



Risk Factor And Incidence Of Surgical Site Infection In Open Reduction And Internal Fixation Patients With Ankle Fracture

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ABSTRACT

Open reduction and internal fixation (ORIF) is the most commonly performed orthopedic procedure. The main complication associated with ORIF is surgical site infection. Depending on the population under investigation, the total rate of problems following ankle fracture repair ranges from 5% to 40%. wound complications have been documented to affect 1.4% to 18.8% of patients. SSI is identified as the most common hospital-acquired infection related to ORIF complications, adversely affecting bone union and functional rehabilitation. Various risk factors for SSI are highlighted, including advanced age, higher BMI, smoking, diabetes, and the severity of the injury. Studies indicate that the incidence of SSI can lead to increased hospital stays and re-hospitalization rates. Understanding these risk factors is crucial for improving patient outcomes and minimizing SSI occurrences in surgical practices. This review synthesizes findings from multiple studies, providing a comprehensive overview of the challenges associated with ankle fracture surgeries and the importance of addressing SSI to enhance recovery and rehabilitation.

Keywords: Surgical site infection, Open reduction and internal fixation, Body Mass Index, Methicillin Resistant Staphylococcus aureus.

INTRODUCTION

Ankle fractures are prevalent across all age groups, making up roughly 50% of tibia and fibula fractures and 7.6% of all adult fractures. Although conservative treatment might be useful for some forms of ankle fractures resulting from simple traumas, surgery—especially open reduction and internal fixation (ORIF)—is the most common technique for treating ankle fractures. However, there are several drawbacks to surgical treatment of ankle fractures as well, such as a high rate of postoperative complications and an inherent risk of difficulties

with ORIF itself. Surgical site infection (SSI) is the most frequent hospital-acquired infection among ORIF complications. Ankle bone union and functional rehabilitation are adversely affected by SSI^[1]. Internal fixation is intended to stabilize bone fragments and allow for early movement; nevertheless, a poor result may occur if a surgical site infection (SSI) develops. Despite this, it has been demonstrated that they treble the rate of re-hospitalization and increase hospital stays by two weeks for each patient^[2]. Some risk factors associated with SSI following surgical treatment of an ankle fracture have been identified in previous studies. These include advanced age, more severe injury types (open fracture, trimalleolar fracture, fracture with accompanying dislocation, Weber type C fracture, higher grade soft tissue injury), delayed operation duration (minutes), higher BMI, smoking, diabetes mellitus, etc.^[1].

RISK FACTOR AND INCIDENCE OF SSI

Yaning Sun et al. conducted a retrospective multicentre study on the “incidence and risk factor for surgical site infection after open reduction and internal fixation of ankle fracture at 3 level institutions at China namely Handan branch of Jizhong Energy Fengfeng Group General Hospital, Third hospital of Hebei medical university and Zingtai people Hospital. They included 1510 patients who underwent ORIF at 3 centres between January 2015-December 2016 and concluded that the incidence rate of SSI is 16%. The independent risk factors are age, open injury, incision cleanliness grade 2-4, high energy mechanism of injury, greater BMI, chronic heart disease, history of allergy, and preoperative neutrophils.75%. Methicillin-resistant Staphylococcus aureus (MRSA) is responsible for the second most SSIs, with several pathogens accounting for half of the cases. Each SSI patient has to stay in the hospital for about 9.4 days. In this study, they also found that the rates of deep SSI were approximately 1.32% and superficial SSI was about 3.05%. The risk of SSI increased dramatically by 57% for every 4kg/m² rise in BMI. The preoperative neutrophil count >75% was a significant predictor of SSI with an incidence rate of 64% ^[1].

In 2009, T.thangarajah et al conducted a retrospective analysis on the topic “Surgical site infection following open reduction and internal fixation of ankle fracture between January -September 2005. They examined 50 individuals in a row who had an ankle fracture treated with open reduction and internal fixation with an average age of 43 [range 16-82] years and they concluded that the risk factor for wound healing is smoking with superficial SSI about 3-8% and deep SSI as 1-6%^[2].

Adam G. Miller MD et al performed a retrospective database review in 2012 on risk factors for wound complications after ankle fracture surgery. The study was conducted on 478 patients who had undergone ORIF by a single surgeon at a single institution between January 2003-December 2010. According to this study, the patients who had an open fracture, diabetes (especially peripheral neuropathy), patients on drugs that compromise wound healing, and patients who did not comply with treatment instructions after surgery were more likely to experience complications with wound healing. Diabetes was the most common compromising condition detected in 81% of the infection that occurs in compromised conditions. As the average age of the

patients in this study was lower, they were unable to pinpoint age as a particular risk factor and they also couldn't make any conclusions regarding smoking and the correlation with wound complications^[3].

CMS Srinivasan and Christopher G Moran performed a retrospective cohort review in 2001 on "internal fixation of ankle fracture in the very elderly" between 1989-1998. 2959 patients with fractured ankle who received ORIF were selected. The study offers some helpful information and their findings show a comparatively low prevalence of problems in this high-risk group. There was a 1% deep infection rate and 3% perioperative mortality. The major issue was a delay in wound healing.^[4]

E.G Kelly et al conducted a prospective cohort study on the title " Risk factor for surgical site infection following operative ankle fracture fixation. All patients who were admitted between July 2008-June 2009 were included and followed for 6 weeks after surgery. Among 122 patients, the study shows no evidence of a meaningful relationship between diabetes and infection. This result might be explained by the cohort's limited sample size of diabetes individuals. Age is a substantial independent risk factor for SSI. An interesting data obtained from this study was females had a high risk of infection and also found that no correlation between smoking and SSI ^[5].

CONCLUSION

Surgical site infections (SSI) are a significant concern following open reduction and internal fixation (ORIF) for ankle fractures, with various risk factors identified, including advanced age, higher BMI, smoking, and underlying health conditions such as diabetes. The incidence of SSI can lead to increased hospital stays and complications that adversely affect recovery and rehabilitation. Understanding these risk factors is crucial for improving patient outcomes and minimizing the incidence of SSI in surgical practices.

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CONFLICT OF INTEREST

There is no conflict of interest.

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