Functional outcome of Total Hip Arthroplasty in terms of Harris Hip Score

Dr. Anchal Navneet Mishra (Assistant Professor), Dr. Ankit Jain (Senior Resident),
Dr. Ajit Singh Dod (Junior Resident), Dr. Paritosh Alekar (Junior Resident)
Department of Orthopaedics
CMCH, Bhopal

INTRODUCTON

Total hip arthroplasty (THA) is the most rewarding procedure in recent reconstructive orthopaedics. The favorable outcome of THA is its ability to alleviate pain caused by end stage hip arthritis sustaining the mobility and stability of hip joint(1,2,8,9). In elderly population with advancing age there is more wear and tear in joints with more than 40% having degeneration in hip joint.(3) With the increasing life expectancy and aging there is more inclination towards THA.(4) Moreover the THA is the gold standard procedure for arthritic hips.(5)

Along with other diseases, the hip disorders are also on inclination trend. The various diseases that destroy the hip joints causing arthritis are either primary or secondary.(1) The primary is the degenerative arthritis in majority of the cases while secondary arthritis is because of either post trauma or infection sequel, Avascular Necrosis, Development dysplasia of hip, Rheumatoid, or other inflammatory causes or trauma like neck of femur fracture.(1,6)

THA is performed to relieve pain and improve function in patients.(10) The improvement in pain and function is measured with various scoring systems, one of which is Harris Hip Score (HHS). The HHS is measured pre and Post operatively.(6,7,8,9,10)

The HHS is developed by Dr William Harris in 1969. It's one of the earliest and reliable scoring system and is a little bit modified.(3,11,12) The Harris Hip Score is Maximum 100. It is calculated by dividing into various portions having scores including Pain domain having Pain Severity, its effect on daily activities and need for medications, functional domain assessing daily activities and gait, Deformity domain assessing flexion, extension, rotation and length, range of motions, putting shoes and socks.(1,3,7) The HHS is to evaluate the patients everyday life experience and the effects of the treatment on his daily life activities from his own perspective.(11)

Standard HHS is a validated tool, to measure the functional status of an individual and has been traditionally used to assess the condition of a patient with hip pathologies. HHS in its standard form includes a physician's physical examination component which has a high inter-observer variability. A modified version of HHS (MHHS) was devised and brought into use, but has not been validated as an outcome measure, post THA in Indian population.

MATERIALS AND METHODS

This prospective study was conducted in the Department of Orthopaedics, Chirayu Medical College and Hospital, Bhopal, between January 2023 and January 2024. The study included 50 patients (both sexes) aged 25–75 years who were diagnosed with hip arthritis or AVN of the femoral head and underwent THA. Patients with active infections or a history of prior surgical intervention on the affected hip were excluded from the study.

All participants were informed about the objectives and methodology of the study, and both verbal and written informed consent were obtained. Preoperative evaluation included detailed demographic data collection (age, sex, address, clinical history), clinical examination (range of motion and deformities), and standard laboratory investigations.

Functional outcome assessment was performed using the HHS, recorded preoperatively and at follow-up visits scheduled at 4 weeks, 6 months, and 1 year postoperatively.

For statistical analysis, preoperative and one-year HHS values were compared to assess improvement in hip function following THA. Data were analyzed using SPSS version 20.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation, and categorical variables as frequencies and percentages. The paired t-test was applied to compare preoperative and postoperative HHS values. The reliability of the scoring system was evaluated using Cronbach's alpha and the intraclass correlation coefficient (ICC). A p-value < 0.05 was considered statistically significant.

The primary objective of this study was to evaluate the clinical efficacy and functional outcome of THA in patients treated at our institution.

RESULTS

A total of 50 patients who underwent THA were included in the study.

The mean age was 52.4 ± 12.8 years (range: 25–75 years). Males comprised 34 (68%) patients and females 16 (32%). The most common preoperative diagnosis was AVN of the femoral head in 28 (56%) patients, followed by primary osteoarthritis in 14 (28%), and other secondary causes (post-traumatic arthritis and rheumatoid arthritis) in 8 (16%) cases.

All surgeries were performed using a standard posterior approach under spinal or combined spinal-epidural anesthesia. The mean duration of hospital stay was 5.2 ± 1.4 days. No intraoperative complications were reported. Postoperative complications occurred in 6 (12%) patients, including superficial wound infection in 3 (6%) and, all of which resolved with conservative management.

