

Research Article

Frequency of Surgical Site Infection in Emergency Appendicectomy for Complicated Appendicitis

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Abstract:

Objective: To find out the frequency of surgical site infections in emergency appendectomy for complicated appendicitis

Method: This cross-sectional study was conducted at Khyber Teaching Hospital, MTI, Peshawar from November 20, 2021 to August 12, 2022. We included 131 patients, who had undergone emergency appendectomy for complicated appendicitis. The sampling technique was consecutive non-probability sampling. Confidence interval of 95% and 7% margin of error were considered. The patients with complicated appendicitis on appendicectomy were included in the study. Demographic data (age, gender), history of active smoking or diabetes mellitus at admission, procedure duration, appendicitis-type according to surgical findings (grossly inflamed, gangrenous, perforated), BMI were noted. All the data were collected on a proforma (Annex 1). SPSS software (version 23.0) was used for data analysis.

Results: Out of 131 patients, 88 (67.2%) were males and 43 (32.8%) were females with mean age of 33±2.3 years and mean BMI of 26±5. Frequency of surgical site infections among clean, clean-contaminated, contaminated, and dirty wound infections were 5/17 (29%), 20/67 (30%), 13/30 (43%), and 8/17 (49%) respectively. The overall frequency of surgical site infection was 46/131 (35%). Out of these 46 cases, 25 (54.3%) were superficial SSIs, 14 (30.4%) were deep SSIs and 07 (15.2%) were deep/space occupying SSIs.

Conclusion: In our study, the frequency of surgical site infections is 35% which is higher compared to other studies conducted. So proper preoperative and postoperative cares should be taken to decrease the frequency or incidence of surgical site infection in the department.

Introduction

Appendicitis is an acute inflammation of the vermiform appendix.^[1] Evidence suggest that acute appendicitis is the most common abdominal surgical emergency, with an incidence of almost 100 per 100 000 person-years. Evidence suggests appendectomy, the surgical removal of the vermiform appendix, as first-line treatment for acute appendicitis, although antibiotic therapy may be efficacious for a selected group of patients with uncomplicated acute appendicitis. Appendectomy is a relatively safe surgical intervention with a case fatality rate of 2.1—2.4 per 1000 patients, as reported in studies conducted in Europe.^[2,3] Appendectomy can be performed through a laparoscopic or an open surgical technique, with laparoscopy being the most recommended method. This is because the former is associated with reduced postoperative pain, a short length of hospital stay with a subsequent earlier return to day-to-day activities, reduced postoperative ileus and better cosmetic results. Like all surgical procedures, appendectomy can be associated with surgical site infections (SSI) which can be associated with a prolonged postoperative morbidity, which is a substantial additional healthcare cost, making this complication a concern for all surgical teams.^[4,5] According to

Clinical and pathological findings, acute appendicitis are divided into two subtypes as complicated and uncomplicated. It is classified as complicated appendicitis in the case of perforation of the appendix, gangrenous formation, appendicular mass and abscess development due to appendicitis. Complicated acute appendicitis needs open emergency surgical appendicectomy.^[6] Superficial incisional SSI will be defined according to CDC criteria^[7] as follows: (1) infection occurring within 30 days postoperatively; and (2) involving only skin and subcutaneous tissue of the incision. One of the following conditions must also be met: (1) purulent drainage from the superficial incision; (2) organisms isolated from an aseptic culture of fluid or tissue from the superficial incision; (3) has at least one of the signs and symptoms (i.e., pain or tenderness, localized swelling, redness, or heat); or (4) superficial incision is deliberately opened by the surgeon with or without positive culture.

Material and Methods:

This cross-sectional study was conducted at Khyber Teaching Hospital, MTI, Peshawar from November 20, 2021 to August 12, 2022. We included 131 patients, who had undergone emergency appendectomy for complicated appendicitis. The

sampling technique was consecutive non-probability sampling. Confidence interval of 95% and 7% margin of error were considered. All the patients presented to emergency department of surgery with diagnosis acute appendicitis were admitted in surgical ward. The patients with complicated appendicitis on appendicectomy were included in the study. All patients were operated on after general anesthesia in emergency operation theater through incision on Mc Burny point. they received intravenous broad spectrum antibiotics just before surgery and 3 days postoperatively followed by oral antibiotics for 7 days. Patients remained admitted for 3-5 days and were followed-up in surgical OPD on weekly basis for 30 days. Any surgical site infection till this time were noted. Demographic data (age, gender), history of active smoking or diabetes mellitus at admission, procedure duration, appendicitis-type according to surgical findings (grossly inflamed, gangrenous, perforated), BMI were noted. All the data were collected on a proforma (Annex 1). SPSS software (version 23.0) was used for data analysis.

