e-ISSN: 0975-5160, p-ISSN: 2820-2651

Available online on www.ijtpr.com

International Journal of Toxicological and Pharmacological Research 2024; 14(1); 41-44

Original Research Article

Assessment of Patient-Reported Outcomes after Hip Resurfacing Surgery: A Prospective Study

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Received: 12-10-2023 / Revised 14-11-2023 / Accepted 20-12-2023
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Conflict of interest: Nil

Abstract:

Hip arthritis stands as a widespread and debilitating musculoskeletal condition, causing progressive cartilage degradation, pain, and restricted hip joint function. Such limitations drastically impact individuals' quality of life, leading to reduced mobility and increased dependency. Hip resurfacing surgery has emerged as a promising alternative to traditional total hip replacement (THR), particularly for younger and more active patient cohorts. While THR historically addressed end-stage hip arthritis, concerns regarding implant longevity and activity limitations in younger patients prompted the exploration of alternative interventions. Hip resurfacing surgery, conserving more natural bone compared to THR, involves the removal of damaged cartilage and minimal femoral head bone, replaced by a metal cap, while resurfacing the acetabulum with a metal component. Patient selection is pivotal, considering factors like age, bone quality, and joint damage extent. This prospective cohort study evaluates patient-reported outcomes post-hip resurfacing in 150 participants, demonstrating a significant increase in Harris Hip Score (HHS) from 48.7 to 89.4 and EQ-5D scores from 0.45 to 0.78 post-surgery. While 85% reported satisfaction, 6.7% faced discomfort. Complications, observed in 8%, included rare dislocations but no implant failures or revisions occurred within the 24-month follow-up. The study underscores hip resurfacing surgery's efficacy in enhancing patient outcomes, hinting at its potential as an alternative to THR. However, ongoing vigilance and comprehensive long-term research are essential for refining its application and evaluating its lasting effects.

Keywords: Hip resurfacing surgery, patient-reported outcomes, pain relief, functional capacity, satisfaction, complications.

Introduction

Hip arthritis is a debilitating condition affecting millions worldwide, characterized by progressive cartilage deterioration, pain, and functional limitations in the hip joint. This musculoskeletal ailment significantly impairs quality of life, leading to reduced mobility, increased dependence, and compromised daily activities. Among the spectrum of treatments available, hip resurfacing surgery has emerged as a promising alternative to traditional total hip replacement (THR) for select patient populations, particularly younger and more active individuals [1].

Conventional THR has historically been the gold standard for managing end-stage hip arthritis, offering substantial pain relief and improved function. However, concerns regarding implant longevity, activity restrictions, and potential complications in younger, more physically active patients have prompted the exploration of alternative surgical interventions. Hip resurfacing surgery, introduced in the late 20th century and refined over subsequent years, has garnered attention for its bone-conserving nature and potential advantages in addressing these specific concerns [2].

Unlike THR, which involves removing the femoral head and replacing it with a prosthetic component, hip resurfacing preserves a larger portion of the patient's natural femoral bone. In this procedure, the damaged cartilage and a minimal amount of bone on the femoral head's surface are removed and replaced with a metal cap, while the acetabulum is resurfaced with a metal component. This bone-conserving approach facilitates easier revision surgeries if

needed, potentially allowing for a return to higher levels of physical activity post-operatively [3].

The candidacy for hip resurfacing surgery is carefully evaluated, often considering age, bone quality, activity level, and the extent of hip joint damage. Younger patients with good bone quality, adequate bone stock, and a desire to maintain a high level of physical activity may be ideal candidates for this procedure. However, it's cruciacl to note that not all patients with hip arthritis are suitable candidates for hip resurfacing; patient selection is paramount to the success of this surgical approach [4].

The decision-making process regarding surgical intervention involves a comprehensive discussion between the patient and the orthopaedic surgeon, weighing the risks, benefits, and individual patient factors. This shared decision-making model ensures that patients are well-informed about the available treatment options and actively participate in determining the most suitable course of action tailored to their unique circumstances [5].

The primary goal of hip resurfacing surgery is to alleviate pain, improve hip joint function, and enhance patients' overall quality of life. Studies have reported favourable pain relief and functional improvement outcomes following this procedure. However, concerns have been raised regarding potential complications associated with metal-on-metal implants used in hip resurfacing, such as metallosis (metal ion release leading to tissue reaction) and implant failure. Although relatively rare, these complications have prompted regulatory scrutiny and careful monitoring of patients undergoing hip resurfacing surgery [6].

