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Statistical analysis of total hip arthroplasty at rural hospital in Maharashtra under MJPJAY: a prospective study

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ABSTRACT

Background: Total hip arthroplasty (THA) is one of the most common orthopedic surgeries globally, particularly in Western countries. In India, its prevalence has increased over the last two decades. However, most data on THA are from Europe and the United States. This study analyzes the clinical and demographic characteristics of patients undergoing uncemented THA at a rural hospital in Maharashtra, India, under the Mahatma Jyotirao Phule Jan Arogya Yojana (MJPJAY).
Methods: A prospective study was conducted in the Department of Orthopedics at Mahatma Gandhi Institute of Medical Sciences, Sevagram, from January 2020 to October 2022. A total of 123 patients (130 hips) who underwent uncemented THA, were included. Patients were categorized by age, gender, and primary indication for surgery. Preoperative evaluations, radiographic analysis, and postoperative follow-ups assessment of pain, range of motion, and complications were done.
Results: The mean age of patients was 40.32±12.53 years, with males (85.36%) outnumbering females (14.64%). Bilateral hip involvement was seen in 56.9% of cases and osteonecrosis of the femoral head was the most common indication (89.23%), with 57.6% idiopathic, 12.3% alcohol-related and 6.1% steroid-induced. The complication rate was 3.8%, with dislocation being the most frequent (2.1%). Revision surgeries performed in 2.1% of cases.
Conclusions: THA under MJPJAY demonstrates comparable clinical outcomes to international standards. Idiopathic osteonecrosis remains the leading cause, with a male predominance. Standardized protocols for the Indian population are needed.

Keywords: Complications, MJPJAY, Osteonecrosis, Total hip arthroplasty, Uncemented

INTRODUCTION

Total hip arthroplasty is an efficient and reliable treatment modality for the treatment of end stage pathology affecting the hip joint causing chronic pain. There has been huge technological advancement in the surgical technique and prosthetic materials in the past few decades leading to excellent outcomes in terms of post operative pain relief and reduced rates of revision in some parts of the world.[1] There are quite a lot of differences between the western (USA, Europe) and Asian population undergoing Total hip Arthroplasty especially in terms of the primary indication for Total hip arthroplasty, age distribution, component size and bone morphology among other things.

There are a lot of population and registry-based studies on the epidemiological characteristics of patients undergoing total hip and knee replacements in the United States and Europe.[2] Some countries in Europe have standardized registries for hip and knee replacements thus providing an

idea of the most preferred technique, instruments and their outcomes in that part of the world. There are very few similar studies published in international journal, based on the population in India and the subcontinent. It is important to understand the common indications, comorbidities, post operative outcomes and complications to improve perioperative outcomes and come up with a standard technique for the Indian population.

The primary objective of this study is to analyze the clinical and demographic characteristics of patients undergoing uncemented Total Hip Arthroplasty (THA) at a rural tertiary care hospital in Maharashtra, India, under the Mahatma Jyotirao Phule Jan Arogya Yojana (MJPJAY).

The study aims to evaluate the indications for surgery, gender-specific age distribution, complication rates and postoperative outcomes in this patient population. Additionally, the study seeks to compare the findings with existing data from Western populations to identify ethnic and demographic differences in THA outcomes.

METHODS

Study type

This is a prospective observational study designed to analyze the clinical and demographic characteristics of patients undergoing uncemented Total Hip Arthroplasty (THA).

Study place

The study was conducted in the Department of Orthopedics at Mahatma Gandhi Institute of Medical Sciences (MGIMS), Sevagram, a rural tertiary care teaching hospital in Maharashtra, India.

Study duration

The study period spanned from January 2020 to October 2022.

Inclusion criteria

Patients of all age groups and genders with Arthritis of Femoral head not responding to conservative management, patients presenting with hip pathologies, including osteonecrosis, post-traumatic arthritis, ankylosing spondylitis, and other secondary causes of hip arthritis, patients who underwent uncemented THA under the Mahatma Jyotirao Phule Jan Arogya Yojana (MJPJAY) scheme.

Exclusion criteria

It excludes patients unfit for surgery due to comorbid conditions, patients who underwent cemented THA or alternative procedures.

Procedure

All patients underwent thorough preoperative clinical evaluation, including physical examination, biochemical investigations and radiological assessment (X-rays of the pelvis with both hips in anteroposterior and lateral views. FIG 1a: X ray pelvis with both hips showing Arthritis of both hip joints secondary to avascular necrosis of femoral head. Fig 1b: Post operative x ray showing uncemented total hip arthroplasty of Left Hip joint. Fig 1c: Post operative X ray of pelvis with both hips showing Bilateral uncemented total hip arthroplasty. Preoperative templating was performed to estimate the size of the acetabular cup and femoral stem.