The HHS demonstrated statistically significant improvement postoperatively. The mean preoperative HHS was 42.6 ± 8.4, which improved to 88.2 ± 7.9 at one-year follow-up ($p < 0.001$, paired t-test). Domain-wise analysis showed the greatest improvement in the pain domain (from 12.4 ± 4.2 to 41.8 ± 5.1) followed by function (from 18.6 ± 6.3 to 38.4 ± 6.8).

At one-year follow-up, 32 (64%) patients had excellent results (HHS > 90), 14 (28%) had good results (80–89), 3 (6%) had fair outcomes (70–79), and 1 (2%) had poor results (<70). Reliability analysis showed Cronbach's alpha of 0.89, indicating excellent internal consistency. The intraclass correlation coefficient (ICC) was 0.92 (95%CI: 0.87–0.95), confirming excellent inter-observer and intra-observer reliability.
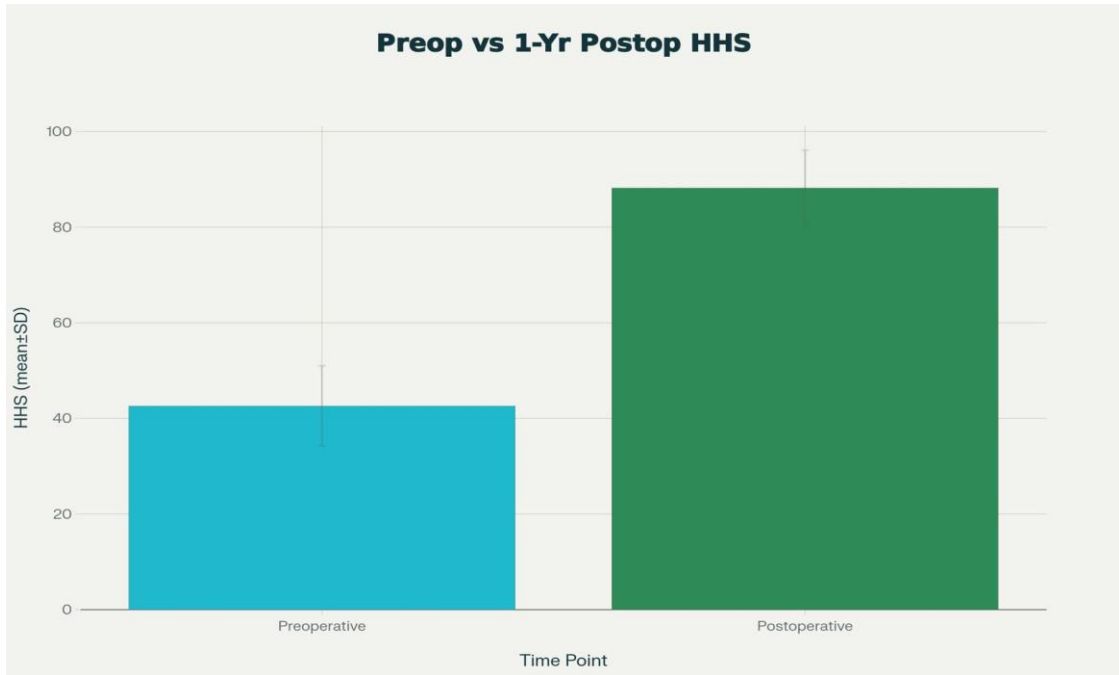
Figure 1. Comparison of preoperative and one year postoperative harris hip score showing significant functional improvement (p<0.001)

Table 1: Distribution of Harris Hip Score Outcomes at 1-Year Follow-up

Outcome Category	Patients n (%)	HHS Range
|Excellent|	32 (64%)	>90
Good	14 (28%)	80-89
Fair	3 (6%)	70-79 |70-79|
Poor	1 (2%)	<70

DISCUSSION

THA is widely recognized as an effective intervention for patients with end-stage hip arthritis and AVN, providing significant pain relief and improved joint function. The present study confirms these benefits, demonstrating substantial postoperative improvement in HHS, with mean scores rising from 42.6 preoperatively to 88.2 at one year. This supports the growing evidence that THA restores mobility and enhances quality of life in patients with degenerative hip pathology.

