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ORIGINAL ARTICLE

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Functional Outcome of Cemented Primary Total Hip Arthroplasty

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ABSTRACT

OBJECTIVE: To determine the efficacy of cemented primary total hip replacement in patients with end stage hip disease.

METHODOLOGY: The study was conducted at Khyber Teaching Hospital Peshawar, Pakistan, from March 2022 to January 2024. The study involved 50 males and 23 females and their aged 40-80 years, who underwent cemented total hip arthroplasty for end-stage hip diseases. The participants underwent a thorough history, physical examination, and Harris hip score to evaluate their functional ability. All arthroplasties were performed through a modified Hardinge lateral approach using cemented total hip prosthesis under spinal anesthesia. The patients were mobilized with crutches on the first postoperative day and received intravenous antibiotics for 3 days. The Harris hip score was monitored at 3 months postoperatively and analyzed using SPSS-23 and paired T test keeping p vale of ≤ 0.05 as significant.

RESULTS: Most hip involvement was right, with 62% being right hip involvement. Hip pain was the main complaint. The Harris Hip Score was 10-32, with mean value of 16.50±4.83 preoperatively while postoperatively at 3rd month it was 86.34±9.84 with p value of <0.00001 which is significant. The Harris hip score was good to excellent in 82%, fair in 12% and poor in 5% cases at 3rd month postoperatively. Complications included skin surgical site infections and dislocations.

CONCLUSION: Cemented total hip arthroplasty is a safe and successful treatment for end-stage hip joint diseases, providing patients with the possibility of regaining mobility, reducing discomfort, and improving quality of life with minimum risk of complications.

KEYWORD: Harris Hip Score; Total Hip Arthroplasty; Osteoarthritis Hip; Osteonecrosis Hip

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INTRODUCTION

Hip joint is an articulation between the femoral head and acetabulum part of the pelvic bone. It is of synovial type with ball and socket mechanism. It acts as a connection between lower extremity and axial skeleton.[1] End-stage hip joint disease represents a wide range of disorders seriously undermining the strength and functioning of the hip joint. The most frequent cause is the development of primary osteoarthritis which is the outcome of degenerative alterations in the joint cartilage and bone. Although secondary osteoarthritis can also occur as an indirect effect of traumatic impact on the hip and cause accelerated abrasion. Moreover, femoral head osteonecrosis, when the blood flow into the femoral head is disrupted, may lead to end-stage joint disease. Finally, the hip may be severely destroyed by inflammatory arthritis, such as rheumatoid arthritis or ankylosing spondylitis. Apart from that, end-stage joint disease may be caused by congenital illnesses, which seriously affect the hip joint structure. Some of such diseases include developmental dysplasia of the hip and Legg-Calvé-Perthes disease. Finally, hip joint septic arthritis may cause a great damage to the joint and severe degeneration of the joint. The early stages of hip disease are addressed conservatively, but when conservative therapies do not provide relief, replacement of the native hip joint with an artificial hip joint is the recommended treatment option.[2,3] Total hip replacement is a type of hip arthroplasty in which both the femoral and acetabular surfaces are replaced by artificial components to relieve hip pain, restore articular movements and improve hip joint functions. The ball and socket mechanism is restored by proper tensioning of the soft tissues and appropriate size acetabular and femoral components. Total hip

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arthroplasty is the preferred procedure for treatment of end stage hip joint disease. Its survival rate is about 85% over 20 years. A variety of materials are being used in formation of total hip prostheses. Similarly there are several fixation methods for total hip replacement components. These include uncemented, cemented, hybrid and reverse hybrid techniques. Uncemented total hip arthroplasty is the most preferred method.[4,5] Literature shows that almost 30% of patients are not happy with their total hip replacement surgeries at a 2-year interval. On one hand, a vast majority of patients experience improved quality of life, ambulation, and pain relief after undergoing hip arthroplasty. However, there are also instances in which patients express dissatisfaction with their hip replacement surgeries due to poor outcomes, hindering their daily activities because of the surgery's functional results. The exact mechanism behind these functional disabilities after total hip surgery is not fully understood.[6,7] Harris hip scoring is a very good tool for assessing the functional outcome of hip joint surgery postoperatively.[8]

Nowadays, hip arthroplasty is performed in most of the secondary and tertiary care health facilities, both in private and public sector in our country, but still the surgeons are facing issues due to less equipped setups, lake of expertise, lack of specialized dedicated axillary staff and poor sterilization facilities. These challenges can lead to poor functional outcomes of hip arthroplasties postoperatively. This study determined the functional outcomes of primary uncemented total hip arthroplasty, using Harris hip score at 3rd month after hip replacement surgery