This prospective study aims to contribute to the existing body of knowledge by assessing patient-reported outcomes following hip resurfacing surgery. By prospectively evaluating a cohort of patients over an extended period, this study seeks to elucidate the effectiveness of this surgical intervention in improving pain levels, functional capacity, quality of life, and patient satisfaction. Additionally, the study aims to identify and analyze any complications or adverse events associated with hip resurfacing surgery in the context of contemporary orthopaedic practices.

Methods

Study Design: This prospective cohort study aimed to assess patient-reported outcomes following hip resurfacing surgery.

Participant Selection: A total of 150 patients diagnosed with hip arthritis, meeting the inclusion criteria, were recruited consecutively for participation in the study. Inclusion criteria encompassed individuals aged between 18 to 65 years, diagnosed with hip arthritis refractory to conservative management, good bone quality as assessed by preoperative imaging studies, and a willingness to participate in the study. Patients with contraindications to hip resurfacing surgery, such as severe osteoporosis, avascular necrosis, inflammatory arthritis, or previous hip surgeries, were excluded.

Surgical Procedure: All surgeries were performed by experienced orthopedic surgeons specialized in hip arthroplasty. A posterior or anterolateral surgical approach was utilized based on surgeon preference and patient-specific factors. The Birmingham Hip Resurfacing (BHR) system or a similar FDA-approved implant was used for all procedures. Intraoperative details including operative time, blood loss, and any intraoperative complications were recorded.

Assessment Tools: Preoperatively, baseline assessments were conducted for all patients using standardized outcome measures, including the Harris Hip Score (HHS) and EQ-5D questionnaire, to evaluate hip joint function and quality of life. Additionally, pain levels were assessed using a visual analog scale (VAS).

Follow-up Protocol: Patients were followed up at regular intervals postoperatively (at 3 months, 6 months, 1 year, and annually thereafter). During each visit, patients underwent clinical examinations and completed the HHS, EQ-5D questionnaire, and VAS for pain assessment. Patient-reported satisfaction surveys specific to the surgery were administered at the one-year follow-up and annually thereafter.

Outcome Measures: The primary outcome measures included changes in HHS, EQ-5D scores, and pain levels from baseline to each follow-up time point. Secondary outcome measures comprised patient-reported satisfaction rates and the incidence of complications or adverse events related to the surgery.

Statistical Analysis: Descriptive statistics were used to summarize baseline patient characteristics. Paired t-tests or non-parametric equivalents were employed to analyze changes in continuous outcome measures over time. Subgroup analyses were conducted based on patient demographics and surgical variables. The incidence of complications was reported as proportions.

Sample Size Justification: The sample size of 150 patients was determined based on previous studies reporting a clinically significant improvement in HHS scores post hip resurfacing surgery. With this sample size, the study had sufficient power (80% or higher) to detect meaningful differences in outcome measures with a confidence level of 95%.

Data Management and Statistical Software: All data were collected and managed using a secure electronic database. Statistical analyses were

performed using SPSS (Statistical Package for the Social Sciences) or similar statistical software.

Results

150 patients (72 males and 78 females) with a mean age of 52.6 years (SD ± 6.4) were enrolled in this prospective cohort study. Preoperatively, the mean Harris Hip Score (HHS) was 48.7 (SD ± 8.2). At a mean follow-up of 24 months post-surgery, the mean HHS significantly improved to 89.4 (SD ± 7.6) (p-value < 0.001), indicating a substantial enhancement in hip function and pain relief.

Regarding the EQ-5D questionnaire, evaluating quality of life, the preoperative mean score was 0.45 (SD ± 0.12). Post-surgery, this score notably increased to a mean of 0.78 (SD ± 0.09) at the same follow-up period (p-value < 0.001), signifying a considerable improvement in overall health-related quality of life post-hip resurfacing surgery.

Patient-reported satisfaction surveys revealed that 85% of patients reported being satisfied or very

satisfied with the surgical outcome. Their satisfaction primarily stemmed from decreased pain levels and enhanced functional capacity. Conversely, 10 patients (6.7%) reported dissatisfaction due to persistent discomfort during specific activities, despite overall improvements.

However, it's noteworthy that complications were observed in 12 patients (8%) post-surgery. These complications encompassed minor issues like temporary inflammation and wound healing complications in eight patients, and more severe complications, such as dislocation, observed in four patients.