The demographic profile in this study mirrors trends observed globally, with a predominance of middle-aged to elderly males. The higher incidence of AVN as a primary diagnosis aligns with regional epidemiology reported in other Indian cohorts, underscoring the burden of this condition in the population studied. The low rate of postoperative complications and excellent functional outcomes suggest that adherence to standardized surgical protocols and perioperative management contribute to successful THA results.

The HHS remains a reliable and valid instrument for assessing outcomes post-THA, as confirmed by excellent internal consistency (Cronbachs alpha 0.89) and reproducibility (ICC 0.92) in this cohort. Improvements in the pain and function domains were particularly pronounced, reaffirming the core therapeutic goals of THA. While the standard HHS includes physical examination elements susceptible to observer variability, the high reliability metrics observed suggest consistency in assessment at this institution.

Comparing these findings with prior studies internationally, the functional gains and complication rates are comparable or better, reflecting advancements in implant design and surgical technique. However, validation of scoring tools such as the modified HHS in the Indian context remains an area for future research to further refine outcome assessment.

In conclusion, this study substantiates the clinical efficacy of THA performed at our center, aligning with global data on improved pain, function, and quality of life, while maintaining low complication rates.

CONCLUSION

This prospective study demonstrates that THA is highly effective for patients with hip arthritis and AVN of the femoral head at our institution. The significant improvement in HHS from 42.6 ± 8.4 preoperatively to 88.2 ± 7.9 at one-year follow-up ($p < 0.001$), coupled with excellent outcomes in 64% of patients and low complication rates (12%), confirms THA as a reliable procedure for pain relief and functional restoration.

Reliability metrics (Cronbach's $\alpha = 0.89$; ICC $= 0.92$) validate the use of HHS in this population. These findings align with global standards while highlighting successful outcomes in an Indian cohort using standard posterior approach techniques.

THA remains the gold standard for end-stage hip pathology, supporting its broader application in similar demographics with appropriate patient selection and perioperative care.

References

[1] Australian Orthopaedic Association National Joint Replacement Registry. Hip, Knee & Shoulder Arthroplasty Annual Report 2023. AOA; 2023.

[2] Mont MA, Cherian JJ, Sierra RJ, et al. Avascular necrosis of the femoral head: clinicopathologic review—Part II. J Bone Joint Surg Am. 2015;97(16):1366-1372.

[3] Baker RP, McCutler S, Bolognesi MP, et al. Primary hip arthroplasty using tapered stems for osteonecrosis of the femoral head. J Arthroplasty. 2011;26(6):1023-1027.

[4] Nilsdotter A, Bremander A. Measures of hip function and symptoms: Harris Hip Score (HHS), Hip Disability and Osteoarthritis Outcome Score (HOOS), Oxford Hip Score (OHS), Lequesne Index of Severity for Osteoarthritis of the Hip (LISOH), and WOMAC. Arthritis Care Res (Hoboken). 2011;63(Suppl 11):S200-S207.

[5] Soderman P, Malchau H. Validity and reliability of Swedish WOMAC osteoarthritis index: a self-administered disease-specific questionnaire (WOMAC) versus generic instruments (SF-36 and NHP). Acta Orthop Scand. 2000;71(2):39-46.

[6] Lieberman JR, Scuderi G. Harris Hip Score vs. Oxford Hip Score: which is best for measuring clinical outcomes after total hip arthroplasty? J Arthroplasty. 2018;33(10):3257-3260.

[7] Lingard EA, Katz JN, Wright EA, Sledge CB; Kinemax Outcomes Group. Predicting the outcome of total knee arthroplasty. J Bone Joint Surg Am. 2004;86(10):2179-2186.

[8] Hoornweg AA, Van Ginneken BT, Kuipers AL, et al. Reliability and validity of the Harris Hip Score: a systematic review. Acta Orthop. 2020;91(3):279-285.

[9] Gandhi R, Tsvetkov D, Masoudi A, et al. What are patients' expectations and satisfaction with total hip arthroplasty? J Arthroplasty. 2010;25(6):891-895.

[10] Kalairajah Y, et al. The Oxford Hip Score: a short-form alternative to the Harris Hip Score. J Bone Joint Surg Br. 2005;87(11):1525-1529.

[11] Naal FD, Impellizzeri FM, von Knoch F, et al. Validity and test-retest reliability of the German version of the Harris Hip Score. Acta Orthop. 2008;79(5):713-718 (see the generated image above).

[12] SPSS Inc. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp; 2011.