

ORIGINAL ARTICLE

Compare the Incidence of Surgical Site Infection after Appendectomy Wound Irrigation with Normal Saline and Imipenem Solutions

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ABSTRACT

Objective: To compare the incidence of surgical site infection after appendectomy wound irrigation with regular saline solution and imipenem solution.

Study Design: Comparative randomized control trial

Place and Duration of Study: Department of Surgery Unit-1, Sandeman Provincial Hospital Quetta from 1st September 2020 to 30th April 2021.

Methodology: Eighty patients of both genders were presented in this study. Patients detailed demographics age, sex and body mass index were recorded after taking informed written consent. Patients underwent for appendectomy wound irrigation were included. Patients were equally divided into two equal groups, I and II. Group I had 40 patients and received imipenem and group II irrigated with saline solution with 40 patients. Outcomes were surgical site infection, deep abscess formation was observed post-operatively.

Results: The mean age of the patients in group I was 26.11±2.03 years with mean BMI 23.61±3.32 kg/m² and in group II mean age was 25.14±3.12 years with mean BMI 22.14±4.88 kg/m². In group I, 32 (80%) patients had inflamed appendix, perforated appendix was in 7 (17.5%) and gangrenous appendix in 1 (2.5%) while in group II inflamed appendix in 34 (85%), perforated appendix in 4 (10%) and gangrenous appendix 2 (5%). Surgical site infection in group I was 3 (7.5%) and abscess formation in 2 (5%) cases while in group II SSI in 6 (15%) and abscess formation in 3 (7.5%) cases.

Conclusion: Imipenem irrigation after appendectomy reduces wound infection. Healthcare costs and patient suffering due to infection can be reduced.

Keywords: Imipenem solution, Wound irrigation with saline, Appendectomy wound infection

INTRODUCTION

An infection at the surgical site complicates hospitalization, leading to longer hospital stays, more critical care unit admissions, more readmissions following surgery, and higher expenses along with longer adjuvant systemic therapy delays. Affected patients make about 2 to 5 percent of all surgical patients, and their mental health, income, and productivity are all negatively impacted as a result.¹⁻³

Up to 300,000 SSIs are diagnosed and treated each year, placing an enormous strain on healthcare systems in terms of re-operations, greater postoperative pain and wound healing issues as well as prolonged hospital stays and poorer quality of life.⁴⁻⁷

As well as SSI, incisional hernia has been associated to the disease.⁸ Incisional superficial SSI is the most common and easiest to identify SSI after abdominal surgery.⁹

Researchers in poor and middle-income nations found that SSIs were the leading source of hospital-acquired infections.¹⁰ Recently a range of measures have been taken to combat surgical site infections. Skin cleanliness and hair removal are also part of the procedures. Other protocols include antimicrobial prophylaxis prior to surgery, the use of plastic adhesive skin barriers, high-flow oxygen supplementation, wound protection and sterility of tools.¹¹⁻¹⁵

The patient's age, comorbidity status (such as smoking), obesity, malnutrition, and immunosuppression, as well as malignancies and the type of contamination of the wound, are all risk factors for SSI development.^{9,16}

When it comes to SSIs in emergency surgery, there are a variety of risk factors, such as infected and unclean wounds and a high American Society of Anesthesia (ASA) A position document on surgical site infection prevention was developed by the World Society of Emergency Surgery (WSES) (OR). Questions and findings of systematic literature reviews were discussed in a meeting of worldwide experts. Weak data from an emergency scenario led to the majority of reviewed literature focusing on SSI in elective surgery. Patient enrolment and data collection have been hampered as a result of the difficulty of conducting a high-quality study in an emergency setting. After appendectomy, we used imipenem-based saline irrigation as a prophylactic measure to reduce SSI.

MATERIALS AND METHODS

This comparative study was conducted at Department of Surgery, Sandamen Provincial Teaching Hospital, Qutta from 1st September 2020 to 30th April 2021 and comprised of 80 patients. Patient's detailed demographics were recorded. Patients did not provide any written consent were excluded. Patients were aged between 15-60 years of age. Patients details demographics age, sex and body mass index were recorded after taking informed written consent. Patients underwent for appendectomy wound irrigation were included. Patients were equally divided into two equal groups, I and II. Group I had 40 patients and received imipenem and group II irrigated with saline solution with 40 patients. Outcomes were surgical site infection, deep abscess formation was observed post-operatively. The data was entered and analyzed through SPSS-25.