The surgical procedure was performed by a senior surgeon with over 20 years of experience. All surgeries were conducted using an uncemented prosthesis with a metal-on-highly cross-linked polyethylene bearing surface. The posterolateral approach was used, with patients placed in the lateral decubitus position under combined spinal and epidural anesthesia.

Intraoperatively, the acetabular cup was fixed with an average size of 52 mm and secured with 2 screws. Postoperatively, intravenous antibiotics (IV Linezolid 600 mg and IV Cefuroxime 1g twice daily for 7 days) and tranexamic acid (1g at induction) were administered. Patients were mobilized with full weight-bearing using a walker on postoperative day.[3] Postoperative physiotherapy included abduction exercises, static quadriceps drills and active ankle movements. Suture removal was performed on postoperative day 14 if the wound was healthy.

Patients were followed up at 1 month, 3 months, 6 months and 1 year. At each follow-up, clinical parameters such as pain, range of motion and walking capacity were assessed. Radiographs were taken to check for complications such as periprosthetic fractures, component loosening and osteopenia. Complications such as infection, dislocation or persistent pain were documented and managed accordingly.

RESULTS

We studied a total of 130 uncemented total hip replacements in 123 patients between January 2020 to October 2022, at department of orthopaedics, MGIMS Sevagram. The mean age of the patients in our study was 40.32±12.53 year (range 16 to 74 years) (Figure 2). Figure 3 shows age distribution of participants where 2 patients lie in between 0 to 20 years age group, 72 patients lie in between 20 to 40 years age group, 42 patients lie in between 40 to 60 years age group and 10 patients lies in between 60 to 80 age group. Out of 123, 105 patients (85.36%) were male while 18 (14.64%) were females. 70 (56.9%) patients had involvement of bilateral hip joints while 43 (33.10%) had unilateral involvement. Arthritis secondary to osteonecrosis of the femoral head was the most common indication for Total hip arthroplasty, seen in

116 (89.23 %) of the cases. Out of these cases with osteonecrosis of femoral head, 75 (57.6%) were idiopathic,16 (12.3%) was due to chronic alcohol use, 8 (6.1%) were due to long term steroid use, 9 (6.92%) were due to sickle cell disease, 7 (5.38%) were due to trauma and 1 (0.7%) was post perthes. Post traumatic arthritis accounted for 3 (2.3%) cases.

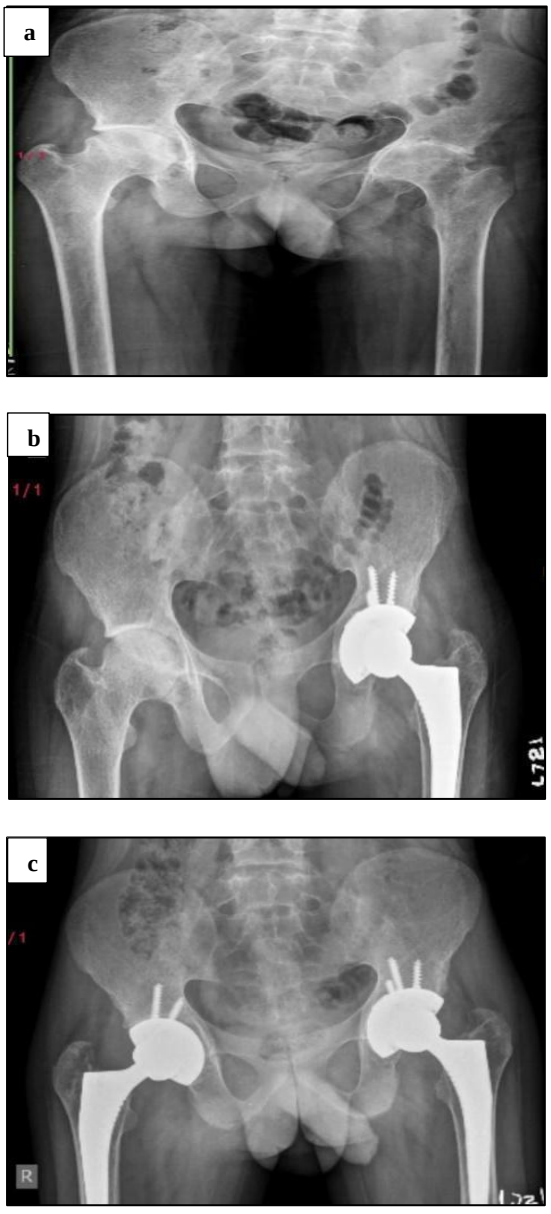

Figure 1: (a) X-ray pelvis with both hips showing Arthritis of both hip joints secondary to avascular necrosis of femoral head. (b) Post operative x ray showing uncemented total hip arthroplasty of left hip joint. (c) Post operative X-ray of pelvis with both hips showing Bilateral uncemented total hip arthroplasty.

