

SSI after appendectomy: Comparison of local irrigation with antibiotic solution versus saline

Shamaila Ayub, Qurat-ul-Ain Anwar, Omer bin Khalid Jamil, Yabinda Sahrish, Shafaq Naseer, Farhan Zaheer

Abstract

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

Material and Methods: This was a prospective randomized control trial conducted at Civil Hospital, Karachi. A total number of 72-patients with acute appendicitis who underwent appendectomy were included in the study and randomized into two groups. In group one at closure wound was irrigated with normal saline while second group was irrigated with imipenem solution. Post-operatively patients were observed for surgical site infection, deep abscess formation.

Results: Wounds irrigated with imipenem solution showed reduced rates of surgical infection when compared to saline irrigation only ($p < 0.05$)

Conclusion: Imipenem solution irrigation is helpful to reduce wound infection after appendectomy. It is an easy to perform and can also reduce healthcare costs and patients' misery due to infection.

Keywords: Appendectomy wound infection, imipenem solution, wound irrigation with saline

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Creek General Hospital,
Karachi.

S Ayub

United Medical and
Dental College, Karachi
QA Anwar

Aga Khan University
Hospital, Karachi
OBK Jamil

Liaquat College of
Medicine and Dentistry,
Karachi
Y Sahrish

Civil Hospital, Karachi
S Naseer
F Zaheer

Correspondence:

Dr. Shamaila Ayub
Assistant Professor Surgery
Address: WSA-16,
Block-14, Water pump,
Federal 'B' Area, Karachi,
Cell No: +92 333-3756359
email: drshama_ilaayub@
hotmail.com

Introduction:

Appendectomy is the standard treatment of acute appendicitis and most widely performed abdominal surgery in the world but still carries a high complication rate mostly post-operative pain and wound infection.¹ The reported rate of wound infection after appendectomy is about 6% to 17%.² Although being a manageable complication, surgical site infection (SSI) results in patient suffering and delayed return to function and is a major burden on healthcare budget.³

Literature shows that a number of methods have been tried in order to reduce post-appendectomy wound infection. These range from wound irrigation from different antibiotics such as ceftazolin⁴ to usage of antimicrobial film incision drapes⁵ and normal saline irrigation.⁶

Imipenem belongs to carbapenem group of antibiotics and has a wide spectrum coverage. It

has an established role in treating abdominal infections, complicated urinary tract infections, sepsis and even febrile neutropenia in cancer patients.⁷ The use of imipenem as a local agent in preventing infection has also been documented in the literature.⁸ At our institution we used imipenem based saline solution irrigation as a prophylactic measure to reduce SSI after appendectomy in a randomized controlled trial and the results are discussed below.

Material and Methods:

This was a randomized controlled trial conducted at Civil Hospital, Karachi Pakistan during August 2015 till December 2017 after approval from Institutional Review Board (IRB). Patients who presented with acute appendicitis and under 18 to 35 years of age were included in the study. Exclusion criteria comprised of patients with comorbidities like diabetes mellitus, chronic renal failure or chronic liver disease and

Table 1: Basic characteristics and operative findings of patients

	Group A [Saline] (n=36)	Group B [Imipenem] (n=36)
Age (Mean ± SD)	24.13±4.23 years	23.65±4.38 years
Gender (Male: Female)	24: 12	21: 15
Body mass index (Mean ± SD)	21.93±2.02 kg/m ²	22.18±1.91 kg/m ²
Operative findings		
Catarrhal inflammation	32 (88.8%)	30 (83.3%)
Perforated appendix	4 (11.2%)	5 (13.8%)
Gangrenous appendix	0	1 (2.7%)

Table 2: Basic characteristics and operative findings of patients

	Group A [Saline] (n=36)	Group B [Imipenem] (n=36)	p - value
SSI	7 (19.4%)	2 (5.5%)	0.011
Abscess formation	2 (5.5%)	2 (5.5%)	0.234
Total infected patients	9 (25%)	4 (11.1%)	0.019

