

## A Hospital Based Prospective Study to Design to Evaluate the Skin Complications in Orthopedic Procedures & Devices

Ramesh Kumar<sup>1</sup>, Kailash Chander Khatri<sup>2\*</sup>

<sup>1</sup>Assistant Professor, Department of Orthopaedic, Government Medical College & Attached Groups of Hospital, Barmer, Rajasthan, India

<sup>2</sup>Assistant Professor, Department of Dermatology, Government Medical College & Associated Groups of Hospital, Barmer, Rajasthan, India

Received: 29-10-2020 / Revised: 01-12-2020 / Accepted: 05-01-2021

### Abstract

**Background:** Different complications are associated with orthopedic surgical procedures. Even though orthopedic surgeries are well-tolerated by subjects, literature quotes a high incidence of postoperative infections, mechanical problems, and allergic reactions after orthopedic surgeries. Hence; the present study was undertaken for evaluating the Skin Complications in Orthopedic Procedures & Devices. **Materials & Methods:** A total of 80 patients who were scheduled to undergo different orthopedic surgical procedures were enrolled. Complete demographic and clinical details of all the patients were recorded. Detailed data in relation to type of surgery performed was also recorded. Two months follow-up was done and presence of and type of skin complication were recorded. All the results were recorded and analyzed by SPSS software. **Results:** Overall incidence of skin complications was 15 percent (12 patients). Out of 17 patients undergoing distal femoral nail fixation procedures, skin complication was present in 2 patients while it was present in 3 patients undergoing knee replacement surgery. Adverse skin reactions were seen in 2 patients each undergoing total hip arthroplasty and limb reconstruction surgery. Out of 12 cases of adverse skin reaction, 4 cases were seen in reaction to orthopedic implants while 3 cases were seen in relation to orthopedic casts. **Conclusion:** Adverse skin reactions are common findings in the patients undergoing orthopedic surgical procedures. Early identification and prompt treatment planning is necessary in such cases for decreasing the associated morbidity.

**Key words:** Orthopedic, Surgical, Skin.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

### Introduction

Different complications are associated with orthopedic surgical procedures. Few of these obstacles, in spite of their unusual incidence and significant preventive protocols applied by orthopedic surgeon, can occur in patients. Similarly, despite significant changes in this area, complications associated with orthopedic surgeries are still documented[1,2].

While taking in view the increasing incidence of associated comorbidities, sincere orthopaedic surgeons are frequently bothered by the occurrence of post treatment complications. Rather; all orthopaedic surgical procedures, even the minor ones, are related to a non-ending tally of adverse events. These adverse effects might be because of the vague assessment of subjects, type of implant, or the surgeon's decisions and practice[3,4]. Even though orthopedic surgeries are well-tolerated by subjects, literature quotes a high incidence of postoperative infections, mechanical problems, and allergic reactions after orthopedic surgeries. The allergic reactions include cutaneous changes (such as eczema), pain, recurrent effusion, delay in wound healing, and implant loosening. Dissimilar to dermal metal contact allergic reactions, which have significant prevalence rates; implant-associated allergies are quite rare. However, there is scarcity of cross-sectional data in relation to occurrence of these reactions. Such skin problems may not only result in the deterioration of patient's condition but also lead to

reoperation and other side effects[5-8]. Hence; the present study was undertaken for evaluating the Skin Complications in Orthopedic Procedures & Devices.

### Materials & methods

The present study was undertaken in Government Medical College & Attached Groups of Hospital, Barmer, Rajasthan (India) with the aim of evaluating the Skin Complications in Orthopedic Procedures & Devices. A total of 80 patients who were scheduled to undergo different orthopedic surgical procedures were enrolled. Complete demographic and clinical details of all the patients were recorded. Inclusion criteria for present study included:

- Patients within the age group of 20 to 60 years,
- Patients with negative history of any other systemic illness,
- Patients with negative history of any previous hypersensitive or allergic reaction

Detailed data in relation to type of surgery performed was also recorded. Two months follow-up was done and presence of and type of skin complication were recorded. All the results were recorded and analyzed by SPSS software.

