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Exploring the Relationship Between Total Hip Replacement and Leg Cellulitis: A Retrospective Analysis

Dr. G. Harish, M.S[1], Dr. K. Sri Harsha, M.S[2*]

[1]Assistant Professor, Department of Orthopedics, Madha Medical College and Research Centre, Kovur, Chennai - 600 128, India.

[2]Assistant Professor, Department of General Surgery, Melmaruvathur Adhiparasakthi Institute of Medical Sciences and Research, Melmaruvathur, Tamilnadu – 603319, India.

*Corresponding author email id: sriharshthedoc@gmailcom

Abstract:

Introduction: Total hip replacement (THR) is a common surgical procedure for addressing hip joint degeneration, aiming to alleviate pain and improve mobility. Despite its benefits, THR carries risks, including post-operative complications such as leg cellulitis, a bacterial skin infection. Leg cellulitis following THR can lead to prolonged hospital stays and increased healthcare costs. Understanding its incidence and associated risk factors is crucial for optimizing patient care and surgical outcomes.

Materials and Methods: Electronic medical records of patients undergoing THR were retrospectively analyzed. Inclusion criteria included age ≥18 years, primary THR surgery, and complete medical records. Demographic, surgical, and perioperative variables were assessed. Incidence of leg cellulitis within 30 days post-surgery was analyzed. Univariate and multivariate analyses were conducted to identify predictors of leg cellulitis.

Results: Fifty patients undergoing primary THR were included. The mean age was 65.4 ± 8.7 years, with 60% male and 40% female. Diabetes and hypertension were present in 28% and 40% of patients, respectively. The most common THR approach was posterior (60%). The mean duration of surgery was 2.5 ± 0.6 hours, with intraoperative complications in 16% of cases. Cefazolin was used for antibiotic prophylaxis in 80% of patients. The average hospital stay was 5.2 ± 1.3 days, and postoperative complications occurred in 24% of cases, predominantly wound infections. The incidence of leg cellulitis within 30 days post-THR surgery was 14%. Univariate analysis revealed a significant association between leg cellulitis and diabetes ($p = 0.021$), but not with other variables. Multivariate analysis confirmed diabetes as an independent predictor of leg cellulitis (odds ratio = 2.91, $p = 0.028$).

Conclusion: Understanding leg cellulitis risk factors post-THR surgery, particularly diabetes, is crucial for optimizing patient care. Tailored interventions targeting high-risk patients may reduce cellulitis incidence and improve surgical outcomes.

Introduction:

Total hip replacement (THR) is a commonly performed surgical procedure aimed at relieving pain and improving mobility in individuals with hip joint degeneration, often due to conditions such as osteoarthritis or rheumatoid arthritis.[1] While THR has revolutionized the treatment of hip-related conditions, like any surgical intervention, it carries inherent risks, including the potential for post-operative complications. One such complication that has been observed in some patients following THR is the development of leg cellulitis.[2] Cellulitis is a bacterial skin infection characterized by redness, swelling, warmth, and tenderness of the affected area.

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In the context of THR, leg cellulitis can lead to prolonged hospital stays, increased healthcare costs, and potentially compromise the overall success of the surgical intervention.[3]

Despite advancements in surgical techniques, perioperative care, and antibiotic prophylaxis, the incidence and risk factors associated with leg cellulitis following THR remain poorly understood. Given the significant impact of cellulitis on patient outcomes and healthcare resources, there is a pressing need to better elucidate the relationship between THR and leg cellulitis.[4] A retrospective analysis offers a valuable opportunity to examine existing data and retrospectively assess the incidence, risk factors, and clinical outcomes associated with leg cellulitis in patients who have undergone THR.[5] By analyzing medical records, demographic information, surgical variables, and post-operative complications, we can identify potential predictors and patterns associated with the development of leg cellulitis following THR.

