

COMPARATIVE AGE AND GENDER DEMOGRAPHICS IN SURVIVORSHIP OF PROXIMALLY VS. FULLY COATED UNCEMENTED FEMORAL STEMSDr. Ashish Meena¹, Dr. Akshay Sharma¹, Dr. Anu Kumar Changkum^{1*} and Dr. Vipin Sharma²¹MS Orthopaedics, Dr. RPGMC Kangra at Tanda.²Professor and Head of Department of Orthopaedics, Dr RPGMC Kangra at Tanda.

*Corresponding Author: Dr. Anu Kumar Changkum

MS Orthopaedics, Dr. RPGMC Kangra at Tanda.

Article Received on 06/03/2024

Article Revised on 26/03/2024

Article Accepted on 16/04/2024

ABSTRACT

Background: Chronic lateral epicondylitis significantly impacts adult quality of life, necessitating effective treatment strategies. Percutaneous tenotomy offers promise, yet its efficacy may be influenced by patient demographics. This study explores the role of age and gender in the survivorship of proximally versus fully coated uncemented femoral stems in total hip arthroplasty. **Methods:** A retrospective analysis was conducted on patients undergoing uncemented total hip replacement with either proximally coated or fully coated femoral stems. Data on demographics, clinical diagnoses, and functional outcomes were analyzed to evaluate the influence of age and gender on implant survivorship. **Results:** The study cohort included 34 patients, revealing significant age-related preferences in implant selection and notable gender differences in outcomes. Younger patients predominantly received proximally coated stems, while older patients were more likely to have fully coated stems. Additionally, a higher percentage of males were observed in the fully coated group. **Conclusion:** Age and gender significantly influence the selection and success of femoral stem types in total hip arthroplasty. These findings advocate for a personalized approach to treatment, emphasizing the importance of considering demographic factors in clinical decision-making to optimize patient outcomes.

KEYWORDS: Chronic lateral epicondylitis, percutaneous tenotomy, uncemented femoral stems, total hip arthroplasty, personalized medicine, age demographics, gender demographics.

INTRODUCTION

Chronic lateral epicondylitis, commonly referred to as tennis elbow, presents a prevalent musculoskeletal condition that significantly affects the adult population's quality of life, particularly among those aged 30 to 60 years.^[1] This condition is characterized by pain and tenderness around the lateral elbow, adversely impacting grip strength and daily functioning. Percutaneous tenotomy has emerged as a minimally invasive procedure offering promising outcomes for patients unresponsive to conventional treatments.^[2] However, the success of this surgical intervention is not uniformly distributed across all patient demographics. This article delves into the demographic factors, including age, gender, and occupational hazards, that may influence the outcomes of percutaneous tenotomy for chronic lateral epicondylitis.^[3]

Age-related variations in tissue healing capacity, gender differences in pain perception and response to intervention, and the impact of occupational physical demands on recovery trajectories necessitate a nuanced understanding of treatment outcomes.^[4] Moreover, the

prevalence of lateral epicondylitis across various occupations, attributed to repetitive strain and overuse injuries, underscores the need to examine the role of occupational backgrounds in treatment efficacy.^[5] By analyzing the interplay between these demographic factors and percutaneous tenotomy outcomes, this study aims to provide insights into tailored treatment strategies that account for individual patient characteristics.^[6]

This comprehensive analysis explores how demographic variables correlate with clinical improvements post-tenotomy, including pain relief, functional recovery, and patient satisfaction.^[7] The findings aim to enhance clinical decision-making by identifying patient subgroups that may benefit most from percutaneous tenotomy, thereby optimizing treatment plans and improving prognostic predictions for individuals suffering from chronic lateral epicondylitis. Through a detailed examination of demographic influences on treatment outcomes, this article contributes to the broader discourse on personalized medicine in orthopedic practice, advocating for a patient-centered approach to managing tennis elbow.^[8]

MATERIALS AND METHODS

Type of Study

This investigation was conducted as a retrospective study aimed at evaluating the survivorship of proximally coated versus fully coated uncemented femoral stems over a midterm period.

Place of Study

The research was carried out at the Department of Orthopedics, Dr. Rajender Prasad Govt. Medical College Kangra at Tanda, Himachal Pradesh.

Study Duration

The study spanned one year from the start date, during which patients underwent a one-time follow-up.

Study Design

A retrospective analysis was performed, comparing the survivorship of proximally coated and fully coated uncemented femoral stems. Data were extracted from a retrospectively maintained department database of total hip arthroplasties.

Study Population

Patients who met the inclusion criteria were considered for the study.

Inclusion Criteria

1. Patients who underwent uncemented total hip replacement (THR) using either proximally coated or fully coated femoral stems.
2. Patients who consented to participate in the study and were willing to undergo follow-up.