### Results

Overall incidence of skin complications was 15 percent (12 patients). Among these 12 patients, 58.33 percent of the patients belonged to the age group of 51 to 60. 75 percent of the patients were males while the remaining were females. Out of 17 patients undergoing distal femoral nail fixation procedures, skin complication was present in 2 patients while it was present in 3 patients undergoing knee replacement surgery. Adverse skin reactions were seen in 2 patients each undergoing total hip arthroplasty and limb reconstruction surgery. Out of 12 cases of adverse skin reaction, 4 cases were seen

\*Correspondence

Dr. Kailash Chander Khatri

Assistant Professor, Department of Dermatology, Government Medical College & Associated Groups of Hospital, Barmer, Rajasthan, India.

E-mail: [kkharti999@gmail.com](mailto:kkharti999@gmail.com)

in reaction to orthopedic implants while 3 cases were seen in relation to orthopedic casts.

**Table 1: Age and gender-wise distribution**

Parameter		Number of patients	Percentage
Age group	20 to 35	3	25
	36 to 50	2	16.67
	51 to 60	7	58.33
Gender	Males	9	75
	Females	3	25

**Table 2: Correlation of type of orthopedic surgery and skin complication**

Type of orthopedic surgery	Skin complication		p- value
	Present	Absent	
Distal femoral nail fixation	2	15	0.12
Total hip arthroplasty	2	12	
Limb reconstruction system	2	14	
Anterior cruciate ligament surgery	1	8	
Knee replacement surgery	3	15	
Others	2	16	

**Table 3: Orthopedic devices and skin complication**

Orthopedic devices	Number of patients	Percentage
Surgical tapes	1	8.33
Corn and callus removal tapes	1	8.33
Orthopedic casts	3	25
Orthopedic implants	4	33.33
Bandages (Knee and wrist)	2	16.67
Others	1	8.99
Total	12	100

## Discussion

Cost-containment measures that can be instituted in the clinical setting and have an immediate impact on limiting morbidity are valuable in Western medicine, as evidenced by the gradual incorporation of value-based care initiatives. Postoperative surgical site infection persists as the most common hospital-acquired infection in general surgery departments, as well as a common problem in the spine population because of varying surgical invasiveness, patient comorbidities, and antiseptic measures, with an incidence ranging from 0% to 16%. Orthopedic surgical site infections have been shown to lead to an increase in hospital readmissions, mortality, and cost and result in worse outcomes when compared to noninfected patients. Because of the significance of these outcomes, finding ways to decrease SSI has been a focus within orthopedic surgery[7-10]. Hence; the present study was undertaken for evaluating the Skin Complications in Orthopedic Procedures & Devices. Overall incidence of skin complications was 15 percent (12 patients). Among these 12 patients, 58.33 percent of the patients belonged to the age group of 51 to 60. 75 percent of the patients were males while the remaining were females. In a previous research conducted by Azizian Z et al, authors evaluated dermal adverse events seen in patients undergoing different orthopedic surficial procedures. They evaluated a total of one hundred twenty six patients. Dermal infections were observed in 26.1 percent of the patients in their study while they observed presence of hypersensitivity reactions in 40 percent of the patients. They also detected cellulitis and fractures complication in 29.2 percent and 55 percent of the patients. Severe reactions presenting as toxic epidermal necrolysis were observed in 3 patients, 2 of whom died eventually [10]. In the present study, out of 17 patients undergoing distal femoral nail fixation procedures, skin complication was present in 2 patients while it was present in 3 patients undergoing knee replacement surgery. Adverse skin reactions were seen in 2 patients each undergoing total hip arthroplasty and limb reconstruction surgery. Madu KA et al, in another study assessed the prevalence of surgical site infection after orthopedic related implant surgeries in 97 patients. They evaluated 61 males and 36 females with overall mean age of 38.7 years. They reported overall infection rate of 9.3% with

