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Original article

EVALUATION OF SURGICAL OUTCOME OF DUAL MOBILITY TOTAL HIP REPLACEMENT

DR. NADEEM A. LIL¹: Professor and Head of Unit, Smt. NHL Municipal Medical College, Ahmedabad.

DR. VIPUL R. MAKWANA²: Assistant professor, Smt. NHL Municipal Medical College, Ahmedabad.

DR. DRASHTANT S. PATEL^{3*}: Resident Doctor, Smt. NHL Municipal Medical College, Ahmedabad. *Corresponding author
Email id: drash_94@rediffmail.com

DR. NISHANT D. JUVA⁴: Resident Doctor, Smt. NHL Municipal Medical College, Ahmedabad.

DR. NIRAV B. PATEL⁵: Resident Doctor, Smt. NHL Municipal Medical College, Ahmedabad.

DR. ARJAV R. PATEL⁶: Assistant professor, Smt. NHL Municipal Medical College, Ahmedabad.

*Corresponding author; **DR. DRASHTANT S. PATEL³** Email id: drash_94@rediffmail.com

ABSTRACT

INTRODUCTION;To reduce the incidence of instability and dislocation rate following primary Total Hip Replacement (THR) surgery, Dual Mobility Total Hip Replacement (DMTHR) component has been developed.

AIMS AND OBJECTIVES ;This study is aimed to assess the functional result and complications following DMTHR.

MATERIALS AND METHODS 26 patients who have undergone DMTHR between June 2018 to February 2020 were included in this retrospective study. Modified Harris Hip Score was used to evaluate surgical and functional outcome.

RESULT ;Out of 26 patients in this study, 17 were males and 9 were females. The mean age was 52 years (Range 21 to 81 years). As per Modified Harris Hip Score functional outcome was Excellent in 20 (77%), Good in 4 (15%), Fair in 1 (4%) and poor in 1 (4%), patients.

CONCLUSION Dual mobility total hip replacement provides good hip range of movement and stability and is also associated with lower dislocation rate.

KEY WORDS

Dual Mobility Total Hip Replacement, Dislocation, Modified Harris Hip Score.

INTRODUCTION

Total hip replacement (THR) is amongst one of the most rewarding surgical procedures for managing hip pathologies like degenerative arthritis, avascular necrosis of femoral head and inflammatory arthritis in recent years. It is need of time to minimize or prevent complications such as post-operative hip instability. The incidence of instability following primary and revision THR has been reported as high as 7% and 25% respectively.¹ Risk factors for instability after THR are multifactorial and may be patient-specific like gender, age, abductor insufficiency, quality of bone or related to operative variables like implant selection, surgical approach, implant malposition, femoral head diameter etc.² One of the reasons for revision surgery following primary THR is hip instability.

The dual mobility cup combines the low friction principle of Total hip arthroplasty popularized by Charnley³ with McKee Farrar concept of using a femoral head of larger diameter to enhance implant stability.⁴ In theory, this system can give a stable hip by adding an extra joint surface without restricting hip range of movement, unlike constrained liners. Any replacement surgery should aim to reproduce or preserve patient's structural and functional hip environment. The objective is to allow early mobilization in the immediate post-operative period and to maintain a balance between mobility and stability. Hip range of movement restriction and Hip instability are the two major factors that compromises this achievement. One option addressing both issues is dual mobility articulation.

AIMS AND OBJECTIVES

The aim of the study is to evaluate the functional outcome and complications following DMTHR.

MATERIAL AND METHODS

We performed a retrospective review of 26 patients who had undergone dual mobility total hip replacement (DMTHR) between June 2018 to February 2020. All patients greater than 18 years of age operated for dual mobility THR, irrespective of gender and cause for surgery were included in this study. The patients not willing for participation, with irregular follow up and incomplete records were excluded. Patient demographics, detailed history, clinical examination data, investigations, X-rays and MRI were obtained from records. All patients were operated under either Spinal anaesthesia or General anaesthesia, in lateral position. Posterior (Southern-moore's) Approach was used. In early post-operative period patient's hip was maintained in abduction and external rotation for 6 weeks. Bed side knee bending and walking with support was allowed from 1st post-operative day. Static quadriceps exercises, ankle and toe mobilization, pelvic lift exercises started. Patients were discharged after 3 days after successful weight bearing. Patients were asked to continue physiotherapy at home. They were asked to avoid sitting in cross-legged and squatting position and not to flex, adduct and internally rotate the operated hip excessively until allowed. Patients were advised for regular follow up for dressing and clinical examination. Suture removal was done after 2 weeks. After 6 weeks patients were allowed to walk without support and do routine work.