METHODOLOGY

This study was conducted in Khyber Teaching Hospital Peshawar, Pakistan between March 2022 and January 2024 taking ethical approval from Institutional Research and Ethical Board of Khyber Medical Collage/ Khyber Teaching Hospital Peshawar (No.113/DME/KMC). The sample size was 73 patients, calculated by WHO sample size calculator taking 5% poor outcomes of cemented total hip arthroplasty[9], 95% confidence interval and 5% margin of error. 73 patients of both genders age 40 years and above who undergone cemented total hip arthroplasty for end stage hip diseases were included in the study while those unfit for surgery or having any infection were excluded from the study. The participants of the study were admitted in the orthopedic unit, 1 day prior to the operative procedure on obtaining a written consent for inclusion in the study and surgical procedure.

Thorough history was taken and physical examination comprised an evaluation of the spine, opposite hip, both knees, and the feet were done. Harris hip score (total score of 100 points) was used to evaluate the participants functional ability prior to surgery. Score between 90 and 100 indicated excellent, score between 80 and 89 indicated good, score between 70 and 79 indicated fair and score below 70 indicated poor functional outcomes. All the arthroplasties were done through modified Hardinge lateral approach and spinal anaesthesia.

All the participants received intravenous ceftriaxone 1gm injection prior to skin incision. All the participants were implanted with cemented modular total hip prosthesis. Hemostasis was secured followed by soft tissues and skin closure. Mobilization of the patients were allowed with touch down weight bearing using crutches in all cases, on 1st postoperative day. Intravenous antibiotics were continued for 3 days. On 3rd postoperative day patients were discharged if no complications faced on oral antibiotics for 7 days. Those facing any complications were managed accordingly. Skin stiches were removed on 14th postoperative day. Harris hip score was again noted in each patient at 3 months postoperatively. SPSS-23 and paired T test keeping p vale of ≤ 0.05 as significant, was used to analyze the data obtained.

RESULTS

Among the total participants of the study 50 (68.50%) were male and 23 (31.50%) were females. Age varied between 40 to 80 years with mean age of 64.59 years (SD = 11.07). Involved hip in most of the cases i.e., 62% was right one while only 38% cases were having left hip involvement. 51% of the participants were suffering from osteonecrosis of hip, 21% were suffering from primary osteoarthritis, 11% were suffering from post-traumatic osteoarthritis, 5.48% were suffering from rheumatic hip disease, 5.48% were suffering from ankylosing spondylitis2.73% congenital hip diseases while 4.11% hips were having sequel of septic hip disease. In majority of the patients the main complaint was hip pain (98%).

Preoperative Harris Hip Score was 10-32 with mean value of 16.50±4.83 while postoperatively at 3rd month it was 86.34±9.84 with p vale of <0.00001, which was statistically significant (Fig. 1). The Harris hip score was excellent to good in 82%, fair in 12% and poor in 5% cases at 3rd month postoperatively (Fig 2).

6.85% patients suffered from complications, 4.10% cases were of skin surgical site infections and 2.74% cases were of dislocations (Table 1).

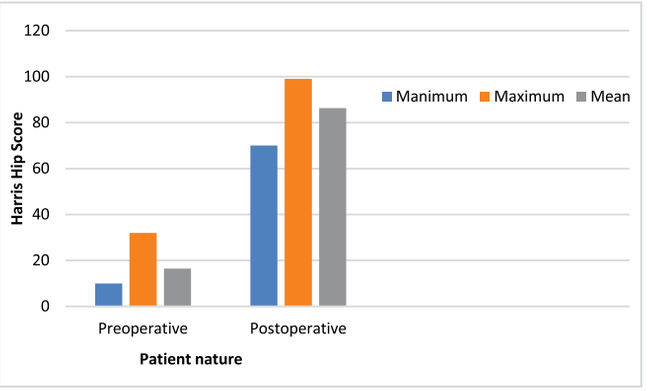

Fig: 1; Harris Hip Score of patient pre and post operatively

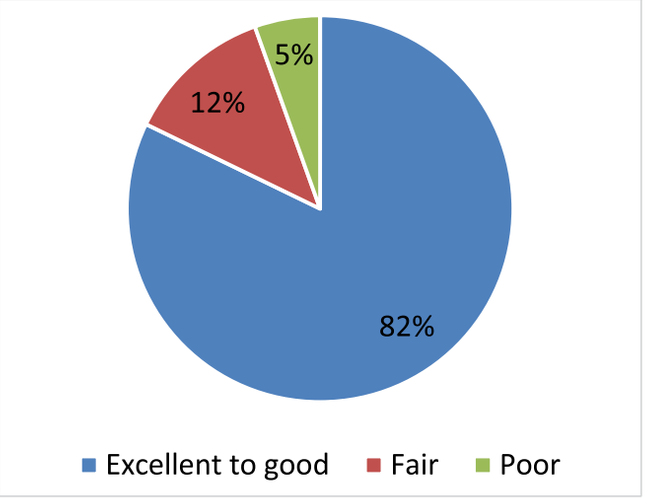

Fig: 2; Postoperative Harris Hip Score Categorization

Complications	Number	Percentage
Skin infection	3	4.10%
Dislocations	2	2.74%
Total	5	6.85%

