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ORIGINAL ARTICLE

Dermatologist in Orthopedic Ward: Prevalence and Pattern of Dermatological Complications of Orthopedic Implants and Procedures – An Observational Study in 100 Cases

Uzma Amin[1], Mazhar Mahmood[2], Faria Asad[3]

[1]Senior Registrar, Dermatology Department, Services Hospital Lahore
[2]Department of Orthopedics, Allied Hospital II, Faisalabad Medical University
[3]Professor of Dermatology, Services Hospital Lahore.

Authorship and Contribution Declaration:
Each author of this article has encountered all 04 criterions of authorship:

1. Commencement and design of the study, attainment of data, or analysis and interpretation of information.
2. Drafting the manuscript or rewriting it censoriously for important intellectual content.
3. Providing concluding endorsement of the version for publication.
4. All authors have settled to be answerable for all aspects of their research work

Corresponding author:
Dr. Uzma Amin
E-mail: dermalgh@gmail.com

ABSTRACT

Objective: This study was done to assess the prevalence and pattern of various dermatological manifestations and their contributing factors after orthopedic surgical interventions.

Methodology: Prospective observational study was done at Dermatology department, Services Hospital Lahore for 6 months after taking ethical approval. 100 cases were included by non-probability consecutive sampling. Post-operative admitted patients in orthopedic ward having some skin complications were included after taking their consent. Patients having any dermatosis before surgery, incomplete clinical/surgical data were excluded. Demographic data was noted, type of procedure done, type of skin complication observed, duration of lesion, contributing or comorbid factors were recorded in predesigned proforma. Diagnosis where needed was confirmed by skin smears or histopathology. Data was analyzed in SPSS version 27; means were calculated for quantitative variables and frequency percentages for qualitative variables.

Results: Significant incidence of conditions ranging from contact dermatitis and surgical site infections to rare complications like metal hypersensitivity and prosthesis abscess were noted.

Conclusion: Complications due to orthopedic treatments were seen in 53% cases. Dermatologist plays a vibrant role in early diagnosing and managing infections and other eczematous reactions seen after orthopedic interventions.

Keywords: Orthopedic procedures, Implants, Dermatological complications.

This article may be cited as: Amin U, Mahmood M, Asad F. Dermatologist in Orthopedic Ward: Prevalence and Pattern of Dermatological Complications of Orthopedic Implants and Procedures – An Observational Study in 100 Cases. Pak. Orthop. Assoc. 2024; Vol. 37 (02)

INTRODUCTION

A dermatologist in orthopedic ward sees the outer story of inner struggle. Any type of surgical procedure can be associated with post-operative complications despite preventive measures and depend on patients' medical history, type of procedure/ or implant inserted and surgeon's practice.[1] Causes of these complications can be multiple or unknown in few cases and infection is most common post-operative complication associated with orthopedic surgeries.[2]

Knowledge and awareness about cutaneous complications developing after orthopedic procedures and various casts and implants is important for proper preventive measures. These may lead to increased morbidity and prolonged hospital stay after surgical procedure and even risk of need for repeat surgeries. [3] Skin infections, delayed wound healing, mechanical problems, drug allergic reactions, delayed wound healing, implant material related allergy are most commonly observed cutaneous complications seen in post-operative patients of orthopedic surgery. Rare complications like metallosis and histiocytosis

have also been reported after joint replacement surgeries. These lesions are often underreported and can significantly impact patient outcomes and satisfaction in addition to deteriorating patient's condition, prolonged hospital stay and need for repeat surgery. [4, 5]

Dermatologists in orthopedic settings can play a crucial role in diagnosing and managing these complications, Therefore, this study was conducted to assess various dermatological manifestations and their contributing factors after orthopedic surgical interventions.[2] By determining the types and causes of these skin complications we wanted to highlight the need of dermatologist's involvement for better management of post-operative cutaneous complications in orthopedic ward.

METHODS

A Prospective observational study was conducted at Services Hospital, Lahore for 6 months after taking ethical approval from IRB. 100 cases were enrolled by non-probability consecutive sampling. Informed consent was taken before enrolling the patients about use of their data and photographs in the study.

Inclusion criteria: Post-operative Inpatients of orthopedic ward with or without having some skin complication

Exclusion criteria: Patients having any dermatosis before surgery, incomplete clinical/surgical data were excluded from study.

Demographic details along with the type of procedure done were recorded. Patients were inquired about presence of any symptom regarding skin and cutaneous lesion appearing after surgical procedure. Detailed clinical examination was done to note for appearance of any skin lesion developing after surgical procedure at the site of surgery otr anywhere else also. Type of skin complication observed, duration of lesion, contributing or comorbid factors were reordered in predesigned proforma. Diagnosis where needed was confirmed by skin smears or histopathology. Photographs were taken where needed.

