

Original article:

Assessment of Frequency of Infections Following Implant Orthopaedic Surgery: A Prospective Study

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Abstract

Background: The success of an implant relies on upon a various elements and is important to decide if failure was characteristic to the device or was caused by outside variables, for example, establishment, quiet co-operation or rate of break recuperating. Hence; we plan the present study to assess the incidence of infection in patients undergoing orthopaedic implant surgery.

Materials & Methods: The present study included assessment of patients undergoing implant related orthopaedic surgery over a period of 2 years. Complete data records of all the patients were recorded along with clinical and demographic details. The clinical details included complete history of fracture of the patients including the duration, site and severity of the fracture. In all the cases, before the starting of the surgery, Cefazoline was given prophylactically at the time of initiation of anaesthesia. On the basis of clinical and microbiological examination, the confirmed diagnosis of infection was given. Complete follow-up of all patients was done initially every two weeks for the first month followed by check-up after every month upto six months. All the results were recorded and analysed.

Results: 11 cases, out of total 120 cases, developed infections post-operatively. 20 percent of the cases receiving dynamic condylar screw developed post-operative infection. 2.5 percent of the cases were above sixty five years of age. Smoking was observed as risk factor in 2.5 percent of the cases.

Conclusion: Proper adequate pre-operative measures are required for controlling the high rate of infections occurring in implant orthopaedic surgical procedures.

Key words: Implant, Failure, Orthopaedic.

INTRODUCTION

The objective of present day orthopaedics is to acquire anatomical union of fracture good with maximal practical return of the patient, for which unbending inside obsession by utilizing proper implants is required.^{1,2} The achievement of an implant relies on upon a various elements and is important to decide if disappointment was characteristic to the device or was caused by outside variables, for example, establishment, quiet

co-operation or rate of break recuperating. Mechanical disappointment of implants falls into 3 classes; plastic, brittle and fatigued failure.³⁻⁵ Plastic failure is one in which the gadget neglected to keep up its unique shape bringing about a clinical disappointment. Brittle failure, a strange sort of embed disappointment, is caused by deformity in plan or metallurgy.⁶⁻⁸ Weariness disappointment happens because of monotonous stacking on a device. Accordingly, when a specialist orthopaedic

surgeon insets and implant, he should understand that he is entering a race between weaknesses of the implant and recuperating of the break.⁹Hence; we plan the present study to assess the incidence of infection in patients undergoing orthopaedic implant surgery.

MATERIALS & METHODS

The present study was conducted in the department of orthopaedics of Bhaskar Medical College and General Hospital, Hyderabad (Andhra Pradesh) and included assessment of patients undergoing implant related orthopaedic surgery over a period of two years. Ethical approval was taken from institutional ethical committee and after explanation of detailed research protocol, written consent was obtained. Inclusion criteria for the present study included patients with closed fracture and patients in which implant orthopaedic surgery was planned. Exclusion criteria for the present study included patients with open fractures, patients in which surgery of soft tissues was planned and patients with any known drug allergy.

Complete data records of all the patients were recorded along with clinical and demographic details. The clinical details included complete history of fracture of the patients including the duration, site and severity of the fracture. In all the cases, before the starting of the surgery, Cefazoline was given prophylactically at the time of initiation of anaesthesia. On the basis of clinical and microbiological examination, the confirmed diagnosis of infection was given. Grading of infection was divided into superficial and deep categories. Another grading used for the categorisation of infection was as early and delayed. When the infection was limited up to the level of deep fascia, the infection was considered as superficial and when it penetrated deep inside the deep fascia, it was categorized as deep infection. Treatment of all infections was done using

antibiotics along with debridement of the wound. Complete follow-up of all patients was done initially every two weeks for the first month followed by check-up after every month upto six months. All the results were recorded and analysed.

RESULTS

11 cases, out of total 120 cases, developed infections post-operatively (Table 1, Graph 1). Among patients receiving interlocking nails was 13.3 percent. 20 percent of the cases receiving dynamic condylar screw developed post-operative infection. Table 2 shows various risk factors associated with infection. 2.5 percent of the cases were above sixty five years of age. Smoking was observed as risk factor in 2.5 percent of the cases.

