

A Profile of Post-Operative Wound in Orthopedic Surgery in Tertiary Care Center

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Conflict of interest: Nil

Abstract:

Introduction: One of the difficult postoperative consequences that increase hospitalization duration and patient costs is an infection in post-Orthopedic surgery. The frequency of Orthopaedic surgery site infection has not received much research to date. Present study was conducted to study the incidence of post-operative infection in orthopaedic surgeries and to analyse the incidence of infection with an aspect of age, gender and the antibiotic sensitivity of isolated organism.

Material & Methods: Present study was Prospective observation study. The study was carried out at Department of Orthopedic, MGM Medical College and Hospital Chh. Sambhajnagar [Aurangabad] duration of study November 2020 till September 2022. All patients undergoing orthopedic procedure.

Observations and Results: The Percentage of surgical site infection in the department of Orthopaedics is 3.07%. Out of 43 cases, 46.51% cases were observed having surgical site infection before or equal to 2 weeks where 53.49% cases were observed having infection after more than 2 weeks. 21(49.84%) patients were having superficial type of infection and 22(51.16%) of patients were having deep infection. In 34.88% cases were observed with isolation of Staphylococcus aureus organism followed by 25.58% cases were observed with Klebsiella isolated organism, 18.60% cases with Pseudomonas organism isolated, 13.95% cases with E.Coli organism and 6.98% cases were observed with Streptococcus organisms isolated.

Conclusion: In present study Staphylococcus aureus organism was found the most common organism isolate. SSI seems to be unavoidable even when all conventional aseptic procedures are followed. Advanced age, the presence of diabetes, an extended preoperative hospital stay of more than 10 days, and a lengthy surgery lasting more than 1.5 hours were risk factors for SSI.

Keywords: post-operative infection, Surgical Infection, Superficial Infection.

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Introduction

One of the difficult postoperative consequences that increase hospitalization duration and patient costs is an infection in post-Orthopedic surgery. The frequency of Orthopaedic surgery site infection has not received much research to date [1].

The first line of fracture care in the majority of trauma centers is now open reduction and internal fixation of fractures using implants and prostheses [1]. This is due, in part, to improve knowledge of the biomechanics of implanted materials, but more crucially, to the patients' improved functional outcomes [2]. 10% of all hospital-acquired infections are surgical-site infections, which are thought to quadruple medical expenses and add an average of 6.5 days to hospital stays [3]. Because open reduction and internal fixation disrupt the blood flow to the bones and implants are foreign substances that provide sites for bacterial adhesion,

this group of patients is especially vulnerable [4]. In all surgical services, there have been very few changes in the microbiology of post-operative wound infections. The most often found organism is Staphylococcus aureus. Escherichia coli, Pseudomonas species, Proteus species, and Enterococcus were among the other aerobic gram-negative organisms [5].

Removal of the implant and related cement, long-term antimicrobial treatment, and debridement of all devitalized tissue are typically required to cure an infection connected to an implant. Whyte et al [6] discovered that in 98% of instances and 2% of cases, respectively, the source of contamination was theatre workers and the skin of the patient. In the latter, 30% of pollutants enter the incision through the air, and 70% enter through the hands of the surgical team or the tools being used [7]. The

study on the efficacy of nosocomial infection control showed a strong correlation between well-Organized surveillance programmes for infection control and a considerable decline in surgical site infection. These programmes also included feedback on infection rates to surgeons [8].

Present study was conducted to study the incidence of post-operative infection in orthopaedic surgeries and to analyse the incidence of infection with an aspect of Age, gender and the antibiotic sensitivity of isolated organism.

Material and Method:

The study was carried out at dept of orthopedic MGM Medical College and Hospital Aurangabad duration of study November 2020 till September 2022.

Study Design: Study Type: Prospective observational study.

Study Centre: All Patients Presenting to the Department of Orthopedics MGM Hospital, Aurangabad.

Sample Size: Approximately 1400 Surgeries (2 Year) sample size is based on average surgeries that are carried out at department of orthopaedic at MGM medical college and hospital (last 3 years).

Inclusion Criterion: all patients undergoing orthopedic procedure.

Exclusion Criterion: Patients with Pathological Fractures and Patients with open fractures and contaminated injuries.

Methods

After approval from the Ethical committee and obtaining informed consent forms from the cases, All cases fulfilling the inclusion criteria were enrolled in the study Preoperative investigation in the form of all pre-surgical blood tests, x-ray chest,

ECG, 2-D Echo etc shall be done Patients' details were entered in the Performa made.

All patients were administered pre-operative antibiotics and post-operative antibiotics as per the antibiotic protocol of MGM medical college Aurangabad (iv cefuroxime 1 hour before surgery and continued for 3 to 5 days after surgery). That patient that shows evidence of postoperative infection like redness of skin, induration, serio-Sanguinous or pus discharge from the wound) shall be evaluated and followed up per Performa and standard orthopaedic care.

