital, a tertiary care hospital in Dera Ghazi Khan, and comparing our result of incidence of SSI with external benchmarks from the CDC/NHSN and INICC.

METHODS

It was a longitudinal study that took place at DHQ Teaching Hospital, Dera Ghazi Khan which is one of main health providing facility in our area and a tertiary care hospital, providing healthcare facilities to patients from neighboring areas as well. All cases which were diagnosed as acute appendicitis and underwent appendectomy were included in this study. The diagnosis of appendicitis was established by consultant on duty with the help of clinical sign and symptoms, laboratory and radiological findings. Exclusion criteria was,

- Age below 15 years or above 50 years
- Diabetes or immunocompromised status
- Smoker or having any other addiction like Naswar
- BMI not more then 30

The standardized surveillance criterion which is used for defining surgical site infection and developed by the CDC was used¹². The patient's physical status before surgery was assessed by American Society of Anesthesiologists (ASA) score. The surgical procedures were categorized into clean contaminated and contaminated; on the basis of presence of contamination. Additional information like

age of patient, sex, smoker, diabetes and body mass index was also collected and analyzed. The result of bacteriologic studies was also collected from the wounds of patients which have developed the surgical site infection.

The surveillance process includes the diagnosis of surgical site infection in about one month after the operation, whether hospitalized or after discharge. The surveillance was done by a trained infection control personnel and nurse. The confidentiality of patients was also maintained by the infection control staff by coding all the data with care. Statistical analysis of collected data was done by using SPSS version 10. The incidence of SSI was calculated by dividing the number of infections by the number of operations performed in defined period and multiplying by 100. Comparative analysis among patients was done by using chi-square test. Relative risk ratios (RR), 95% confidence intervals (CI), and *p*-values were also calculated.

RESULTS

Two hundred and one patients having surgery for appendicitis were included in this study between 1st May 2016 and 31st Oct 2016.

Table 1: Gender Distribution (n=201)

Male	155
Female	46

Table 2: Age Distribution (n=201) Mean 28.71 years±

Age Group (years)	Number of patients
15-20	11
21-25	35
26-30	42
31-35	38
36-40	32
41-45	26
46-50	17

Table 3: Procedure technique (n=201)

Laparoscopic Appendicectomy	20
Open Appendicectomy	181

Table 4: Nature of Procedure upon operative findings (n=201)

Clean contaminated	149 (74.12%)
Contaminated	37 (18.40%)
Dirty	15 (7.46%)

Table 5: Incidence of Surgical site infection (n=201)

Group	Superficial SSI	Deep SSI
Clean contaminated	9 (6.04%)	0
contaminated	5 (13.51%)	0
Dirty	6 (40%)	1 (6.6%)

DISCUSSION

The surgical site infection rate found in our hospital was higher than that reported by CDC/NHSN, which depended mainly on nature of cases upon operative findings. The infection rate for clean contaminated cases in our hospital was slightly higher than the CDC/NHSH, despite efforts have been made to control infection rate it was yet found higher. It is important to emphasize the surveillance of SSIs and compliance monitoring with the surgical operation, there is also importance of antibiotic prophylaxis, perioperative vital monitoring, postoperative prevention of hypothermia, and hair removal practices. Factors related to SSIs in the patient population included nature of disease and its severity like complicated appendectomies (e.g., gangrenous, perforated). The population studied included mainly natives of lower Punjab except three patients which belong to Balochistan, which are common patients in our hospital due to vicinity of Balochistan. Despite the methods used for detection of surgical infections after discharge, it is important to take into the account that patients with SSIs will get medical care from general practitioners and even sometimes from quacks after discharge. These patients usually do not come back and this factor can contribute to the worsening of SSI. Also number of operation included in the study can affect the power of risk factor analysis. At present there is no national SSI scoring system or benchmark present so we used US CDC/NHSN data for references of and evaluation of our results and future quality improvement.

CONCLUSION

Our study has concluded that the incidence of surgical site infection is higher in our hospital as compared to external benchmarks, with an increased rate of infection during the study period. The data collected can now be used to evaluate our standards of care and this will help us to improve our quality in hospital. This study will also help us to know about the organism prevalent in our hospital and cause of SSI. This will also help us to formulate hospital antibiotic policy.

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