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Functional outcomes and complications of total hip arthroplasty with dual mobility cup : an audit

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Abstract

Objective: To determine the functional outcomes in total hip arthroplasty with a dual mobility cup, performed in our hospital.

Methods: After receiving an exemption from the Ethics review committee of the hospital, data collection for audit was started in January 2019. Records from July 2016 to June 2018 were included. All patients who underwent total hip arthroplasty with dual mobility prosthesis without any age limit were included. A proforma was prepared to collect the required information. Data was entered and analyzed on SPSS v. 21.

Results: Two hundred and ten patients were included, 114 females and 96 males. Of the total, 188 patients underwent unilateral surgery while 22 had bilateral hip arthroplasty. The mean postoperative hospital stay was 5.91 ± 3.9 days. Mean pre-op Harris score was 33.7 ± 7.6 and the post-op mean score was 75.9 ± 5.34 . Eighty-three (39.5 %) patients had the neck of femur fracture, 31(14.8%) had osteoarthritis while 28(13.3%) had avascular necrosis. Post-surgery complications included, wound infection, surgical site haematoma, NSTEMI, and only one patient reported dislocation after use of dual mobility cup.

Conclusion: The dislocation rate which was the prime concern, has been reduced with the use of dual mobility implant in total hip arthroplasty patients.

Keywords: Total hip replacement, Femoral head, Osteoarthritis, Arthroplasty, Wound infection.
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Introduction

Hip replacement has always being a challenging surgery for orthopaedic surgeons. Regardless of awareness about bone health, neck of femur fractures are on a rising trend in developed and developing countries.¹ The implant to choose is very difficult at times. Conventional total hip arthroplasty (THA), bipolar hemiarthroplasty, and various other implants are available in femoral head replacement. Amongst so many implants Dr. G. Bousquet came up with a dual mobility implant.² It has two articulation surfaces; one is between the shell and the polyethylene (external bearing) and between the polyethylene and the femoral head (internal bearing). Movement occurs at the inner bearing; the outer bearing only moves at extremes of motion.^{3,4} Dual mobility is used for increased range of movement (ROM) and this implant specifically has reduced the risk of dislocation.⁴ At various times hemiarthroplasty has been preferred due to lesser dislocation rate compared to total hip arthroplasty, However, THA has been shown to provide better functional outcomes, lower rate of reoperations, and less pain in some studies.^{1,5}

The purpose of this study was to determine the functional outcomes of total hip arthroplasty with a dual mobility

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cup at our center.

Method

The project was started in January 2019, after obtaining approval from the Ethical review committee of the Aga Khan University Hospital, Karachi. All patients who underwent dual mobility cup for hip replacement were selected from July 2016 to June 2018 regardless of age, gender and pre-operative diagnosis.

The patients who were initially operated outside AKUH were excluded from the study. Since it was an audit, the patient's data was collected retrospectively (July 2016 to June 2018), their medical records were checked and a proforma was filled. The proforma had questions regarding age, gender pre-operative diagnosis of the patients, ambulation, and Hip Harris score before surgery (except the patient who had trauma), and their course was followed in the post-op clinic and Harris hip score was retrieved from their files as it had been noted on follow up visits.

The collected data was analysed using Statistical Package for Social Sciences (SPSS, Inc, Chicago, IL, USA) version 21. Descriptive analyses was done for all quantitative variables such as age, mean scores, follow up time, and frequencies were calculated for all qualitative variables such as complication, indications of surgery, and weight bearing status.

Results

The total number of patients was 210 with 114 females (54.3%) and 96 (45.7%) males. The mean age of the patients was 59.14±15.64 years and maximum age was 90 years. Bilateral hip pathology was present in 22 patients and 188 had unilateral lesions. The mean postoperative hospital stay was 5.91±3.9 days. Indications for surgery included, neck of femur fractures in 83, osteoarthritis of the hip in 30 and 28 had Avascular necrosis (Table-1). Total 11 patients had post-surgery complications which also included non-surgical complications in one patient who had dislocation of the replaced Hip joints. Close reduction was done in 3 and one had to be taken to the operating room. Infection, surgical site haematoma and implant failure were the main complications reported. Only one patient had the non-surgical complication of NSTEMI (Figure-1). None of the patients had aseptic loosening and implant breakage. A total of 195 (94.9%) patients were discharged with full weight-bearing, 3 (1.4%) on partial weight-bearing, and 12

(6%) were on non-weight bearing ambulation and were allowed ambulation on the first follow up. The mean pre-op Harris score was 33.7±7.6 [range (20-45)] while the post-op score improved with a mean of 75.9±5.34 [range (70-92)]. The maximum follow up of patients was 2±0.495 years with a minimum of 1 year. Only 5 patients were lost to follow up.