The mean duration of hospital stay after surgery was 3.8 days (SD ± 1.2), and the mean time to return to daily activities was 12 weeks (SD ± 3.5). Importantly, within the follow-up period of 24 months, no cases of implant failure or need for revision surgery were reported.

The statistical significance demonstrated by the p-values in the improvements of HHS and EQ-5D scores confirms the efficacy of hip resurfacing surgery in enhancing patient-reported outcomes. The absence of implant failure or the need for revision surgery within the follow-up period suggests the procedure's stability and durability.

Table 1:

Outcome Measure	Preoperative Mean (SD)	Postoperative Mean (SD)	p-value	Patient Satisfaction
Harris Hip Score (HHS)	48.7 (8.2)	89.4 (7.6)	< 0.001	85% satisfied/very satisfied
EQ-5D Index	0.45 (0.12)	0.78 (0.09)	< 0.001	-
Complication Rate	-	8%	-	-

Discussion

The results of our prospective cohort study provide valuable insights into the outcomes of hip resurfacing surgery, shedding light on the efficacy, patient satisfaction, and potential complications associated with this surgical intervention. The comprehensive analysis of preoperative and postoperative data reveals noteworthy improvements in various aspects of patient-reported outcomes.

The substantial enhancement in the Harris Hip Score (HHS) from a preoperative mean of 48.7 to a postoperative mean of 89.4 indicates a significant improvement in hip function and pain relief. This improvement is not only statistically significant (p-value < 0.001) but also clinically meaningful, highlighting the positive impact of hip resurfacing surgery on the patients' daily lives. The HHS has been a widely used and validated tool for assessing hip function, and our study adds to the existing evidence supporting its effectiveness in evaluating surgical outcomes [7,8].

Similarly, the evaluation of health-related quality of life using the EQ-5D questionnaire demonstrates a substantial increase in the mean score from 0.45 preoperatively to 0.78 postoperatively. This improvement is statistically significant (p-value < 0.001), indicating a considerable enhancement in overall quality of life. The EQ-5D is a valuable tool that captures not only physical well-being but also factors in mental and social aspects of health, making it a comprehensive measure for assessing the impact of surgical interventions on patients' lives.

Patient-reported satisfaction is a crucial aspect of assessing the success of any surgical procedure. In our study, 85% of patients reported being satisfied or very satisfied with the surgical outcome. This high satisfaction rate is consistent with the observed improvements in HHS and EQ-5D scores. The primary contributors to patient satisfaction were decreased pain levels and improved functional capacity, aligning with the intended goals of hip resurfacing surgery. Despite the overall positive response, it is crucial to acknowledge the 6.7% dissatisfaction rate, with specific concerns related to persistent discomfort during certain activities. This highlights the importance of individualized patient counseling and managing expectations, emphasizing that while the majority experience

significant improvements, individual variations exist.

The complication rate of 8% post-surgery, with minor complications in 5.3% and more severe complications in 2.7%, warrants careful consideration. Temporary inflammation and wound healing complications were observed in a minority of cases, emphasizing the need for vigilant postoperative care and monitoring. The occurrence of dislocation in 2.7% of cases highlights the importance of careful surgical technique and ongoing surveillance to mitigate potential adverse events. While the complication rate is relatively low, it underscores the necessity of a thorough risk-benefit assessment when considering hip resurfacing surgery.

Notably, the absence of implant failure or the need for revision surgery within the 24-month follow-up period provides assurance regarding the stability and durability of the hip resurfacing implants used in our study. This aligns with the existing literature, suggesting that hip resurfacing can offer satisfactory outcomes with long-term implant survival.

Conclusion

The study focused on hip resurfacing surgery's efficacy for managing hip arthritis, assessing outcomes in 150 patients over a 24-month period. Results highlighted significant improvements in hip function and quality of life, indicated by a substantial rise in Harris Hip Score (HHS) from 48.7 to 89.4 and an increase in EQ-5D scores from 0.45 to 0.78 postoperatively. Patient satisfaction stood at 85%, reflecting reduced pain levels and enhanced functionality, yet 6.7% reported dissatisfaction due to residual discomfort. Complications, observed in 8% of cases, included minor issues and rare dislocations, but no implant failures or revision surgeries occurred within the follow-up period, affirming the procedure's stability. The study emphasizes the procedure's efficacy in improving patient outcomes, reinforcing its potential as an alternative to traditional hip replacement, but ongoing vigilance and further research into long-term implications are warranted for comprehensive assessment and refinement.

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