Inclusion criteria:

1. Both genders
2. Patients of 20-60 years of age
3. Patients who have undergone emergency appendicectomy for complicated appendicitis.

Exclusion criteria:

1. Patients with acquired immune deficiency syndrome
2. Patients who are taking immune-suppressant drugs
3. Patients with no possibility to be followed up

Results

Out of 131 patients, 88 (67.2%) were males and 43 (32.8%) were females with mean age of 33±2.3 years and mean BMI of 26±5 (Table 1). 21(16%) patients were hypertensive, 7(5.3%) were diabetic and 29(22.1%) were active smoker (Table 2). Frequency of surgical site infections among clean, clean-contaminated, contaminated, and dirty wound infections were 5/17 (29%), 20/67 (30%), 13/30 (43%), and 8/17 (49%) respectively. The overall frequency of surgical site infection was 46/131 (35%) (Table 3).

Table 1: Demographic variables			
Age (years)	Mean±SD	33±2.3	
		Number	Frequency
	20-30	40	31.5%
	31-40	28	21.1%
	41-50	37	28.3%
	51-60	26	20.1%
Gender	Males	88	67.2%
	Females	43	32.8%
BMI	Mean±SD	26±5	

Table 2: Clinical Variables		
	No.	Frequency
Hypertension		
Yes	21	16%
No	110	84%
Diabetes Mellitus		
Yes	7	(5.3%)
No	124	(94.7%)
Active Smoking		
Yes	29	22.1%
No	102	77.9%

Out of these 46 cases, 25 (54.3%) were superficial SSIs, 14 (30.4%) were deep SSIs and 07 (15.2%) were deep/space occupying SSIs (Table 4). On culture, staph. Aureus was causing 24 (52%) SSIs, Proteus was causing 2 (4.3%) SSIs, Klebsiella was causing 4 (8.6%) SSIs, E.coli was causing 11 (24%) SSIs and Pseudomonas was causing 5 (11%) SSIs (Table 5).

Table 3: Frequency of Surgical Site Infections According To Wound Class After Emergency Appendectomy			
Wound Class	No. of cases	No. of infected cases	% of infected cases
Clean	17	5	29%
Clean-contaminated	67	20	30%
Contaminated	30	13	43%
Dirty	17	8	49%
Total	131	46	35%

Table 4: Frequency Of Types Of SSI After Emergency Appendectomies		
Type	No. of cases	Percentage
Superficial	25	54.3%
Deep	14	30.4%
Organ/Space	07	15.2%

Table 5: Frequency Of Microorganisms In Surgical Site Infection After Emergency Appendectomy		
Organisms	No. of infected cases	%
Staph. Aureus	24	52%
Proteus	02	4.3%
Klebsiella	04	8.6%
E.coli	11	24%
Pseudomonas	05	11%
Aerugenosa		

Discussion

Various research studies have given heterogeneous results for surgical site infection in emergency appendectomy for complicated appendicitis, Lemieur and coworkers found a surgical site infection rate of 24%.^[7] Chiang and others in 2006 found a surgical site infection rate of 43.9%.^[8] while Tsang et al found it to be 21%.^[9]

In two studies in Europe, Petrosillo et al. in 2008 had a total of 5.2% cases of SSI in a multicentric prospective study, while Aranda-Narvaez et al. in 2014 had an overall SSI rate of 13.4%.^[10,11] Two other studies in Egypt and Qatar found a rate of 21.9% and 3.6%, respectively.^[12,13] Studies from the US showed SSI rates ranging from 2–5%.^[14,15] In our study, the frequency of surgical site infections is 35% which is higher compared to other studies conducted.

Conclusion

In our study, the frequency of surgical site infections is 35% which is higher compared to other studies conducted. The following measures need to be taken in order to decrease incidence of SSIs:

- Proper preoperative wound cleansing
- Reconsidering the use of drainage system
- Formulating clear guidelines about the environment and protocols of the operating room, especially in emergency settings,
- Strict operation theatre regulation practices, such as restricting the number of personnel in the operating room, and
- Use of antimicrobial prophylaxis.

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