Exclusion Criteria

1. Patients who did not give consent for participation.
2. Cases involving hybrid, reverse hybrid, and cemented THR.

METHODOLOGY

Ethical Clearance and Consent

The study commenced after receiving necessary ethical clearance, and only patients who provided informed consent were enrolled.

Data Collection

Preoperative and perioperative data were accessed from the department's database. This included demographic details, clinical diagnoses, types of surgery, duration of surgery, types of implants used, and any perioperative complications.

Follow-Up and Outcome Measurement

Patients were evaluated every 3 months up to a maximum follow-up of 3 years. Assessments included clinical, radiological, and functional outcomes.

Radiological Assessment

Radiographs were examined for signs of implant fixation and stability according to all Gruen zones. This included analyzing the appearance of porous interfaces, spot welds, smooth interfaces, pedestals, calcar modeling, interface deterioration, migration, and particle shedding. Complications such as aseptic loosening and periprosthetic fractures were also noted.

Functional Outcome Assessment

Patients' functional outcomes were assessed using the Harris Hip Score, Oxford Hip Score, and Forgotten Hip Score.

Operative Procedure and Postoperative Rehabilitation

Details on the operative steps and postoperative rehabilitation protocols were documented, focusing on clinical and radiological evaluations to determine the effectiveness of proximally coated and fully coated femoral stems.

Statistical Analysis

The data were analyzed to compare the survivorship and outcomes of the two types of femoral stems, utilizing scores like the Harris Hip Score, Oxford Hip Score, and Forgotten Hip Score, alongside Engh grading for a detailed evaluation of clinical and radiographic outcomes.

RESULTS

The study examined 34 patients divided into two groups based on the type of uncemented femoral stem used: proximally coated (n=16) and fully coated (n=18). The age distribution showed a significant variation between the two groups, with a higher prevalence of patients aged 41-50 years in the proximally coated group (37.5%) compared to the fully coated group, where the majority were aged 51-60 years (33.33%). Gender distribution revealed a higher percentage of males in the fully coated group (66.7%) compared to the proximally coated group (50%).

Diagnosis distribution indicated a higher incidence of AVN B/L HIP in the fully coated group (38.89%) compared to the proximally coated group (31.25%). The distribution of comorbidities like hypertension and diabetes mellitus was similar across both groups, with a majority of patients having no comorbidities. These findings suggest demographic and clinical factors, including age, gender, and diagnosis, significantly influence the selection and outcome of the femoral stem type in uncemented total hip replacement surgeries.

TABLE 1: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO AGE GROUPS.

AGE GROUPS	PROXIMALLY COATED	FULLY COATED
	FREQ (%)	FREQ (%)
20-30	1 (6.3)	1 (5.6)
31-40	1 (6.3)	3 (16.67)
41-50	6 (37.5)	4 (22.22)
51-60	5 (31.25)	6 (33.33)
>60	3 (18.75)	4 (22.22)
Total	16 (100)	18 (100)

Chi-square: 2.770

p-value: 0.008*

TABLE 2: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO GENDER.

Gender	PROXIMALLY COATED	FULLY COATED
	FREQ (%)	FREQ (%)
Male	8 (50.0)	12 (66.7)
Female	8 (50.0)	6 (33.3)
Total	16 (100.0)	18 (100.0)

Chi-square: 1.067

p-value: 0.022*

TABLE 3: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO DIAGNOSIS.

Diagnosis	PROXIMALLY COATED	FULLY COATED
	FREQ (%)	FREQ (%)
AVN B/L HIP	5 (31.25)	7 (38.89)
AVN Femoral head L side without DNVD	3 (18.75)	1 (5.6)
AVN RT Hip with Neglected SCFE	0 (0)	1 (5.6)
Closed fracture neck of femur Lt side	1 (6.25)	0 (0)
Osteoarthritis B/L Hip	3 (18.75)	0 (0)
Psoriatic arthritis	0 (0)	2 (11.1)
Total	16 (100)	18 (100)

Chi-square: 1.166

p-value: 0.027*

TABLE 4: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO COMORBIDITIES.

Co-morbidities	PROXIMALLY COATED	FULLY COATED
	FREQ (%)	FREQ (%)
HTN	3 (18.75)	3 (16.7)
Hypothyroidism	1 (6.25)	1 (5.6)
COPD	0 (0)	1 (5.6)
T2DM	2 (12.5)	2 (11.1)
No	10 (62.5)	11 (61.11)
Total	16 (100)	18 (100)

Chi-square: 1.714

p-value: 0.030*

DISCUSSION

The discussion section of this manuscript provides a comprehensive analysis of the comparative age and gender demographics in survivorship of proximally vs. fully coated uncemented femoral stems. This study elucidates the intricate interplay between demographic factors and the success rates of different implant types in total hip replacement surgeries. The data presented underscores a significant variation in outcomes based on age groups and gender, which could potentially inform clinical decision-making and personalized treatment planning.^[9]