Data was entered and analyzed in SPSS version 27. Prevalence and frequencies of dermatological complications was calculated. Means were calculated for quantitative variables and frequency percentages for qualitative variables.

RESULTS

Among 100 cases which were studied, 66 % were male and 34% were female patients. Mean age was 34 years with age range of 17 to 83 years. Age groups comprised 18-35 years (39%), 36-50 years (42%) and 51-75 years (19%).

Common procedures and indications for intervention included fracture fixations (internal or external) which were 62%, total knee replacement (9%), hip replacement (13%), reoperation for implant removal (2%), spine surgery (5%) and congenital malformed limbs surgery (2%) Prevalence of dermatological complications was 53%. Data stratification of age with gender showed p- value of 0.0013 which means a significant association between age groups and prevalence of dermatological complications. This showed impact of age on prevalence of complications and their variability across different age groups. Whereas, gender stratification with prevalence of complications revealed insignificant results (p-value: 0.84).

Various types of infections were seen in 21% cases. Among these swelling, tenderness, cellulitis, abscess, folliculitis, purulent ooze from surgical site were frequently observed. 1 case developed necrotizing fasciitis of lower limb requiring repeat surgical intervention within 1st week of post-operative period.

MRSA was the most commonly isolated organism in surgical site infections (31%) followed by pseudomona aeruginosa (23%) in post-operative infection cases. No growth was seen in 35% of infections.

Allergic contact dermatitis or implant hypersensitivity due to various type of external implants used for fractures fixation was most common dermatological complication seen in 57% cases which needed immediate treatment to reduce the itching. Internal implants caused localized infection in the form of cellulitis or abscess requiring prolonged antibiotic treatment or removal of implant. Figure 1 shows various skin manifestations related to various implants used in treatment of orthopedic problems.

2 cases developed subcutaneous abscess formation over hip joint prosthesis which needed its surgical removal. One case developed pyoderma gangrenosum at site of sutures. Pressure related injuries and sores were frequently seen due to immobilization (10%). Contact dermatitis due to continuous trauma by dressing was seen in 5% cases, pruritus and frequent tingling over surgical incision line was seen in 54% cases in late post-operative cases. Maceration and candidiasis under cast and dressings was frequently observed in fracture fixation procedures (8%).

2 cases developed Steven Johnson Syndrome due to injection of diclofenac sodium in post-operative phase requiring referral to medical emergency for management.

Table 1: Types of dermatological complications related to orthopedic interventions

Dermatological complications	Percent	Number
Surgical site infections:	21%	11
Cellulitis	7%	4
Necrotizing fasciitis	2%	1
Intertrigo	4%	2
Candidiasis	4%	2
Abscess	4%	2
Contact eczema due to external devices:	57%	30
Orthopedic casts		
Topical drug reactions	3%	15
Surgical Tape and bandages	1%	6
	17%	9
Skin lacerations due to implants	11%	5
Cutaneous Reactions due to Drugs	7%	4
Papulosquamous rash		
Fixed drug eruption	2%	1
SJS/TEN	2%	1
	4%	2
Hypertrophic Scars and keloids	2%	1
Hyper and hypo Pigmentation	6%	2

Figure 1: Infective complications requiring repeat intervention

a. Abscess formation over ankle internal fixation site b. Cellulitis leading to denudation of skin c. Compartment syndrome 2 days after fixation of tibial fracture d. incision drainage done on other side of leg to release the fascial planes.

Figure 2: Irritant contact allergies to dressings after fracture fixations

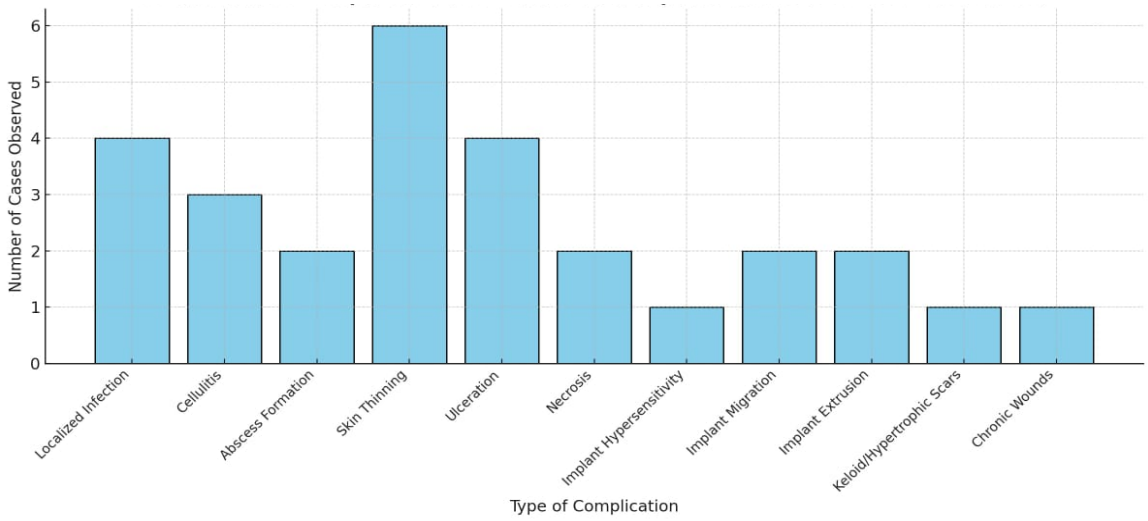

Figure 3: Pattern of various cutaneous complications to implants in orthopedic surgical treatment