Table No. 1: Complications

DISCUSSION

Total hip arthroplasty (THA) is the gold standard operation for individuals with end-stage hip degeneration, providing mobility and respite from agonizing pain. THA not only restores the structural integrity of the hip joint by replacing worn-out or damaged components with artificial implants, but it also relieves the constant discomfort and functional restrictions that come with advanced hip disease. This surgical method seeks to reconstruct a near-normal hip joint architecture, restoring biomechanical function and promoting a return to activities of daily life.[3]

One of the primary advantages of THA is its ability to successfully alleviate pain and restore functioning, frequently giving patients, results equivalent to their original hip joint. This leads to better mobility, quality of life, and independence for those who were previously disabled by hip joint illnesses. Furthermore, improvements in the field of arthroplasty have resulted in significant success, leading to increased longevity and improved functional outcomes for artificial hip joints. Recent advancements in implant design, materials, better cementing techniques, and surgical techniques have all greatly contributed to the success of THA surgeries. Implants now promise greater lifetime, with enhanced wear resistance and less chance of mechanical failure, ensuring the longevity of the artificial joint.[10]

In our study we observed the functional outcome of cemented primary hip arthroplasty. The age range in our study ranged between 40 and 80 years with an average age of 64.59±11.07 years. The majority of the patients were in age group range of 51 to 60 years of age. Similar observations were noted by Thiagarajan P, who observed that the majority of the patients in their study were in the age range group of 50-60 years.[1] Shah KA et al observed in their study that the mean age of patients was 60 years.[11] Results of both the studies are comparable to our results regarding the ages of the patients and support our observations regarding the most common age group where hip replacement surgeries are performed. In our study, the male patients outnumbered the female patients. Similar observation were made by other researchers regarding gender of the patients undergoing total hip replacements.[9,12]

In our study Harris Hip Score at arrival of the patients ranged 10-32 with mean value of 16.50±4.83 while after cemented total hip replacement at 3rd month it ranged 70-99 with mean value of 86.34±9.84. Our results are similar to study by Thiagarajan P who observed mean Harris hip score after cemented total hip arthroplasty to be 86.81±6.1 at 3rd month postoperatively.[11] Observed that 82% of the patients were having good to excellent functional outcomes, 12% were having fair functional outcomes and 8% patients were having poor functional outcomes postoperatively. Shah et al noted that 87% of patients were good to excellent functional outcomes postoperatively. Vinjamuri ARS et al also observed a significant improvement in functions after hip replacement surgery and observed that 90.9% patients had an excellent hip score, 6.06% had good and only 3.03% had fair result.[14] Our results are comparable to the results of the above studies. These observations show that cemented total hip replacement is as beneficial in our setup as it is in other centers of the world.

Total 6.85% patients suffered from complications in our study, 4.10% cases were skin surgical site infections and 2.74% cases were of dislocations. Management of all these complications

was done conservatively. Nearly similar results were found by Marahatta SB et al. who observed that 2% of their patients developed skin infection and 2% of the patients hip dislocations postoperatively.[3] Besides these complications other complications observed by other researchers in their studies include osteolysis, periprosthetic fracture, failure of acetabular component and failure of femoral components.[15] But we have not encountered such complications. All such complications need a reasonably long time to develop but in the present study, each patient was studied only for 3 month to determine the short term functional outcome of total hip replacement. We didn't observed any mortality and huge morbidity like in other similar studies.

CONCLUSION

Cemented total hip arthroplasty is a safe and successful treatment for end-stage hip joint diseases, providing patients with the possibility of regaining mobility, reducing discomfort, and improving quality of life with minimum risk of complications.

CONFLICTS OF INTEREST: The authors declare that they have no conflict of interest related to the contents of the study.

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AUTHORS CONTRIBUTIONS

FK: Conception, Design of the work, Data collection, and Drafting, Reviewed, Final approval, Agreement to be accountable.

KM: Conception, Design of the work, Acquistion, Data Analysis, and Drafting, Reviewed, Final approval, Agreement to be accountable.

MWK: Conception, Design of the work, Interpretation of data for the work, and Drafting, Reviewed, Final approval, Agreement to be accountable.

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