

# Compare the Frequency of Surgical Site Infections Following Irrigation of Appendectomy Wounds with Sterile Saline Solution Vs Imipenem Solution

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## ABSTRACT

**Objective:** The purpose of this study was to compare the frequency of surgical site infection following appendectomy wound irrigation with imipenem solution versus ordinary saline solution.

**Study Design:** Randomized/ Prospective study

**Place and Duration:** This prospective randomized study was conducted at Department of Surgery, Jinnah International Hospital, Abbottabad and MTI Hayatabad Medical Complex Peshawar in the period from 01 July, 2022 to 31 December, 2022.

**Methods:** Total 106 patients of acute appendicitis who underwent for appendectomy were included. After getting informed written consent detailed demographics of enrolled cases were recorded. Patients were categorized in two groups. Fifty-three cases of group I received imipenem solution at closure of wound and group II was irrigated with saline solution in fifty three cases. Patients were followed for surgical site infection and the development of deep abscesses after surgery.

**Results:** In all there were majority 63 (59.4%) males and 43 (40.6%) females. Patients mean age in group I was 26.7±3.43 years and had mean BMI 22.15±11.23 kg/m<sup>2</sup> while in group II mean age was 25.16±6.39 years with mean BMI 21.14±16.44 kg/m<sup>2</sup>. Frequency of catarrhal inflammation was 47 (88.7%) in group I and 44 (83.02%) in group II followed by perforated appendix and gangrenous appendix. Frequency of SSI in group I was lower found in 4 (7.5%) as compared to group II in 8 (15.1%) cases with p value <0.005. There was no any significant difference observed in abscess formation among both groups

**Conclusion:** In this study, we came to the conclusion that irrigation with imipenem solution can aid to lessen wound infection following appendectomy. It is simple to do and can lower medical expenses as well as patients' suffering from infections.

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

## INTRODUCTION

At 10 occurrences per 100,000 people annually, acute appendicitis is one of the most frequent surgical emergencies worldwide [1]. The gold standard therapy for acute uncomplicated appendicitis is appendectomy, even if appendicitis accompanied with a mass or abscess is often managed conservatively or with ultrasound-guided closed drainage [2]. The standard open procedure or laparoscopic methods can both be used to remove an appendix. Appendectomy complications might include stump appendicitis, intestinal blockage, abdominal/pelvic abscess, and surgical site infection (SSI) [3].

Compared to laparoscopic appendectomy, open appendectomy showed a greater incidence of overall and incisional SSI (6.7% vs. 4.5%), although the incidence of organ/space SSI was the same in both groups (3%). Another observational research [5] showed that open appendectomy resulted in greater incidence of superficial SSI (9%) compared to laparoscopic appendectomy (5%).

There are several factors that might increase the risk of surgical site infection, hence many preventative measures have been proposed. Prophylactic intraoperative wound irrigation is one of them. This straightforward technique involves transferring a solution through the surface of an open wound to achieve tissue hydration. When using antibiotics or antiseptics, it may have a bactericidal impact in addition to removing and diluting bodily fluids, microorganisms, and cellular debris. Intraoperative wound irrigation is frequently used by surgeons. [6] Not all nations or hospitals, nevertheless, include it in common practise. Methods also differ depending on the population, application surface, procedure, and solutions employed. Studies looking at how intraoperative wound irrigation affects healing have revealed similar variations in methods and results. [7] Few current recommendations on preventing surgical site infections have addressed the issue of intraoperative wound irrigation and offered competing recommendations. Intraoperative wound irrigation and intraperitoneal lavage were advised by National Institute for Health and Care Excellence recommendations published in 2008 and revised in 2013. [8] Incision lavage with antibiotics was

recommended in 2014 by both the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America. [9]

Over the years, several measures have been suggested and put into practise in an effort to stop SSI. These include the methods for cleansing the skin, hair removal, maintaining intraoperative normothermia, administering preoperative antimicrobial prophylaxis, using plastic adhesive skin barriers, supplementing high flow oxygen, protecting the wound, ensuring the sterility of the instruments, preparing the bowel, the length of the incision, and delaying the closure of the primary incision [10–12].

The onset of SSI is multifaceted and may be influenced by the patient's risk factors, including age, comorbidities, smoking habit, obesity, malnutrition, immunosuppression, malignancies, and the kind of contamination of the wound [13].

Since emergency surgery frequently involves contaminated and filthy wounds, lengthy operations, patients with comorbid conditions, and surgeons with high American Society of Anesthesiologists (ASA) scores, this form of surgery has a significant risk of surgical site infection (SSI). These factors prompted the World Society of Emergency Surgery (WSES) to create a position paper on SSI prevention in the operating room (OR).

Clean contaminated surgery is the classification for appendectomy for non-perforated appendicitis. The effectiveness of preoperative antibiotic usage in avoiding infectious problems following surgery has been demonstrated by a variety of authors. [14, [15]

In a randomized controlled experiment, we employed imipenem-based saline solution irrigation at our institution as a preventative approach to lower SSI after appendectomy. The findings are reported below.

## MATERIAL AND METHODS

This prospective randomized study was conducted at Department of Surgery, Jinnah International Hospital, Abbottabad and MTI Hayatabad Medical Complex Peshawar in the period from 01 July,

2022 to 31 December, 2022 and comprised of 106 patients. The study comprised patients who were between the ages of 20 and 40 who had acute appendicitis. Patients having comorbid conditions including diabetes mellitus, chronic renal failure, chronic liver disease, or any other immunocompromised state were excluded from the study. Also excluded were those who had a known hypersensitivity to carbapenems. Prior to enrolment, each patient was informed about the study and required to sign a written consent form.