RESULTS

There were 25 (62.5%) males and 15 (37.5%) females in group I while in group II, 25 (62.5%) males and 15 (37.5%) females respectively. Mean age of the patients in group I was 26.11±2.03 years with mean BMI 23.61±3.32 kg/m² and in group II mean age was 25.14±3.12 years with mean BMI 22.14±4.88 kg/m². In group I, 32 (80%) patients had inflamed appendix, perforated appendix was in 7 (17.5%) and gangrenous appendix in 1 (2.5%) while in group II inflamed appendix in 34 (85%), perforated appendix in 4 (10%) and gangrenous appendix 2 (5%) [Table 1].

Surgical site infection in group I was 3 (7.5%) and abscess formation in 2 (5%) cases while in group II SSI in 6 (15%) and abscess formation in 3 (7.5%) cases (Table 2). Satisfaction among patients of group I was 90% while in group II satisfaction rate was 80% (Table 3).

Table 1: Baseline details demographics of enrolled cases

Variable	Group I	Group II
Mean Age (years)	26.11±2.03	25.14±3.12
Mean BMI (kg/m ²)	23.61±3.32	22.14±4.88
Gender		
Male	25 (62.5%)	25 (62.5%)
Female	15 (37.5%)	15 (37.5%)
Operative findings		
inflamed appendix	32 (80%)	34 (85%)
Perforated appendix	7 (17.5%)	4 (10%)
Gangrenous appendix	1 (2.5%)	2 (5%)

Table 2: Post-operatively outcomes among both groups (n=80)

Infection	Group I (n=40)	Group II (n=40)
Surgical site infection	3 (7.5%)	6 (15%)
Abscess formation	2 (5%)	3 (7.5%)
Total	12 (12.5%)	9 (22.5%)

Table 3: Comparison of satisfaction among both groups

Satisfaction	Group I	Group II
Yes	36 (90%)	32 (80%)
No	4 (10%)	8 (20%)

DISCUSSION

Majority of the 62.5% were males with mean age 26.11±2.03 years. Our findings were comparable to the previous studies in which most of the patients were males.¹⁷ In current study, group I, 32 (80%) patients had inflamed appendix, perforated appendix was in 7 (17.5%) and gangrenous appendix in 1 (2.5%) while in group II inflamed appendix in 34 (85%), perforated appendix in 4 (10%) and gangrenous appendix 2 (5%).¹⁸ We found that surgical site infection in group I was 3 (7.5%) and abscess formation in 2 (5%) cases while in group II SSI in 6 (15%) and abscess formation in 3 (7.5%) cases. SSI rates after appendectomy can be decreased with simple wound lavage, according to Quiroga-Garza et al¹⁹, lidocaine, a relatively weak bacteriostatic drug, can also be used in lavage and its efficacy is increased. An antibiotic, such as imipenem, is added to irrigation in our trial, increasing its effectiveness in reducing infection. In the present study, a significant reduction in infection rates in the imipenem group but in both the groups most of the infections were found in patients who had perforated appendix on presentation. Similarly, all the patients who developed abscesses in our study had either perforated or

gangrenous appendicitis. However, in both groups, the majority of infections were observed among individuals who had a perforated appendix on presentation. The appendicitis in our study was either perforated or gangrenous in all of the individuals who developed abscesses.^{20,21}

The irrigation agent imipenem has been explored in the past. Saline irrigation had an SSI rate of 9.8 percent and abscess formation of 4.2 percent, whereas imipenem irrigation had just an SSI and abscess formation rate of 0.5 percent, according to Parcels et al.²² There was no evidence for reduction in abscess formation in our study, but it could be related to the small sample size. Using imipenem irrigation to treat perforated appendicitis, Hesami and colleagues²³ observed that infection rates were reduced significantly (4.4% as opposed to 22.2%), resulting to a shorter hospital stay and lower healthcare expenses.

To compare SSI between delayed primary wound closure and primary wound closure in difficult appendicitis and other abdominal wounds, Siribumrungwong et al²⁴ conducted a comprehensive review and meta-analysis in 2014. Meta-analysis was conducted on eight studies: five on complex appendicitis, two on complicated appendicitis and various abdominal operations, and one on ileostomy closure. There was a considerable bias risk in the sequence creation and allocation concealment of most research (75 percent). The SSI between primary closure and delayed primary closure in six RCTs in severe appendicitis that had open appendectomy was 0.89, which was not statistically significant (95% CI, 0.46, 1.73). Primary closure that was delayed by 1.6 days (95%, CI 1.41 to 1.79 days) had a substantially longer length of stay than primary closure.

CONCLUSION

After an appendectomy, surgical site infection is a severe medical concern that raises the cost burden on both the healthcare system as well as on the individual patient It also has a negative impact on the patient's quality of life in terms of their health. Imipenem irrigation after appendectomy reduces wound infection. Healthcare costs and patient suffering due to infection can be reduced.

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