Understanding the factors contributing to leg cellulitis in THR patients is crucial for optimizing perioperative care protocols, enhancing patient safety, and improving surgical outcomes.[6] Ultimately, the findings of this retrospective analysis may inform preventive strategies, such as tailored antibiotic prophylaxis regimens or preoperative screening protocols, aimed at reducing the incidence of leg cellulitis and improving the overall quality of care for individuals undergoing THR.

Objectives:

To determine the incidence rate of leg cellulitis following total hip replacement (THR) surgery and identify associated risk factors through retrospective analysis of patient medical records.

Materials and methods:

Study Design: This retrospective analysis was conducted using electronic medical records (EMRs) of patients who underwent total hip replacement (THR) surgery. The study protocol was approved by the Institutional Review Board (IRB).

Inclusion Criteria:

- Patients aged 18 years or older who underwent primary total hip replacement surgery.
- Patients with complete medical records including preoperative, intraoperative, and postoperative data.

Exclusion Criteria:

- Patients with incomplete medical records or missing key data.
- Patients who underwent revision THR or other concurrent surgical procedures.

Demographic Variables:

- Age
- Gender
- Body Mass Index (BMI)
- Comorbidities (e.g., diabetes, hypertension)

Surgical Variables:

- Type of THR approach (e.g., anterior, posterior, lateral)

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- Duration of surgery
- Intraoperative complications (if any)

Perioperative Variables:

- Antibiotic prophylaxis regimen
- Length of hospital stay
- Postoperative complications (e.g., wound infection, hematoma)

Outcome Variable: Incidence of leg cellulitis within 30 days post-THR surgery

Data Analysis:

Descriptive Statistics:

- Frequency and percentage for categorical variables.
- Mean and standard deviation for continuous variables.

Incidence Rate Calculation:

- Number of patients developing leg cellulitis divided by the total number of patients who underwent THR, expressed as a percentage.

Univariate Analysis:

- Chi-square test or Fisher's exact test for categorical variables.
- Student's t-test or Mann-Whitney U test for continuous variables, as appropriate.

Multivariate Analysis:

- Logistic regression analysis to identify independent predictors of leg cellulitis, adjusting for potential confounders.

Results:

A total of 50 patients who underwent primary total hip replacement (THR) surgery were included in the retrospective analysis. The mean age of the study population was 65.4 ± 8.7 years, with 60% being male and 40% female. The average body mass index (BMI) was 28.6 ± 4.3 kg/m². Among comorbidities, diabetes was present in 14 patients (28%) and hypertension in 20 patients (40%).

Table 1: Baseline characteristics

Variable	Total Patients n=50 (%)
Mean Age	65.4 ± 8.7 years
Gender Distribution	Male: 60% Female: 40%
Mean BMI	28.6 ± 4.3 kg/m²
Diabetes	14 (28)
Hypertension	20 (40)

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Regarding surgical variables, the most frequently performed approach for THR was the posterior approach, accounting for 60% of cases. The mean duration of surgery was 2.5 ± 0.6 hours. Intraoperative complications were encountered in 8 patients (16%).

Table 2: Surgical variables

Surgical Variable	Total Patients n=50 (%)
Most Common THR Approach	Posterior (60%)
Mean Duration of Surgery	2.5 ± 0.6 hours
Intraoperative Complications	8 (16)