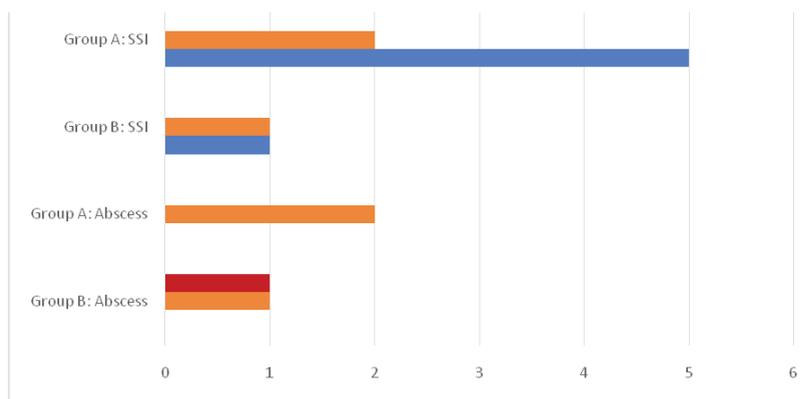


Figure 1: Distribution of Infected patients with respect to operative findings

any other immunocompromised state. Patients with known allergy to carbapenems were also excluded. All patients were briefed about the study and signed a written consent form prior to enrollment.

Patients were divided into two groups A and B by non-probability consecutive sampling. Both groups underwent open appendectomy via grid iron incision. Before closure of the wound, the tissues were irrigated with one liter of normal saline in group-A while in group-B received irrigation with one liter of saline containing one gram of imipenem (1mg/ml). Post-operatively all patients in both groups received standard post-operative management including intravenous antibiotic and analgesia. Patients were followed for SSI and deep abscess formation for a

period of four weeks post-surgery.

Results:

A total number of 72-patients were eligible for study and were allocated in to group-A and B. Out of 36 patients of group-A, 32(88.8%) had acutely inflamed appendix and 4 (11.2%) had perforated appendix. While in group-B, 30(83.3%) had acutely inflamed appendix, 5(13.8%) had perforated appendix and 1 (2.7%) patient suffered from gangrenous appendicitis. Rest of patient characteristics were similar as depicted in table-I.

At follow up visits in clinic it was noted that in group-A 7-out of 36 patients developed SSI, whereas in group-B only 2-patients had SSI (p=0.011). However, both groups had similar rates of abscess formation which required a secondary drainage procedure as shown in table II.

Discussion:

In study by Lord et al. showed the rate of in-hospital wound infections in 685-patients without antibiotic lavage was 0.73%, compared with 0% among 760-patients whose wounds were irrigated with antibiotic solution.⁹ However, these were clean surgical procedures and infection is a complication that cannot be completely eradicated after procedures such as appendicitis.

Badia JM et al. have showed that a simple lavage of wound is also an effective method to decrease SSI rates after appendectomy.⁶ Studies also show that even lidocaine which is a very weak bacteriostatic agent can be used in lavage and further increase its efficacy.¹⁰ Our study indicates that irrigation is even more effective in reducing infection when an antibiotic such as imipenem is added to it.

In our study we had 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 as shown in figure I. Hence early presentation and prompt

treatment can also play a pivotal role in reducing infection after appendectomy.

Imipenem has been studied in the past as an irrigation agent. Parcels et al. did a retrospective study on 1063 appendectomy patients and showed that saline irrigation had an SSI rate of 9.8% and abscess formation of 4.2%, whereas imipenem irrigation lead to an SSI and abscess formation of 0.5% only.⁸ Our study was nowt able to demonstrate reduction in abscess formation but it could be due to small study sample.

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.¹¹ Our study findings also concur with the findings of Hesami et al.

Conclusion:

In the light of current study and past literature it can be concluded that routine irrigation of appendectomy wounds with imipenem solution is a safe and easy procedure and can effectively decrease SSI, thus leading to low patient morbidity and reduced hospital costs.

Conflict of interest: None

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Role and contribution of authors:

Dr. Shamaila Ayub, collected the data, references and did the initial writeup.

Dr. Qurat-ul-ain Anwar, collected the data and helped in introduction and discussion writing.

Dr. Omer bin Khalid Jamil, helped in collecting the data and interpretation of data and introduction writing.

Dr. Yabinda Sahrish, collected the references and helped in introduction writing.

Dr. Shafaq Naseer, collected the data, references and helped in tabulation of data and result writing.

Dr. Farhan Zaheer, critically review the article and made final changes.

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