Statistical analysis IBM SPSS Version. 21 were used for descriptive statistics. Microsoft Excel book 2019 was used to prepare tables and graphs.

Observations and Results

In the Department of orthopaedics, MGM Medical College and Hospital Chh. Sambhajinagar, Maharashtra, India in 2 years total of 1400 cases went under the orthopaedic procedure. Out of that 43 cases were infected, in the 43 cases of follow up 4 patients underwent implant removal, 20 patients were admitted on an IPD basis out of which 10 patients under went debridement with I.v antibiotics and the rest of the 10 were admitted for daily dressing and I.v antibiotics. 19 patients were managed on an OPD basis with oral antibiotics and alternate day dressing until the subsidence of infection. The 4 patients who went under implant removal underwent revision surgery (implant removal with temporary stabilisation followed by definitive fixation).

The Percentage of surgical site infection in the department of Orthopaedics is 3.07 % The Rate of surgical site infection in the Department of orthopaedic MGM Medical College and Hospital Chh. Sambhajinagar, Maharashtra, India is 3 in every 100 patients.

Table 1: Demographic profile of patients

Particular	No. of patients [n=43]	Percentage
Age-Group	≤ 20	4.65
	21-30	18.60
	31-40	27.91
	41-50	34.88
	51-60	13.95
Gender	Male	81.40
	Female	18.60

In the present study age ranged from 18 to 60 years of age. 34.88% cases were observed having age less than or equal to 20 years of age followed by 27.91% cases were observed having age from 31 to 40 years of age, 18.60% cases were observed having age from 21 to 30 years of age, 13.92% cases were observed having age from 51 to 60

years of age where 4.65% cases were observed having age less than or equal to 20 years of age. Male cases were predominantly higher than female cases. 81.40% cases were male cases where 18.60% were female cases with M:F ratio of 4.38:1.

Table 2: Distribution of patients according to Comorbidities

Comorbidities	No. of patients [n=43]	Percentage
Diabetes mellitus	6	13.95
Hypertension	5	11.63
Diabetes mellitus + Hypertension	2	4.65
No co-morbidities	30	69.77

13.95% cases were observed having diabetes mellitus, 11.63% cases were observed with hypertension where 4.65% cases were observed with diabetes mellitus + hypertension. 69.77% cases were observed without any comorbidity like diabetes mellitus, hypertension or any other.

Table 3: Distribution of patients according to Implants used

Implants used	No. of patients	Percentage
Plate	23	53.49
Nail	08	18.60
Screw	12	27.91
Total	43	100%

In the present study 53.49% cases were observed with plate use, 27.91% cases were observed with Screw and 18.60% cases were observed with nail procedure.

Table 4: Patients according to Interval and Infection type

Particular	No. of patients [n=43]	Percentage	
Interval between surgery and infection	≤ 2 weeks	20	46.51
	> 2 weeks	23	53.49
Infection type	Superficial	21	48.84
	Deep	22	51.16

Cases having surgical site infection less than or equal to 2 weeks were categorized as early infection where cases having site infection more than 2 weeks were categorized as late infection. 46.51% cases were observed having surgical site infection before or equal to 2 weeks where 53.49% cases were observed having infection after more than 2 weeks. 21(49.84%) patients were having superficial type of infection and 22(51.16%) of patients were having deep infection.

Table 5: Distribution of patients according to Organisms isolated

Organisms isolated	No. of patients	Percentage
E.coli	06	13.95
Klebsiella	11	25.58
Pseudomonas	8	18.60
Staphylococcus aureus	15	34.88
Streptococcus	03	6.98
Total	43	100%

In the present study 34.88% cases were observed with isolation of Staphylococcus aureus organism followed by 25.58% cases were observed with Klebsiella isolated organism, 18.60% cases with Pseudomonas organism isolated, 13.95% cases with E.Coli organism and 6.98% cases were observed with Streptococcus organisms isolated.

Antibiotics Used For Patients Had Surgical Site Infection:

For the 43 patient who presented with surgical site infection, antibiotics were given according to culture sensitive report. In follow up patient 19 were managed on an opd basis with alternate day dressing and oral antibiotics such as Tab linezolid Tab cefuroxime Tab linezolid+Tab clindamycin in combination. The patient which was admitted to (IPD) the orthopaedic ward Inj tigecycline Inj meropenem & Inj colistin, Inj piptaz, Inj linezolid was given which went through various

procedures that are debridement, implant removal, and daily dressing.

Discussion

Compared to non-implant-related Orthopaedic procedures, the placement of orthopaedic prostheses or trauma implants is a major surgical procedure that carries a higher risk of infection after the procedure.