DISCUSSION

One of the disasters which can occur after implant orthopaedic surgery is infection of surgical site. This possesses serious problems both for the patients and the surgeon.¹⁰It might lead to prolongation of hospitalization time, increased administration of antibiotics, and prolongation of time of rehabilitation. Assessment of risk factors before the starting of surgery might be helpful in controlling the implant failure.¹¹Hence; we plan the present study to assess the incidence of infection in patients undergoing orthopaedic implant surgery.

In the present study, we observed that infections occurred in approximately 9 percent of the cases in which implant orthopaedic surgery was carried. We also observed that smoking, diabetes and increasing age might act as risk factors that can lead to post-surgical infection. Khan MS et al assessed the frequency of infection in orthopedic implant surgery in a public hospital and to evaluate the risk factors, causative organism, complications and treatment. Close fracture cases admitted for internal fixation devices were included. The exclusion criteria were soft tissue surgery, wounds and open fractures needing external fixation devices. The

follow up was done for six months. Infection developed in 6 patients, out of which superficial and deep infections were 2 (1.92%) and 4 (3.84%) respectively. There were 2 infection cases in each stage of the infection i.e. early, delayed and late. The staphylococcus aureus was the commonest organism, i.e., 3 (50%) out of 6. The age of the patients was more than 60 years in 3 (2.88%) patients, 30 to 60 years in 2 (1.92%) patients and below 30 year in 1 (0.96%) patient. The smoking history was in 2 (1.92%) patients Infection rate in our study was quite high and needs proper measures to control it because it had great financial burden on patient and on hospital resources and could lead to morbidity and mortality in patients. They could not find significant risk factors in our small sample size study although the infection was relatively more common in patients with advanced age, prolonged surgery time, smoking and skin abrasion at fracture site. Commonest organism was Staphylococcus aureus.¹²

Fang A et al carried a retrospective case control analysis of 48 cases of postoperative infection following spinal procedures. Spinal procedures that became infected after surgery were analyzed to identify the significance of preoperative and intraoperative risk factors. Characterization of the nature and timing of the infections was also performed. The rate of postoperative infection following spinal surgery varies widely depending on the nature of the procedure and the patient's diagnosis. Preoperative comorbidities and risk factors also influence the likelihood of infection. A review of 1629 procedures performed on 1095 patients revealed that a postoperative infection developed in 48 patients (4.4%). Data regarding preoperative and intraoperative risk factors were gathered from patient charts for these and a randomly selected control group of 95 uninfected patients. For analysis, these patient groups were

further divided into adult and pediatric subgroups, with an age cutoff of 18 years. Preoperative risk factors reviewed included smoking, diabetes, previous surgery, previous infection, steroid use, body mass index, and alcohol abuse. Intraoperative factors reviewed included staging of procedures, estimated blood loss, operating time, and use of allograft or instrumentation. The majority of infections occurred during the early postoperative period (less than 3 months). Age >60 years, smoking, diabetes, previous surgical infection, increased body mass index, and alcohol abuse were statistically significant preoperative risk factors. The most likely procedure to be complicated by an infection was a combined anterior/posterior spinal fusion performed in a staged manner under separate anesthesia. Infections were primarily monomicrobial, although 5 patients had more than 4 organisms identified. The most common organism cultured from the wounds was Staphylococcus aureus. Additionally, awareness of critical intraoperative parameters will help to optimize surgical treatment. It may be appropriate to increase the duration of prophylactic antibiotics or implement other measures to decrease the incidence of infection for high risk patients.¹³ Dumaine V et al reported the number of operative site infections (OSI) observed during a three year period and described the characteristic features. Factors of risk of OSI include the patient's general status, particularly for arthroplasty. Surveillance of OSI in orthopedic surgery requires the development of a system responding to the problem of a long observation period. It would be important to know the precise number of OSI and their characteristic features in order to develop comparison tools.¹⁴

CONCLUSION

From the above results, we conclude that proper adequate pre-operative measures are required for

controlling the high rate of infections occurring in implant orthopaedic surgical procedures.

