

## A DESCRIPTIVE STUDY OF BACTERIOLOGICAL SPECTRUM OF ORTHOPEDIC IMPLANT INFECTION IN CLOSED FRACTURES

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**Article Info:** Received 24 May 2021; Accepted 29 July 2021

**DOI:** <https://doi.org/10.32553/ijmbs.v5i8.2058>

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**Conflict of interest:** No conflict of interest.

### Abstract

**Background:** Surgical Site Infection (SSI) is defined as pain associated with erythema, induration, local tenderness, pus discharge or any culture positive or negative discharge from a surgically created wound.

**Methods:** Hospital based Descriptive type of Observational study conducted on Patients in the department of Orthopaedics in teaching hospitals attached to S.M.S Medical College and hospital.

**Results:** 6.2% patients have wound infection. Gram positive 87.5% patients have found with Staph. Aureus and Gram negative 12.5% patients have found with Pseudomonas.

**Conclusion:** Infection in closed fractures with implants was quite high. The adverse outcome of SSIs related to a clean orthopedic surgical procedure can be associated with significant morbidity, cost, and even mortality.

**Keywords:** Infection, Closed, Implants

### Introduction

Surgical Site Infection (SSI) is defined as pain associated with erythema, induration, local tenderness, pus discharge or any culture positive or negative discharge from a surgically created wound.<sup>1</sup>

SSI leads to serious consequences, including increased costs due to its treatment and increased length of hospital stay.<sup>2</sup> The risk of death in patients with SSI is increased when compared to those who did not develop an infection.<sup>3</sup>

The serious consequences imposed on patients who developed SSI determine the need for efforts to create strategies for the prevention of this infection. One of the strategies used is the determination of risk factors, which allows identifying clinical situations or conditions that predispose to the development of SSI. In this sense, the identification of risk factors for SSI contributes to the early adoption of nursing interventions that aim to minimize this type of postoperative complication.<sup>4</sup>

SSI is a great disaster in terms of financial burden on the hospital resources, morbidity and mortality. Being a preventable condition, SSI frequencies are continuously surveyed throughout the world to help reduce its incidence. So the rationale of the study is to monitor the SSI rate in orthopaedic implant surgeries and its common causative organisms in our population undergoing orthopaedic implant surgery and if the frequencies are found significantly higher than other studies, then device measures to help reduce its frequency and thus decrease

both financial burden of the state and morbidity and mortality of the patients. This study will also provide us fresh local data regarding bacteriology of SSI of orthopaedic implants surgery and will guide us in setting future recommendation for rational use of antibiotics.

### Materials and Methods

#### Study Area

Patients in the department of Orthopaedics in teaching hospitals attached to S.M.S Medical College and hospital.

#### Study Design

Hospital based Descriptive type of Observational study

#### Study Duration

Data collection was started first after the approval from institutional research review board and ethical committee upto June 2020 or till sample size was achieved, whichever is earlier. It was taken another month for follow up and one month for data processing and writing thesis.

#### Study Universe

All cases of closed fracture with operative indications attending at orthopaedics department of S.M.S. Medical College Jaipur (Raj), India

#### Inclusion Criteria

- Closed fracture cases

- Either gender
- In age groups admitted from 18-70 years
- Elective implant surgery
- Emergency implant surgeries

#### Exclusion Criteria

- Pregnancy
- Periprosthetic fractures
- Associated major visceral injury
- Soft tissue surgery,
- Open fractures needing external fixation devices,
- Pathological fractures

- Patient with pre-existing cardiac /pulmonary/renal disease

#### Statistical analysis

The data was coded and entered into Microsoft Excel spreadsheet. Analysis was done using SPSS version 20 (IBM SPSS Statistics Inc., Chicago, Illinois, USA) Windows software program. Descriptive statistics included computation of percentages, means and standard deviations. Level of significance was set at  $P \leq 0.05$ .

#### Results

Age more than 60 years patients were 27.7%, age 30-40 years patients were 21.5% and age 50-60 years patients were 14.6%. Mean age was 46.7 years. Male (74.6%) patients were found higher as compared to female patients (25.4%).

**Table 1: Type of Fracture wise distribution of the study**

	Frequency	Percent
Acetabulum	3	2.3
Calcaneum	3	2.3
Distal end radius	6	4.6
Greater Tuberosity Humerus	1	.8
Hoffa's fracture	1	.8
Intertrochanteric femur	33	25.4
Lateral Condyle Humerus	1	.8
Leg Bone	6	4.6
Medial Condyle Humerus	1	.8
Mid Shaft radius	1	.8
Mid Shaft Ulna	1	.8
Neck of femur	14	10.8
Pilon Fracture	1	.8
Proximal humerus	8	6.2
Proximal Tibia	14	10.8
Segmental Leg Bone	4	3.1
Shaft of femur	15	11.5
Shaft of humerus	4	3.1
Subtrochanteric femur	6	4.6
Supracondylar femur	3	2.3
Talus	4	3.1
Total	130	100.0

**Table 2: Microorganism wise distribution of the study**

	Frequency	Percent
<b>NIL</b>	122	93.8
<b>Pseudomonas</b>	1	.8
<b>Staph. Aureus</b>	7	5.4
<b>Total</b>	130	100.0

Total 6.2% patients have wound infection

**Table 3: Microorganism wise distribution of the study**

	Frequency	Percent
<b>Pseudomonas</b>	1	12.5
<b>Staph. Aureus</b>	7	87.5
<b>Total</b>	8	100.0

Gram positive 87.5% patients have found with Staph. Aureus and Gramnegative 12.5% patients have found with Pseudomonas.

### Discussion

Implant supported infection is an unsolved problem in the development of orthopaedics. Infections occurs even through orthopaedists perform thoroughly clean procedures during surgery and patients are strictly managed before and after surgery. Infection is a very important problem in the orthopaedic surgery because of its continuing incidence, clinical importance and serious sequelae, the treatment being very difficult and expensive (for example, the treatment of an infected hip prosthesis costs twice as much as an aseptic revision and six times as much as the primary replacement). Rates of infection have been reduced by antibiotic prophylaxis, but the increasing number of implants used means that there are still many patients affected each year. Implants are avascular and therefore antibiotics can reach them only by diffusion from the surrounding tissues. Infection involving an implant cannot be cured simply with antibiotics and it often necessitates the surgical removal of the implant. Phillips (2003)<sup>5</sup> et al reported that among patients who had primary total hip replacement, 0.2% of 58521 had a deep infection during the first 26 postoperative weeks.

### Conclusion

Infection in closed fractures with implants was quite high. The adverse outcome of SSIs related to a clean orthopedic surgical procedure can be associated with significant

morbidity, cost, and even mortality. The patient's functional status may also be adversely affected by an orthopedic SSI. Staphylococcus aureus was the commonest organism isolated from the infected cases

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