The occurrence of post-operative infections is anticipated to rise as orthopaedic implants' longevity and quality continue to progressively improve and more biomaterials are implanted each year. These infections are typically brought on by foreign or endogenous germs that enter the surgical site while the procedure is being performed. Numerous different types of bacteria, both aerobic and anaerobic, may exist either separately or in

combination. Following clean operations, such as elective orthopaedic surgeries, when the only potential sources of contamination were airborne or exogenous, the infection rate was the lowest (less than 2%). In terms of the use of implants, length of the procedure, and other factors that are significant risk factors contributing to a greater infection rate in these procedures, the situation of SSI in orthopaedic surgeries is distinct from that of other surgeries. Present study was conducted with the aim of to evaluate post-operative wound in orthopedic surgery.

In the present study age ranged from 18 to 60 years of age. 34.88% cases were observed having age less than or equal to 20 years of age followed by 27.91% cases were observed having age from 31 to 40 years of age, 18.60% cases were observed having age from 21 to 30 years of age, 13.92% cases were observed having age from 51 to 60 years of age where 4.65% cases were observed having age less than or equal to 20 years of age. In study conducted by Radhamony NG et al [9] (2021), 40% cases were observed having age from 51 to 60 years of age where 20% each cases was observed having age from 18 to 30 years, 41 to 50 years and having age more than 60 respectively.

Male cases were predominantly higher than female cases. 81.40% cases were male cases where 18.60% were female cases with M:F ratio of 4.38:1. In study conducted by Mukherjee S et al [10] (2020) they observed, 56.25% were male cases and 43.75% were female cases.

In the present study 13.95% cases were observed having diabetes mellitus, 11.63% cases were observed with hypertension where 4.65% cases were observed with diabetes mellitus + hypertension. 69.77% cases were observed without any comorbidity like diabetes mellitus, hypertension or any other. In study conducted by Radhamony NG et al [9] (2021), 40% cases were observed with diabetes mellitus.

In the present study 53.49% cases were observed with plate use, 27.91% cases were observed with Screw and 18.60% cases were observed with nail procedure. In study conducted by Mukherjee S et al [10] (2020) they observed, 46.25% cases were observed with plate implant used, 18.75% each cases were observed with nails and screws / wire implant used respectively, 7.5% cases were observed with DHS / DCS implant used.

In the present study surgical site infection was categorized as early and late interval of 2 weeks from surgery to site infection. Cases having surgical site infection less than or equal to 2 weeks were categorized as early infection where cases having site infection more than 2 weeks were categorized as late infection. 46.51% cases were observed having surgical site infection before or

equal to 2 weeks where 53.49% cases were observed having infection after more than 2 weeks. In study conducted by Radhamony NG et al [9] (2021), Post operatively all cases were observed having surgical site infection at more than 2 weeks. In study conducted by Mukherjee S et al [10] (2020) they observed, 34.5% cases were observed having SSI less than or equal to 2 weeks where 65.5% cases were observed having surgical site infection after 2 weeks.

In the present study 34.88% cases were observed with isolation of Staphylococcus aureus organism followed by 25.58% cases were observed with Klebsiella isolated organism, 18.60% cases with Pseudomonas organism isolated, 13.95% cases with E.Coli organism and 6.98% cases were observed with Streptococcus organisms isolated. In study conducted by Radhamony NG et al [9] (2021), Staphylococcus organism was isolated from 40% cases where 20% each cases were observed with Klebsiella and proteus organism isolated. In study conducted by Mukherjee S et al [10] (2020) they observed, 40% cases were observed Staphylococcus aureus organism isolation, 17.5% cases were observed with Klebsiella SP. organism isolation, 15% cases were observed with Pseudomonas aeruginosa organisms, 5% cases were observed with Escherichia coli, Acinetobacter Baumannii, Enterococcus sp., Staphylococcus, coagulase negative each organisms were isolated from 2.5% each cases respectively where 1.25% each cases were observed with isolation of Citrobacter sp. organism, proteus mirabilis, proteus sp. proteus vulgaris organisms isolated.

Conclusion

In present study Staphylococcus aureus organism was found the most common organism isolated from the cases followed by Klebsiella organism, Pseudomonas organism, E.coli organism and Streptococcus organisms. SSI seems to be unavoidable even when all conventional aseptic procedures are followed. Advanced age, the presence of diabetes, an extended preoperative hospital stay of more than 10 days, and a lengthy surgery lasting more than 1.5 hours were risk factors for SSI. Therefore, cutting the length of the preoperative hospital stay and the surgical procedure as much as feasible while keeping all the required aseptic precautions are the controllable factors that can lower the risk of SSI. To avoid the formation of increasingly resistant pathogen strains, it is important to note that as we go towards the post-antibiotic age, it will be appropriate to administer antibiotics in post-operative wound infections only after thorough culture and sensitivity reports.

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