Table 1: Rate of infection in implant cases

Type of procedure	Number of cases performed	No. of infected cases	Percentage of infected cases
Interlocking nails	30	4	13.3
Total knee replacement	3	0	0
Proximal femoral nail	10	1	10
Dynamic hip screw	19	1	5.2
Dynamic condylar screw	5	1	20
Plates (Long bones)	20	1	5
Fixator interneer in spine fracture	4	0	0
Others	29	3	10.3
Total	120	11	9.1

Graph 1: Rate of infection in implant cases

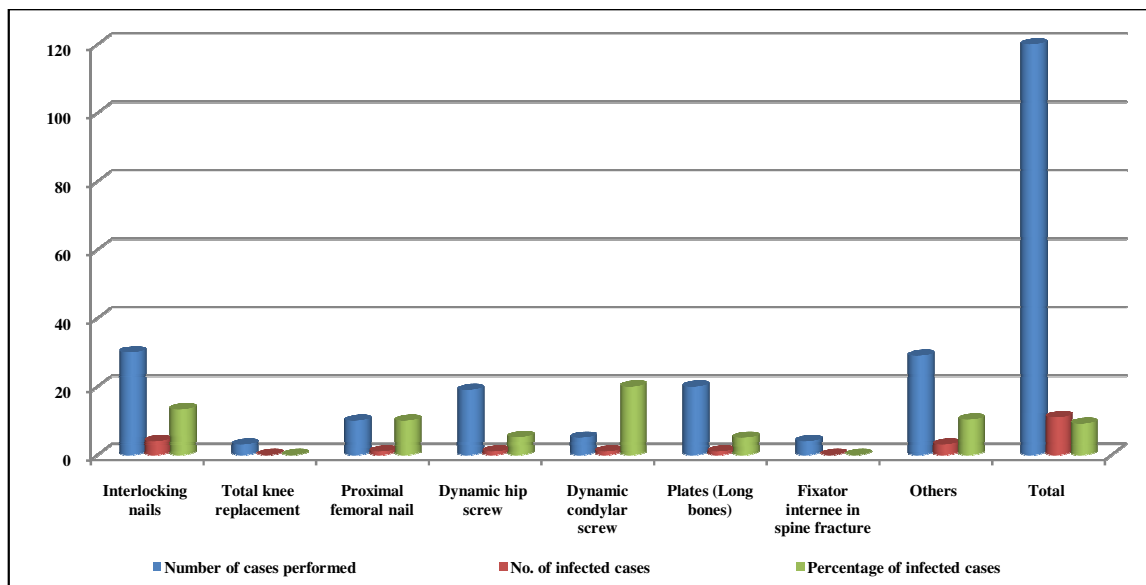
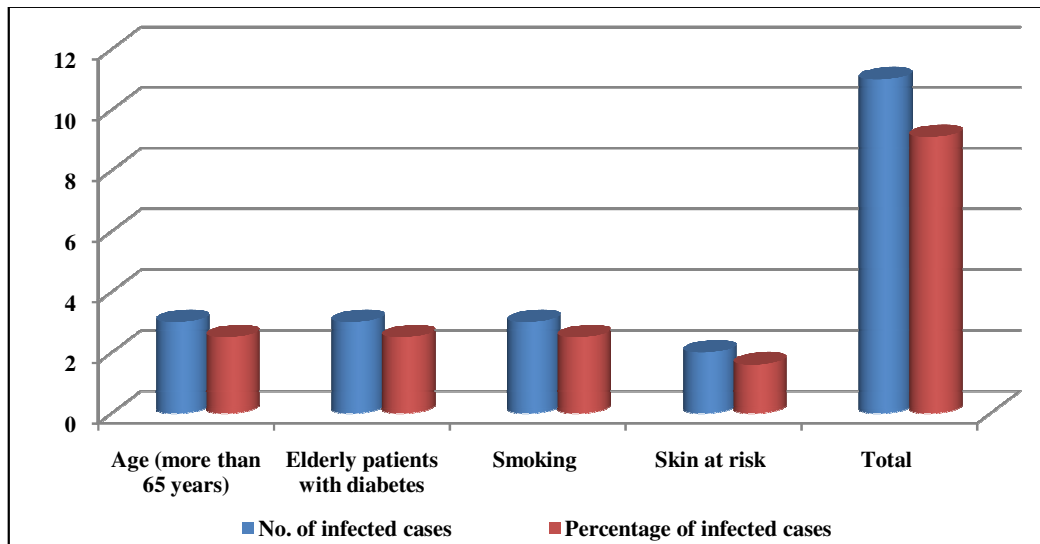


Table 2: Various risk factors probably associated with infection

Various risk factors	No. of infected cases	Percentage of infected cases
Age (more than 65 years)	3	2.5
Elderly patients with diabetes	3	2.5
Smoking	3	2.5
Skin at risk	2	1.6
Total	11	9.1

Graph 2: Various risk factors probably associated with infection



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