Ankylosing spondylitis accounted for 8 (6.15%) cases. Giant cell tumor of Proximal femur accounted for 1 (0.7%) case. TB Hip accounted for 1 (0.7%) case. Average acetabular cup size used in our study was 52 mm fixed with an average of 2 screws. Complications were seen in 5 (3.8%) cases. 3 (2.1 %)

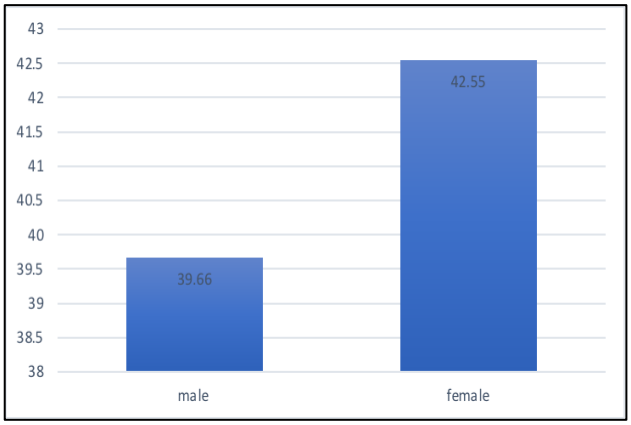

Figure 2: Mean age at total hip replacement in male's vs females.

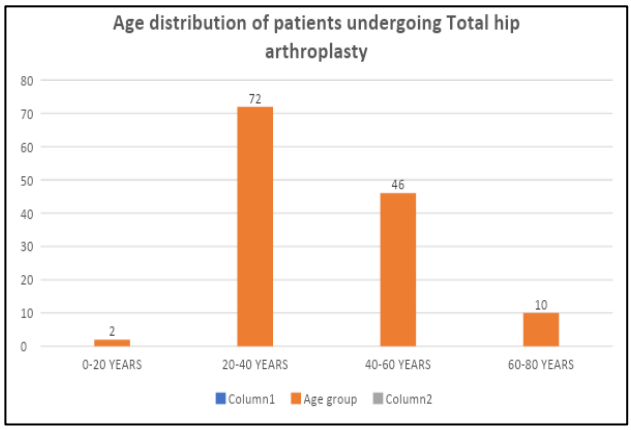

Figure 3: Age distribution of patients undergoing total hip arthroplasty.

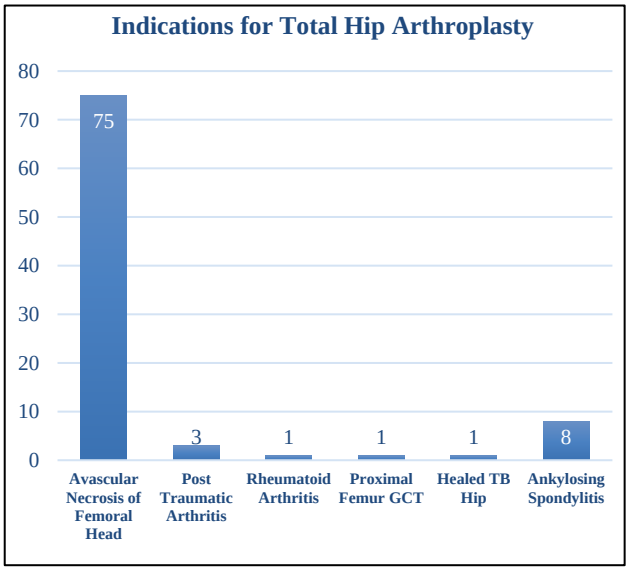

Figure 4: Indications for total hip arthroplasty.

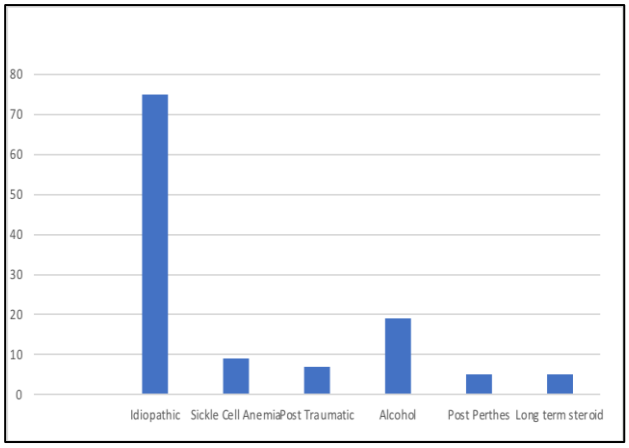

Figure 5: Causes of avascular necrosis of femoral head.

