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Original Research Article.

Incidence of Infections Among Compound Fractures in Orthopaedics IPD: A Hospital Based Study

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ABSTRACT

Introduction: In orthopedic trauma patients, infection is a common problem related with increased morbidity. Even with improvements in management, infection still remains a significant problem. This study is of great importance as the incidence of compound fracture cases is increasing due to the increasing number of road traffic accidents and development of antibiotic resistance.

Methodology: 196 compound fractures cases were 20-60 age group included in this study. This study conducted in the Department of Orthopaedics, Era's Lucknow Medical College. The duration of study was over a period of two years.

Results: In this study, we found that 83.6% single type of culture, 13.2% mixed culture and 3.2% other like candida. Different type of organism was isolated from this study.

Conclusion: This study concludes that, an infection is very much prevalent in compound fracture patients and shows an increasing incidence pattern.

Keywords: Compound Fracture, Organism, Monomicrobial, Polymicrobial.

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INTRODUCTION

Compound fracture is a fracture in which broken bone fragments lacerate the soft tissue and protrude through a wound in the skin. It has some exceptional risks beyond those encountered with closed fractures that may occur with similar amounts of force. The risk of infection and delayed healing are the severe problems with these fractures. In open fractures, the contact of hematoma with the external milieu, makes it more prone to infection.[1-2] It has been reported that between 60-70% of open fracture injuries will have positive wound cultures before treatment commences in the hospital. It has been proved that sepsis occurs in 2-25% of all open fractures, which leads to significant morbidity.[3]

Gustilo and Anderson classification is the most widely used classification for open fractures. It groups into three major grades: the energy of the fracture, extent of contamination, and the degree of soft-tissue damage.[4] Type I infections have 0%–2% risk of infection, Type II infections have a 2%–12% risk, and Type III infections have the highest risk of 10%–50%.[5,6]

In order to administer an effective antibiotic treatment for these fractures, understanding the bacterial flora is very important. It seems that there are two principal factors that produce infection- the dose and virulence of the organism. Wound debridement and irrigation are the pillar in reducing the incidence of infection. Road traffic accidents are the most responsible factor of compound fracture cases. It is a growing problem worldwide and accountable for around 50 million injuries annually.[3] In India, most of the cases of compound fractures end up in fracture site infection due to many risk factors like gross contamination, delayed intervention, multiple surgeries etc.

A few studies have been reported on bacteriology of open fracture wounds in India.[7-9] This study was aimed at determining the trend of causative micro-organisms of fracture site infection in the orthopedic ward of Era's Lucknow Medical College and Hospital, Lucknow, Uttar Pradesh, India.

MATERIALS & METHODS

Study Population

196 compound fractures cases were 20-60 age group included in this study.

Study Area

This study conducted in the Department of Orthopaedics, Era's Lucknow Medical College and Hospital.

Study Duration

The duration of study over a period of two years.

Data Collection

In the operating room, samples were taken after debridement was done using the standard procedure under strict aseptic conditions and were immediately transported to the microbiology department for culture and antibiotic sensitivity testing. Antibiotic therapy was modified based on the sensitivity reports.

Data Analysis

Data were analyzed by using Microsoft excel.

RESULTS

In our study 196 total numbers of cases were included. Among the all cases 64.2% were male & 35.7% cases were male. Most of the cases were belongs to 41-50 age (64.3%) age group followed by other age group. In this study, we found that 83.6% single type of culture, 13.2% mixed culture and 3.2% other like candida. Different type of organism was isolated from this study which showed in table 4.

Table 1: Distribution of cases according to gender

Gender	n	%
Male	126	64.2%
Female	70	35.7%
Total	196	100%

Table 2: Distribution of cases according to age group

Age Group	n	%
20-30	15	7.6%
31-40	20	10.3%
41-50	126	64.3%
51-60	35	17.8%
Total	196	100%

Table 3: Distribution of cases according to microbial culture

Types of Microbial Culture	n	%
Monomicrobial	164	83.6%
Polymicrobial	26	13.2%
Other	6	3.2%
Total	196	100%

Table 4: Distribution of cases according to organism

Organisms	n	%
Staphylococcus aureus	19	9.6%
Pseudomonas aeruginosa	34	17.4%
CONS	9	4.5%
Klbsiella spp	78	39.7%
Proteus spp	46	23.4%
E. coli	6	3.1%
Citrobacter	4	2.2%
Mixed culture	26	13.2%
Candida	6	3.2%
Total	196	100%

DISCUSSION

In orthopedic trauma patients, infection is a common problem related with increased morbidity. Even with improvements in management, infection still remains a significant problem.[4,10] This study is of great importance as the incidence of compound fracture cases is increasing due to the increasing number of road traffic accidents and development of antibiotic resistance. Very few studies have been done on this topic in India.

The present study found Klebsiella, Proteus, Pseudomonas species, Staphylococcus aureus and Eschericia coli as the common microbes in orthopedics open fractures. S. aureus used to be the most common strain in the 1950s and 1960's. Harvey Bernard (1962) observed that the pattern of infection has been changed and gram negative bacteria are becoming more and more common. E. Jack Benner (1967) reported the incidence of gram negative bacteria to be 59% but in contrast Surange and Rai (1971-73) found it as 35.25% S. aureus, 22.55% E. coli and 18.5% B. pyocyancs.

Das, Mishra et al[11], done a study at IMS and SUM Hospital, Odisha on 621 orthopaedic wound patients out of which 468 cases showed bacterial growth. This study found Klebsiella Species, (39.7%) was the most commonly isolated organism followed by Proteus Species, (23.4%), Pseudomonas aeruginosa (17.4%), Staphylococcus aureus (9.6%), Citrobacter Species (2.2%), and E. coli (3.1%).

Shiraz Bhatty et al[12] observed that most of bacterial infections are nosocomial and the isolated bacteria would depend upon the microbiologic environment of the institution**.** In their study, the commonest site of injury was the leg (55.5%). Staphylococcus aureus was the predominant organisms isolated in these open fractures. Lingaraj et al[7] showed that organisms grown in pre-debridement cultures did not correlate with postoperative wound infection. Lee found that post-debridement cultures could predict infection in only 42% of the cases. In an another study by D'Souza et al. observed that in predicting postoperative infection, pre and post debridement cultures play an important role. Jadranka Maksimovićet al[13], assessed 277 patients after operation and revealed surgical site infection in 63 patients. The overall incidence rate of surgical site infections was 22.7%. Though, the incidence increased from 13.2% in clean wounds to 70.0% in dirty wounds.

Patzakis et al[2]. We observed a significant reduction in this incidence of infection with the use of prophylactic parenteral antibiotics in open wound fractures. Results suggested that the choice of antibiotic must depend on the severity of fracture such as Type I and II injuries most commonly grow Staphylococcus aureus, hence a second generation cephalosporin is recommended and more severe Type III injuries predominantly grow Gram negative aerobes, for which Gentamycin is to be added.

CONCLUSION

This study concludes that, an infection is very much prevalent in compound fracture patients and shows an increasing incidence pattern. Recently, among varied results regarding the pathogenic organism, there is a changing trend from gram positive like, Staphyloccocus aureus towards gram negative organisms like Klebsiella, Proteus, Pseudomonas.

To reduce the incidence of fracture site infections, there is a vital need to adopt basic principles of asepsis and sterilization and to use antibiotics in these patients sensibly.

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