Patients were followed up regularly weekly till suture removal after that every monthly till 3 months then every 6 monthly up to a maximum of 2 years. Modified Harris Hip Score was used to evaluate functional outcome on each follow up.

RESULT

26 patients, 17 males and 9 females were evaluated on follow up by Modified Harris Hip Score. The mean age was 52 years(Range 21 to 81 years).The most common indication for surgery was Primary Hip Avascular Necrosis(AVN) (17 Patients) followed by Implant failure and failed osteosynthesis with arthritis(5 Patients), healed Infective Arthritis(2 Patients), post-traumatic arthritis(1 Patient) and 1 patient of failure of previous arthroplasty. Out of 26 patients, 13 patients had been operated

on left side, 10 patients on right side and 3 patients had bilateral surgery. There were 10 patients each of type A and type C and 6 patients of type B according to Dorr Femoral bone classification. Uncemented DMTHR was done in 17 patients and Cemented DMTHR done in 9 patients.

As per Modified Harris Hip Score functional outcome was excellent in 20 (77%), Good in 4 (15%), Fair in 1 (4%) and poor in 1 (4%), patients. Mean Modified Harris Hip Score at final follow up was 92.6 (Range 60-100). At final follow up Limb length discrepancy (LLD) occurred in 5 patients, 3 patients had limb lengthening and 2 patients had shortening. In all patients LLD was equal to or less than 1 cm and it didn't hamper any patient's routine activity. 2 patients had persistent Trendelenburg gait, but it did not affect their walking distance and they were satisfied with their result. 2 patients developed grade 2 heterotopic ossification. 1 patient had dislocation on 10th post-operative day which was managed by closed reduction and abduction bar was given for 6 weeks. None of the patients had any complications like neurovascular insult, periprosthetic fractures, infection or implant loosening at final follow up. All our patients were able to return to their pre-operative level of activity or even better with an average period of 2.6 months.

Case

A 40 year old male patient underwent Right side Primary DMTHR for Right Hip Avascular Necrosis.



Figure 1: A. Pre-op x-ray showing Right hip AVN, B. Post-op x-ray, C. X-ray at 1 year follow up.



Figure 2: Hip range of movements at final follow up.

DISCUSSION

Dual mobility acetabular component was introduced as an alternative to conventional THR component to reduce the risk of THR dislocation in patients undergoing primary THR. Dual mobility cups have recently become widely popular as an alternative to standard THR cups in the prevention and treatment of instability in both primary and revision THR and has advantage of increased stability without compromising clinical and functional outcomes and implant longevity.

Dual mobility total hip replacement prosthesis is based on two design concepts for the ball and socket portion of implant. The two concepts are:

1.A small size femoral head which can minimize wear.³

2.A large size femoral head that can minimize the risk of dislocation and increase hip range of motion.⁴

During normal movement, the smaller head/ Ball of the implant rotates inside the secondary head, which normally doesn't move. This motion occurs during the majority of routine, every day activities like walking and sitting. Second head will move after first head reaches its limit of range of motion. This secondary movement permits a larger range of motion⁵ without compromising hip stability and thus less chances of hip dislocation.

In all the patients femoral stem and acetabular cups of respective size were used. They were either cemented or uncemented based on the quality of the bone.

Functional outcome was evaluated by the The Modified Harris Hip Score which was developed for the assessment of the results of hip surgery. The 4 components of the score are pain, function, deformity and hip range of motion covering 44, 47, 4 and 5 points respectively with maximum score being 100 points. In our study Average Modified Harris Hip Score at final follow up was 92.6. In a study by Acker A. et al.⁶ on 20 patients and Deepak S. et al.⁷ on 20 patients managed with DMTHR, the average scores at final follow up were 87.6 and 90.3 respectively.

In our study, no patient required revision due to any cause and the cup survivorship was 100%. Comparing to other studies, Acker A et al. had cup survivorship of 100% and Deepak S. et al. had cup survivorship of 94.6%.

In our study, rate of dislocation was only 3.84.

CONCLUSION

The advantages of using DMTHR are stability and good hip range of movement with lower dislocation rate particularly those patients who are at higher risk of instability, either due to lack of muscle control, neuromuscular problems, spino-pelvic imbalance or with history of previous hip surgeries. DMTHR demonstrates a significant reduction in dislocation rates and is a viable alternative to conventional THR.

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