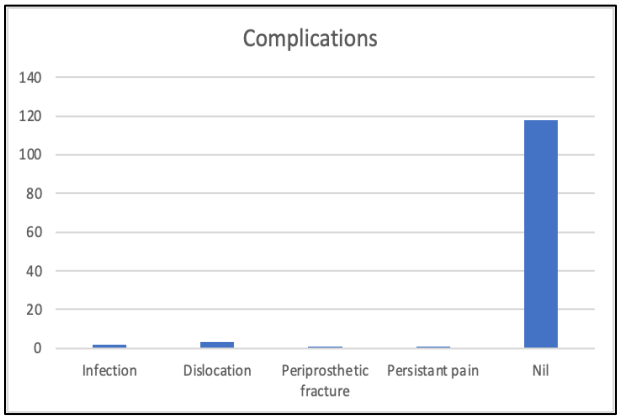

Figure 6: Complications.

Patients had dislocation of the prosthetic hip joint, 1 patient had persistent pain over the operated hip joint which was managed conservatively, while 1 patient had periprosthetic fracture due to trauma in the post operative period, on post operative radiograph fracture was found displaced and managed conservatively. 3 (2.1%) patients required revision surgery during study duration in view of dislocation, 2 patients had dislocation due to trauma to hip, one of the patients had trauma after 2 years and one had trauma after 4 months post-surgery, one patient had dislocation on post op day 2 due to () all of these patients underwent revision surgery. 2 (1.6%) patients had infection post-surgery which was superficial and managed with intravenous antibiotics, settled in few days (Figure 6).

A study based in India between 2011 to 2017, showed an increase in the rate of revision total hip replacements over the years with the rate of revision being 21% and most common cause for revision was post operative infections.[13] Our study showed an increase in the rate of primary total hip replacements between 2020 to 2022. The rate of periprosthetic fractures following hip arthroplasty is increasing in both the western world and countries like Japan due to advancing age of the population.[3] There was 1 case of periprosthetic fracture in our study which was due to trauma in the post-operative period. According to literature and international studies the rate of dislocation following total hip arthroplasty is 0.2 to 10 %. Our study had a dislocation rate of 2% which is comparable to that in the literature.

DISCUSSION

Total hip arthroplasty is a very efficient procedure to manage patients with intractable long-term pain in the hip, but there is huge disparity in the pattern of utilization and outcomes of this procedure in different populations. Majority of patients undergoing total hip arthroplasty in USA, between 2012 to 2019 were whites, comprising 74% of the total hip replacements. This number is disproportionately large compared to their proportion in the general US population. There are studies that show that in the US the outcome of total hip arthroplasty is comparatively lower in non- whites.[1] This is attributed to multiple factors including, delayed presentation and choosing a low volume centre with no availability of highly trained arthroplasty surgeons.[2] Given such disparities among different ethnic groups within the same country (USA), it is essential we study the attributes related to total hip arthroplasty in all the different geographic regions (where there are no population based registers) to be able to optimize the utilization rates and outcomes of the same.

The vast majority of data regarding total hip arthroplasty in literature is from studies in the United States of America or Europe. European countries also have national registries for hip and knee replacement. The data regarding total hip arthroplasty from Asia is mainly based on Korean and Japanese studies. Data from other countries like India, is lacking due to a very few reported studies, which are also disregarded of not published in renouned international journals.[3]

The data from western countries doesn't apply directly to the Asian countries. Studies have shown that the significant difference between the populations might be because the most common indication for total hip arthroplasty in the western world is primary arthritis of hip while that in Asian countries is secondary hip arthritis, which is consistent with our findings.[3-5] Among the various causes for secondary hip arthritis, avascular necrosis of femoral head is most common in Korea while arthritis due to dysplastic hip is most prevalent in Japan Osteonecrosis of femoral head affects young male adults between the 3rd and 5th decades of life.[6,7]

This is why in most studies from Taiwan and Korea majority of the patients undergoing THA are males (66%) with age <65 years. Compared to this, most patients undergoing total hip arthroplasty in the western world are >65 years old with a larger proportion of females.[8,9] The surgical approaches used also vary among different regions. The posterior and lateral approaches in lateral decubitus position, are most commonly used in Asia, USA

and some European countries. Anterior and anterolateral approaches are most commonly used in central Europe. All surgeries in our study were done using the posterolateral approach to the hip. There is an increasing trend for Primary total hip replacements, over the past few years in the western countries (USA and Europe) with an increasing trend of revision surgeries. Studies from Korea also show an increase in the rate of primary total hip replacements over a period of 5 years with significant decrease in the rate of revision surgeries in the <65 years age group.[10]

There are some limitations of the study, these are as follows.