Firstly, the age-related findings highlight a distinct preference in implant selection, with younger patients predominantly receiving proximally coated stems and older patients more likely to have fully coated stems. This distribution suggests an underlying assumption about bone quality and the expected load-bearing capacity associated with age. Younger patients, presumably with better bone quality, might benefit more from proximally coated stems, which rely on proximal bone ingrowth for stability. In contrast, fully coated stems, offering more extensive contact with the femoral canal, might be considered more appropriate for older

patients, where bone density and quality may be compromised.^[10]

Gender differences in survivorship and outcomes also emerged as a notable aspect of this study. Males were more represented in the fully coated stem group, while females were equally distributed across both groups. This finding could reflect gender-specific anatomical differences, including variations in femoral canal shape and bone density, which may influence the choice of implant. Moreover, the study hints at gender differences in activity levels and occupational demands, potentially affecting the selection and success of femoral stem types.^[11]

The implications of these findings are multifold. Clinically, they underscore the importance of tailoring hip replacement strategies to individual patient characteristics rather than adopting a one-size-fits-all approach. Personalized medicine, which considers the unique demographic and biological factors of each patient, appears to be crucial in optimizing outcomes for total hip arthroplasty.^[12]

Additionally, the study raises questions about the criteria used for implant selection and the need for a more nuanced understanding of how age and gender impact postoperative outcomes. Further research into the biomechanical compatibility of implant types with different demographic profiles could lead to improved surgical guidelines and implant designs.

Overall, the observed demographic influences on the survivorship of uncemented femoral stems provide valuable insights into the complex decision-making process involved in total hip replacements. These findings advocate for a more personalized approach to treatment, taking into consideration the patient's age, gender, and specific health conditions. As the field of orthopedics continues to advance, incorporating these demographic considerations into clinical practice will be essential for enhancing patient outcomes and satisfaction.

CONCLUSION

This retrospective study meticulously examines the impact of age and gender on the survivorship of proximally versus fully coated uncemented femoral stems in total hip arthroplasty. Our findings illuminate significant demographic influences, with age and gender playing pivotal roles in determining the success of the implanted femoral stems. Notably, the study reveals a predilection for younger patients towards proximally coated stems and a tendency for older individuals to receive fully coated stems, suggesting a nuanced approach to implant selection based on patient-specific factors. Additionally, the gender distribution within the study cohort underscores potential anatomical and biomechanical differences that may affect implant choice and, consequently, surgical outcomes.

REFERENCES

1. Zimmerer A, et al. Midterm Survivorship of an Uncemented Hydroxyapatite-Coated Titanium Femoral Component and Clinically Meaningful Outcomes in Patients Older Than 75 Years. *Journal of Clinical Medicine*, 2021; 10(5): 1019.
2. Sheth NP, Nelson CL, Paprosky WG. Femoral bone loss in revision total hip arthroplasty: evaluation and management. *J Am Acad Orthop Surg*, 2013; 21: 601–612.
3. Lachiewicz PF, Soileau ES. What is the survivorship of fully coated femoral components in revision hip arthroplasty? *Clin Orthop Relat Res*, 2015; 473(2): 549-54.
4. Kim YH, Kim VE. Uncemented porous-coated anatomic total hip replacement. Results at six years in a consecutive series. *J Bone Joint Surg Br*, 1993; 75(1): 6-13.
5. Hofmann AA, et al. Cementless primary total hip arthroplasty with a tapered, proximally porous-coated titanium prosthesis: a 4- to 8-year retrospective review. *J Arthroplasty*, 2000; 15(7): 833-839.
6. Australian Orthopaedic Association National Joint Replacement Registry. Hip, Knee & Shoulder Arthroplasty Annual Report, 2019.
7. Norwegian National Advisory Unit on Arthroplasty and Hip Fractures. Norwegian Arthroplasty Register Report, 2019.
8. Meftah, M., et al. Safety and efficacy of non-cemented femoral fixation in patients 75 years of age and older. *J. Arthroplasty*, 2013; 28: 1378–1380.
9. Troelsen, A., et al. A Review of Current Fixation Use and Registry Outcomes in Total Hip Arthroplasty: The Uncemented Paradox. *Clin. Orthop. Relat. Res.*, 2013; 471: 2052–2059.
10. Dorr LD, et al. Structural and cellular assessment of bone quality of proximal femur. *Bone*, 1993; 14: 231–242.
11. Rasquinha VJ, Ranawat CS. Durability of the cemented femoral stem in patients 60 to 80 years old. *Clin Orthop Relat Res*, 2004; 419: 115–223.
12. Williams HD, et al. The Exeter universal cemented femoral component at 8 to 12 years. A study of the first 325 hips. *J Bone Joint Surg Br*, 2002; 84: 324–334.