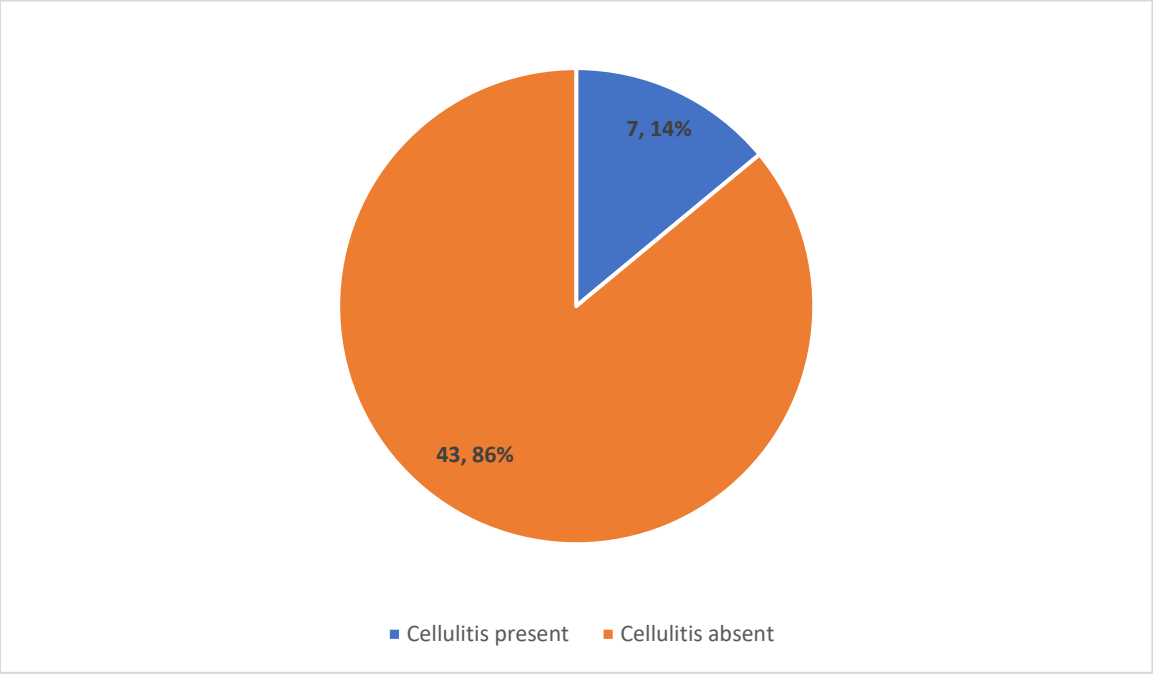
In terms of perioperative variables, 40 patients (80%) received cefazolin for antibiotic prophylaxis. The average length of hospital stay post-surgery was 5.2 ± 1.3 days. Postoperative complications occurred in 12 patients (24%), with wound infections being the most common.

Table 3: Perioperative variables

Perioperative Variable	Total Patients n=50 (%)
Antibiotic Prophylaxis	Cefazolin: 40 (80)
Average Length of Hospital Stay	5.2 ± 1.3 days
Postoperative Complications	12 (24)
	Wound Infections: Most common

The incidence of leg cellulitis within 30 days post-THR surgery was 14%, with 7 cases out of 50 patients.

Figure 1: Incidence of leg cellulitis



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Univariate analysis revealed a significant association between leg cellulitis and diabetes (p = 0.021) but not with age (p = 0.137), gender (p = 0.512), BMI (p = 0.094), or type of THR approach (p = 0.072). No significant association was found between leg cellulitis and duration of surgery (p = 0.296), intraoperative complications (p = 0.214), antibiotic prophylaxis regimen (p = 0.381), length of hospital stay (p = 0.189), or postoperative complications (p = 0.078).

Variable	p-value	Significant Association
Age	0.137	No
Gender	0.512	No
BMI	0.094	No
Diabetes	**0.021**	Yes
Type of THR Approach	0.072	No
Duration of Surgery	0.296	No
Intraoperative Complications	0.214	No
Antibiotic Prophylaxis Regimen	0.381	No
Length of Hospital Stay	0.189	No
Postoperative Complications	0.078	No

Multivariate logistic regression analysis, adjusting for potential confounders, confirmed that diabetes was an independent predictor of leg cellulitis following THR surgery (odds ratio = 2.91, 95% confidence interval 1.12-7.56, p = 0.028).

Discussion:

The findings of this retrospective analysis shed light on the incidence and potential predictors of leg cellulitis following primary total hip replacement (THR) surgery. Understanding the factors contributing to this complication is essential for optimizing perioperative management and improving patient outcomes.