Discussion

Hip replacement has always been a challenge to orthopaedic surgeons. Various implants are available for hemiarthroplasty and total hip arthroplasties. The choice of the implant itself has to be a topic for debate over the past few decades. Dual mobility was introduced in 1970 and since then it has been very popular amongst orthopaedic surgeons. It has gained popularity due to dual articulating surfaces which has given the patient added advantage which the single articulation implants failed to provide. Dual mobility implant is famous due to reduced risk of dislocation, less impingement (Figure-2), lower friction and lower wear, Increase range of motion and Intra-prosthetic dissociation.^{3,6-8}

On the contrary, if a dislocation occurs, it is extremely difficult to reduce using closed techniques. Furthermore, dual mobility cups lack screw holes. As with all monolithic cups, the inability both to visualize the acetabula floor during impaction and to use screws, may compromise fixation.³ Various studies have compared dual mobility cup for total hip replacement with other implants. Conventional THA rates of dislocation ranging from 1.9% to 5.8%.⁹⁻¹² The dislocation rate of conventional THA in revision surgeries are as high as 21%.¹³ When compared to a bipolar hemiarthroplasty, dual mobility has a reduced dislocation rate.¹⁴ Dual mobility has reduced the possibility of acetabular erosion related to a bipolar hemiarthroplasty. Bensen et.al compared dislocation rates and the difference was significant.

Table-1: Total hip arthroplasty indications of surgery.

Indication	Indication of Surgery Number of patients	%
Neck of femur fracture	83	39.5
Osteoarthritis	31	14.8
Avascular necrosis (AVN)	28	13.3
Dynamic dysplasia of hip joint (DDH)	14	6.7
Pathological fracture	10	4.8
Infected hip implant	10	4.9
Austin Moore failure	6	2.9
Rheumatoid arthritis	5	2.4
Septic arthritis	2	1.0
Others	16	8.4

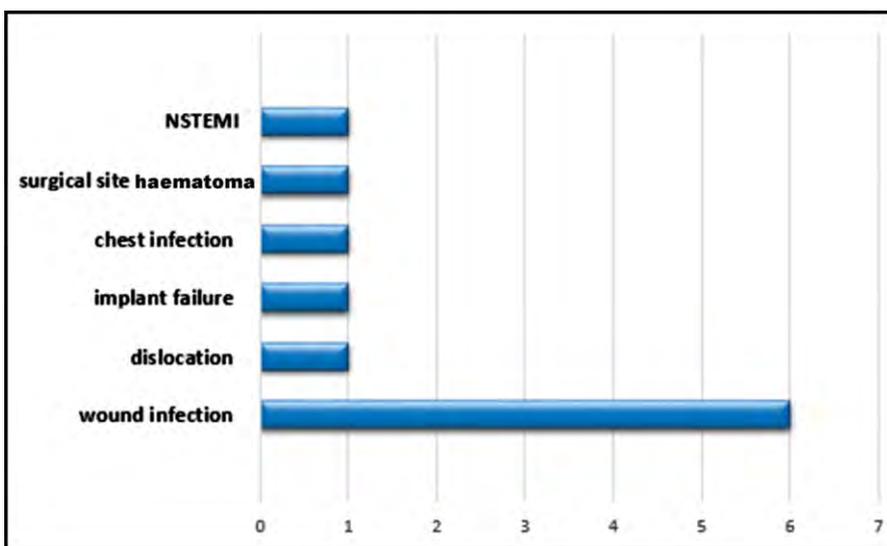


Figure-1: Post-surgery complications. NSTEMI: Non ST Elevated Myocardial Infarction

This study determined the dislocation rate of Bipolar to be 14.6% and Dual mobility to be 4.57%.¹⁴ In our study dislocation rate was 0.5%. In the study by Langlais et. al, dual mobility cup showed a dislocation rate of 1.1% and infection rate of 2.35%.¹⁵ Our wound infection rate was 2.9%. Guyen et. al had a dislocation rate of 5.5% and infection rate of 5.5%.¹⁶ Philippot et.al had a dislocation rate of 3.7%. In cases of revision due to infection the dislocation rate was 9% and in case of instability arthroplasty revision 0%.¹⁷ In the latest study published by Justinas et.al, 2% required a re-surgery due to dislocation compared to other implants out of which 9% required re-surgery due to



Figure-2: Post-op X-ray of right hip total hip arthroplasty with dual mobility cup.

dislocation.¹⁸ In our study, 0.48% hip-operated patients had to be taken to the operating room and 1.43% were reduced manually under sedation. Many countries have increased the number of dual mobility cups like Lebanon has 88% steady and linear increase in usage of dual mobility cups from the year 2013-2017.¹³ In 2017 more than 60% of all total hip replacement implants were dual mobility cups. The same trend has been noted in France¹⁶ and the United States of America.⁶ Chahine et.al shows the mean Hip Harris hip score to be as high as 94.8 to 98.7¹³ and our post-operative mean Harris hip score was 75.9 which is a fair score as per criteria. The reason for this figure could be some of the complications that are reported and sometimes patients do not respond properly in clinic.

Conclusion

Overall, the Dual mobility cup is better in terms of dislocation compared to other implants used for hip arthroplasties. The mean Harris hip score also showed fair results after surgery and patients' ambulation was also improved.

Recommendations

We recommend a 5 years follow up prospective study to be conducted in our region to explain early and late functional scores and outcomes of total hip arthroplasty with the dual mobility cup.

Limitations

The limitations of our study was the retrospective data collection which could have flaws in the figures retrieved.

Disclaimer: None.

Conflict of Interest: None.

Funding Disclosure: None.

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