Figure 4: Hypersensitivity skin reactions to external and internal implants necessitating re intervention

DISCUSSION

" When bones heal, don't forget the skin they live under''

Healing is not just about fixing what is broken; it is also about caring for the surface. Dermatologists' involvement in orthopedic wards can facilitate an accurate diagnosis of allergic and infectious complications, implementation of preventive measures like hypoallergenic implants and promotion of wound healing through targeted therapies. [1]

Early recognition of dermatological symptoms and various orthopedic signs can improve patient outcomes by leading to appropriate treatment and reducing patient morbidity.[2]

Surgical site infections were most common cutaneous reactions seen after orthopedic procedures and result from inadequate sterilization, prolonged operative time or patient related comorbidities like

diabetes mellitus or immunodeficiency.[6] Various other studies also show that commonest post procedure dermatological complications are related to microbes. [7]

Orthopedic casts are a type of medical treatment given to immobilize the limb, support bones and soft tissues. Casts related skin discoloration, miliaria, itching, pressure ulceration and candidiasis was most frequently seen in our cases. Tehrani M in his study in Iran observed pain, swelling, impaired mobility, numbness and a burning sensation inside the cast being the most common complications in the first week after cast application.[8]

Orthopedic implants and procedures introduce foreign materials into the body, triggering potential local and systemic reactions. Factors contributing to complications include allergic Reactions due to Nickel and cobalt in implants are common allergens which cause contact dermatitis or systemic hypersensitivity.[4] By use of newer implants made of steel and titanium these complications are much reduced. 2 of our cases developed persistent discharging sinus and abscess formation as a late complication of femoral implants which needed their surgical removal. Similar cases have also been reported in other studies. [9, 10, 11]

Cutaneous manifestations in the form of systemic side effects of drugs are also a part of various treatments given after orthopedic procedures. Maculopapular drug rash was most commonly seen in our study caused by different antibiotics like cephalosporin antibiotics and quinolones; followed by Fixed drug eruption due to drugs used for pain relief. [12] Severe drug reaction in the form of Steven Johnson Syndrome leading to Toxic epidermal necrolysis after diclofenac was seen in 2 of our cases and required immediate admission in intensive care unit.

Sutures and dressings can cause local irritation, exacerbating pre-existing skin conditions like atopic eczema and fungal infections.[3]

There are some other minor skin complications after orthopedic procedures like hypertrophic scarring, hyper and hypopigmentation, atrophy of skin after local corticosteroid injection to control arthritis. On the other hand, we can reduce the risk of subcutaneous fat atrophy and hypopigmentation by use of diluted steroids and low-solubility steroids like triamcinolone acetonide for deep structures like knee. [2]

Limited studies have been done in this area; their results are mostly consistent with our study, although with certain differences due to the type of procedure, previous comorbidities, duration of hospital stay etc. 1, 3

The study emphasizes the need for preoperative screening for metal allergies, particularly in patients with a history of dermatitis. Postoperative vigilance for dermatological issues can enhance early detection and management, reducing the morbidity of already post operative patients.

CONCLUSION

Dermatological complications in orthopedic patients are a significant and may be life threatening. These can be less disturbing like eczema and traumatic injuries but serious one like cellulitis and skin necrosis. This study highlights the vital role of dermatologists in early diagnosing and managing these conditions for improving patient post-operative recovery and outcome.

Conflict of interest
None declared by author.

Funding Information
There was no Sponsorship or Financial support to conduct this research.

Recommendations
Future research should involve larger, multicenter studies to explore long-term outcomes of dermatological complications in orthopedic patients.
Screening for previous history of atopy and chronic dermatosis should be done to avoid allergies to metal and adhesives; and provide prompt treatment of cutaneous complications by regular dermatological assessment.

Limitations
Single-center design, relatively small sample size and lack of prolonged follow-up were limitations of this study.

Ethical Considerations
Ethical issues like informed consent, data fabrication, plagiarism or falsifications have been entirely observed by authors of study.

Authors' Contributions
UA: Diagnosis and management of the case, data collection and manuscript writing.
MM: Data analysis and critical review of manuscript
FA: Study design and final approval of manuscript to be published.

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