Single-center study

Results from a single rural hospital may not be generalizable to other populations.

Small sample size

The limited number of patients reduces the study's ability to represent broader trends.

Short follow-up

A one-year follow-up may not capture long-term complications like prosthesis loosening.

No control group

The absence of a comparison group, such as patients receiving cemented THA, limits the ability to assess relative outcomes.

Socioeconomic Bias

All patients were treated under a government scheme, potentially limiting applicability to different economic groups.

CONCLUSION

There is significant difference in the data in our study when compared to western world due to ethnic and demographic characteristic. Such studies will go a long way in developing standard protocols in terms of patient selection, timing of surgery, approach, and prosthetic materials to be used in our population. Pre-operative templating, intra-operative acetabular cup positioning and meticulous closure are utmost important for better outcomes.

We have performed all the total hip arthroplasties under the Mahatma Jyotirao Phule Jan Arogya Yojana (MJPJAY), implying that patients operated under this scheme belong to a relatively lower socioeconomic status. In our study, we found that the most common cause for total hip arthroplasty was idiopathic, with a male preponderance. The mean age for males was 39, and for females, it was 43. When proper care was administered during surgery, the occurrence of complications was minimized.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. American Joint Replacement Registry (AJRR): 2020 Annual Report. Rosemont, IL: American Academy of Orthopaedic Surgeons (AAOS). 2020. Available at: https://www.aaos.org/registries/publications/ajrr.
2. Pierce TP, Elmallah RK, Lavernia CJ, Chen AF, Harwin SF, Thomas CM, Mont MA. Racial Disparities in Lower Extremity Arthroplasty Outcomes and Use. Orthopedics. 2015;38(12):1139-46.
3. Kiefer H. Differences and Opportunities of THA in the USA, Asia and Europe. Bioceramics and Alternative Bearings in Joint Arthroplasty. Republic of Korea. 2007:3–8.
4. Malchau H, Herberts P, Eisler T, Garellick G, Söderman P. The Swedish total hip replacement register. J Bone Joint Surg Am. 2002;84:2-20.
5. Zhan C, Kaczmarek R, Loyo-Berrios N, Sangl J, Bright RA. Incidence and short-term outcomes of primary and revision hip replacement in the United States. J Bone Joint Surg Am. 2007;89:526-33.
6. Lai YS, Wei HW, Cheng CK. Incidence of hip replacement among national health insurance enrollees in Taiwan. J Orthop Surg Res. 2008;3:42.
7. Kim HA, Koh SH, Lee B, Kim IJ, Seo YI, Song YW, Hunter DJ, Zhang Y. Low rate of total hip replacement as reflected by a low prevalence of hip Osteoarthritis in South Korea. Osteoarthritis Cartilage. 2008;16:1572-5.
8. Zhan C, Kaczmarek R, Loyo-Berrios N, Sangl J, Bright RA. Incidence and short-term outcomes of primary and revision hip replacement in the United States. J Bone Joint Surg Am. 2007;89:526-33.
9. Birrell F, Johnell O, Silman A. Projecting the need for hip replacement over the next three decades: influence of changing demography and threshold for surgery. Ann Rheum Dis. 1999;58:569-72.
10. Youn PW, Lee Y, Ahn J, Jang EJ, Kim Y, Kwak HS, Youn KS, Kim HJ. Epidemiolgy of hip replacements in korea from 2007 to 2011. J Korean Med Sci. 2014;29:852-8.
11. Berry DJ, von Knoch M, Schleck CD, Harmsen WS. Effect of femoral head diameter and operative approach on risk of dislocation after primary total hip arthroplasty. J Bone Joint Surg. 2005;87:2456-63.
12. Parvizi J, Picinic E, Sharkey PF. Revision total hip arthroplasty for instability: surgical techniques and principles. J Bone Joint Surg. 2008;90:1134-42.

13. Mittal G, Kulshrestha V, Kumar S, Datta B. Epidemiology of revision total hip arthroplasty: an indian experience. Ind J Orthop. 2020;54(5):608-15.

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