staphylococcus aureus being the most common causative organism (55.6% patients). They concluded that Surgical site infection following implant surgery is relatively common in our environment with staphylococcus aureus as the major causative organism[11]. In the present study, out of 12 cases of adverse skin reaction, 4 cases were seen in reaction to orthopedic implants while 3 cases were seen in relation to orthopedic casts. In another study conducted by Schultzel M et al, authors evaluated the overall prevalence rate of metal hypersensitivity reactions in patients undergoing orthopedic surgical procedures. Only 41 (4.9%) of 840 patients self-reported any metal hypersensitivity. Of these, 34 (83%) were patch-test positive to 1 or more metals. There were 27 whose test results were positive for nickel, 4 each to cobalt or gold thiosulfate, and 1 each to tin or titanium[12]. Wu PY et al commenced a retrospective analysis on patients undergoing orthopedic surgical procedures and observed that Eczema rates in the joint replacement patients were 38% higher than in the control group. They also observed that joint replacement patients showed a 1.35-fold increased risk of eczema[13]. In another study conducted by Lachiewicz PF et al, results highlighted that in spite of multiple case studies describing metal hypersensitivity reactions in patients who underwent TKA with a cobalt-chromium prosthesis, the lack of evidence-based medicine on metal hypersensitivity made it a diagnosis of exclusion, with patch testing or surgical intervention rarely indicated[14].

## Conclusion

Adverse skin reactions are common findings in the patients undergoing orthopedic surgical procedures. Early identification and prompt treatment planning is necessary in such cases for decreasing the associated morbidity.

## References

1. Chee YL, Crawford JC, Watson HG, Greaves M. Guideline on the assessment of bleeding risk prior to surgery or invasive procedures; British Committee for Standards in Haematology. Br J Haematol. 2008; 140(5):496-504.

2. Rightmire E, Zurakowski D, Vrahas M. Acute infections after fracture repair: management with hardware in place. *Clin Orthop Relat Res.* 2008;466(2):466–72.
3. Bohm E R, Dunbar M J, Frood J J, Johnson T M, Morris K A. Rehospitalizations, early revisions, infections, and hospital resource use in the first year after hip and knee arthroplasties. *J Arthroplasty.* 2012;27(2):232–7.
4. Bozic K J, Kurtz S M, Lau E. et al. The epidemiology of revision total knee arthroplasty in the United States. *Clin Orthop Relat Res.* 2010;468(1):45–51.
5. Raad I, Hanna H, Jiang Y. et al. Comparative activities of daptomycin, linezolid, and tigecycline against catheter-related methicillin-resistant *Staphylococcus bacteremic* isolates embedded in biofilm. *Antimicrob Agents Chemother.* 2007; 51 (5): 1656–60.
6. John A K, Baldoni D, Haschke M. et al. Efficacy of daptomycin in implant-associated infection due to methicillin-resistant *Staphylococcus aureus*: importance of combination with rifampin. *Antimicrob Agents Chemother.* 2009;53(7):2719–24.
7. Viol A, Pradka S P, Baumeister S P. et al. Soft-tissue defects and exposed hardware: a review of indications for soft-tissue reconstruction and hardware preservation. *Plast Reconstr Surg.* 2009;123(4):1256–63.
8. Kurtz S M, Ong K L, Schmier J. et al. Future clinical and economic impact of revision total hip and knee arthroplasty. *J Bone Joint Surg Am.* 2007;89( 03):144–51.
9. Thompson JS, Baxter BT, Allison JG. Temporal patterns of postoperative complications. *Arch Surg.* 2003; 138(6):596–602.
10. Azizian Z, Hesami Z, Mansouri P, Ebrahimpour A, Attar B, Chalangari R. Skin Complications of Orthopedic Procedures and Devices. *Iran J Public Health.* 2018;47(12):1937–44.
11. Madu KA, Enweani UN, Katchy AU, Madu AJ, Aguwa EN. Implant associated surgical site infection in orthopaedics: a regional hospital experience. *Niger J Med.* 2011;20(4):435–40.
12. Schultzel M, Klein CM, Demirjian M, Blout C, Itamura JM. Incidence of Metal Hypersensitivity in Orthopedic Surgical Patients Who Self-Report Hypersensitivity History. *Perm J.* 2020;24:19.091.
13. Wu PY, Muo CH, Tsai CH. Increased risk of eczema after joint replacement: A population-based retrospective cohort study. *Medicine (Baltimore).* 2019;98(45):e17914.
14. Lachiewicz PF, Watters TS, Jacobs JJ. Metal Hypersensitivity and Total Knee Arthroplasty. *J Am Acad Orthop Surg.* 2016; 24(2):106–12.

**Conflict of Interest:** Nil

**Source of support:** Nil