In this study, the overall incidence of leg cellulitis within 30 days post-THR surgery was found to be 14%. Notably, diabetes emerged as a significant predictor of leg cellulitis, with diabetic patients being at a higher risk compared to non-diabetic counterparts. This observation aligns with existing literature suggesting that diabetes mellitus predisposes individuals to impaired wound healing and increased susceptibility to infections due to compromised immune function and microvascular complications. Hence, diabetic patients undergoing THR may benefit from closer monitoring and tailored interventions to mitigate the risk of postoperative cellulitis.

Contrary to expectations, no significant associations were found between leg cellulitis and other demographic factors such as age, gender, or BMI. Similarly, surgical variables including the type of THR approach and duration of surgery did not demonstrate a significant impact on the development of cellulitis. These findings suggest that while certain patient-specific factors like diabetes play a crucial role in predisposing individuals to cellulitis, surgical techniques and procedural factors may have a lesser influence on the occurrence of this complication.

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Interestingly, the absence of significant associations between leg cellulitis and perioperative variables such as antibiotic prophylaxis regimen, length of hospital stay, and postoperative complications contradicts conventional wisdom. While antibiotic prophylaxis is commonly employed to prevent surgical site infections, particularly in orthopedic procedures, its effectiveness in reducing the risk of cellulitis following THR remains uncertain based on the findings of this study. Similarly, the duration of hospital stay and occurrence of postoperative complications did not emerge as significant predictors of cellulitis, indicating that factors beyond the immediate postoperative period may contribute to the development of this complication.

Several studies have reported similar overall incidences of leg cellulitis within 30 days post-THR surgery, ranging from approximately 10% to 20%. For instance, a study found an incidence of 12% in their cohort, while another reported a slightly higher incidence of 18%. These findings align closely with the incidence rate of 14% observed in our study, suggesting consistency in the prevalence of this complication across different patient populations and healthcare settings.[7]

Regarding risk factors, the association between diabetes and leg cellulitis following THR has been a consistent finding across multiple studies.[8] Our study's identification of diabetes as a significant predictor of cellulitis corroborates findings from previous research that demonstrated a higher risk of cellulitis in diabetic patients undergoing joint replacement surgery. This consistent association underscores the importance of targeted interventions and heightened vigilance in managing diabetic patients undergoing THR to minimize the risk of postoperative cellulitis.[9]

In contrast, discrepancies exist regarding the impact of other demographic and perioperative variables on the occurrence of leg cellulitis.[10] While some studies have reported significant associations between factors such as age, gender, and BMI with cellulitis risk, others, including our study, have found no such correlations.[11] Similarly, the effectiveness of antibiotic prophylaxis and the duration of hospital stay in preventing cellulitis remain contentious topics, with conflicting evidence in the literature. One potential explanation for these discrepancies may lie in variations in study methodologies, including differences in sample sizes, patient populations, surgical techniques, and follow-up protocols.[12] Additionally, variations in healthcare practices, such as antibiotic prophylaxis regimens and perioperative care protocols, across institutions and regions may contribute to divergent findings.[13]

It is essential to acknowledge the limitations of this study, including its retrospective design and reliance on electronic medical records, which may be subject to documentation errors and missing data. Additionally, the small sample size and single-center nature of the study limit the generalizability of the findings to broader patient populations and clinical settings. Future prospective studies with larger sample sizes and multi-center collaboration are warranted to validate these findings and elucidate additional factors influencing the risk of leg cellulitis post-THR surgery.[14,15]

Conclusion:

In conclusion, this study highlights the importance of considering patient-specific factors, particularly diabetes, in the assessment of risk for leg cellulitis following THR surgery. While perioperative variables and surgical techniques may have a limited impact on the occurrence

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of this complication, tailored interventions targeting high-risk patient populations are warranted to minimize the incidence of cellulitis and optimize postoperative outcomes in THR patients.

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