In two groups of patients, I and II, non-probability consecutive sampling was used to split the patients. Grid iron incision open appendectomy was performed on both groups. Before the wound was stitched up, the tissues in group I were irrigated with one litre of saline containing one gramme of imipenem (1 mg/ml), while group II received one litre of regular saline. All of the patients in both groups received the usual post-operative care after surgery, which included an intravenous antibiotic and analgesics. Three weeks following surgery, patients were monitored for the development of deep abscesses and SSI. All of the data were analysed using SPSS 22.0. For categorical data, frequencies and percentages were utilized.

**RESULTS**

In all there were majority 63 (59.4%) males and 43 (40.6%) females in this study.(table 1)

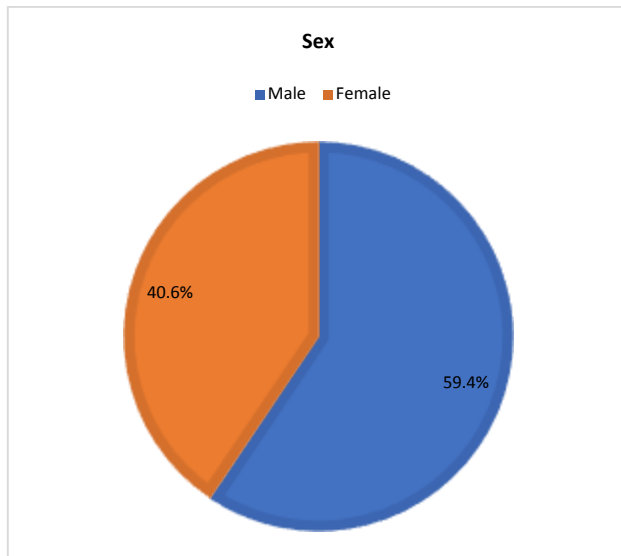


Figure-1: Patients distribution with gender

Patients mean age in group I was 26.7±3.43 years and had mean BMI 22.15±11.23 kg/m<sup>2</sup> while in group II mean age was 25.16±6.39 years with mean BMI 21.14±16.44 kg/m<sup>2</sup>. Frequency of catarrhal inflammation was 47 (88.7%) in group I and 44 (83.02%) in group II followed by perforated appendix and gangrenous appendix.(table 2)

Table 1: Detailed demographics of the included cases

Variables	Group I	Group II
Mean age (years)	26.7±3.43	25.16±6.39
Mean BMI (kg/m <sup>2</sup> )	22.15±11.23	21.14±16.44
Findings of Surgery		
catarrhal inflammation	47 (88.7%)	44 (83.02%)
perforated appendix	6 (11.3%)	7 (13.2%)
gangrenous appendix	0	2 (3.8%)

Frequency of SSI in group I was lower found in 4 (7.5%) as compared to group II in 8 (15.1%) cases with p value <0.005. There was no any significant difference observed in abscess formation among both groups.(table 3)

Table-2: Association of SSI and abscess formation

Variables	Group I	Group II
Surgical Site Infection		
Yes	4 (7.5%)	8 (15.1%)
No	49 (92.5%)	45 (84.9%)
Abscess formation		
Yes	2 (3.8%)	2 (3.8%)
No	51 (96.2%)	51 (96.2%)

**DISCUSSION**

Even with advancements in medicine, SSI following appendectomy remains a significant issue. This study was done to compare two substances (normal saline vs. imipenem) that could lower the rate of wound infection.

According to a study by Lord et al., compared to 760 patients whose wounds received antibiotic solution irrigation, the rate of in-hospital wound infections was 0.73% in 685 patients who did not receive antibiotic lavage. [16] Although these surgeries were clean, infection is a consequence that can persist even after operations for conditions like appendicitis. Badia JM et al. have demonstrated that a straightforward lavage of the wound is also an efficient way to lower SSI rates following appendectomy. [17] Studies have also shown that even extremely weak bacteriostatic agents like lidocaine can be employed in lavage to boost the effectiveness. [18] According to our research, irrigation with an antibiotic like imipenem added to it can reduce infection even more effectively.

The imipenem group in our study experienced a significantly lower infection rate than the control group, although in both groups, the majority of infections were discovered in patients who had a ruptured appendix at the time of presentation. Similar to this, every patient in our study who experienced an abscess had either gangrenous or perforated appendicitis. Hence, rapid diagnosis and treatment can also be crucial in minimising infection after appendectomy. Povidone iodine was found to favourably reduce the frequency of purulent discharge from wounds in research by Haider S. and Sallam A., which lessened the severity of wound site infection even if it did not successfully reduce the proportion of SSI. [19] In a similar vein, Chundamala J examined 15 research, of which 5 studies did not demonstrate that povidone-iodine irrigation was substantially more effective in preventing surgical site infection than regular saline, water, or no irrigation. Comparing povidone-iodine irrigation to regular saline, water, or no fluid irrigation, the other 10 trials found that povidone-iodine irrigation was considerably more effective at preventing surgical site infection. [20]

In 2019, Vinay and colleagues released the findings of their investigation, which revealed that the povidone-iodine irrigation group had a wound infection rate of 10%, compared to the usual saline irrigation group's 7.8%. [21] They came to the conclusion that the infection rate remained unchanged whether the lesion was irrigated with povidone-iodine solution or regular saline. Hesami et al. performed irrigation with imipenem in perforated appendicitis and found that it was successful in lowering the infection rate significantly (4.4% v/s 22.2%) thus also leading to shorter hospital stay and low healthcare costs.[22] Our study findings also concur with the findings of Hesami et al.

**CONCLUSION**

In this study, we came to the conclusion that irrigation with imipenem solution can aid to lessen wound infection following appendectomy. It is simple to do and can lower medical expenses as well as patients' suffering from infections.

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