

**Original Article**

A Prospective study of Outcomes of Bipolar Hemiarthroplasty in Young Adults for Avascular Necrosis of Femoral Head

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Abstract

Objective: There are various Surgical methods for treatment of avascular necrosis of femoral head like core decompression, vascular and avascular bone grafting, osteotomies, hemiarthroplasty, total hip replacement and arthrodesis. The aim of this prospective study was to evaluate the Outcomes of Bipolar Hemiarthroplasty in Young Adults as Treatment of Avascular Necrosis of Femoral Head.

Patients & Method: This prospective study was conducted on 25 relatively young male adults with mean age of 39 years (range 28 to 59 yaers). Approximately all the patients were of avascular necrosis of femoral head with nearly normal acetabulum. Superficial smoothing of the acetabulum was also performed in few cases. Snug fitting of the trial cups was confirmed and care was taken that there is no gross movement between outer cup and acetabulum. We believe that Bipolar prosthesis is easy to implant and can be done in the above age group instead of conventional hemiarthroplasty and more extensive surgery like total hip replacement. Due to double mobility it protects the acetabular cartilage for a quite long time with the increased range of motion in the hip joint. Clinical follow up was done by using Harris hip score (HHS) system.

Results: All patients, were regularly followed up and longest follow up is 3 years in five patients and shortest follow is three months in three patients. The HHS significantly improved from a preoperative value of 39.3 (range, 54-30) to a postoperative value of 89.12 (range 74-96). According to HHS grades, the final outcome was excellent in 14 hips, good in 8 and fair in 3 hips. Complications seen were wound infection in one case.

Conclusion: Bipolar hemiarthroplasty with tight fitting cup for avascular necrosis of femur neck has a very low chances of groin pain, erosion of acetabulum, and revision during follow up

Keywords: Femoral head, avascular necrosis, bipolar hemiarthroplasty.

Introduction

Avascular necrosis of the femoral head in young adults following fracture neck of femur has

always presented a great challenge to orthopaedic surgeons. The various modalities of the treatment of avascular necrosis of femoral head like core

decompression, vascular and avascular bone grafting, pelvic support osteotomies, hemiarthroplasty, total hip replacement and arthrodesis have varying degree of limitations.^(1,2,3)

Total hip arthroplasty is indicated amongst young subjects in avascular necrosis with acetabular involvement; however, its action is not clear amongst cases without involvement of acetabulum.⁽⁴⁾ Arthrodesis is not acceptable to most of the Indian patients and osteotomies are having their own limitations like instability and shortening of limb. Thompson and Austin Moore prosthesis and their derivatives have received wide-spread use in the treatment of conditions requiring replacement of femoral head. Despite overall clinical satisfaction the use of these devices presented several problems. The incidence of femoral loosening has been reduced greatly by the use of bone cement. But the acetabular wear, pain and protrusion acetabuli have been persistent and well documented problems reported to occur in more than 50% patients in some literature⁽⁵⁾.

These problems have promoted the development of family of new implant having the interposition of an inner prosthetic bearing intended to reduce the effects of frictional wear on acetabular cartilage. Bateman (1974) as well as Giliberty (1978)^(6,7) reported the bipolar prosthesis as an intermediate step between the moore type hemiarthroplasty and a total hip replacement. Krein (1984) studied the biomechanics of bipolar hip endoprosthesis and indicated that inter-prosthetic motion is the key of success⁽⁸⁾. Polyethylene liner acts as a shock absorber and minimizes the strain on the shaft and diminishes the rigidity of implant.

Bipolar prosthesis are now being used for treatment especially in younger patients. The amount of erosion and the occurrence of symptoms was determined by the activity and duration of follow up. The main problem seemed to be motion between the acetabulum and outer cup and chances of particulate wear⁽⁹⁾. The present

study was conducted with the aim to evaluate the Outcome of Bipolar Hip Arthroplasty in Young Adults as Treatment of Avascular Necrosis of Femoral Head.

Patients and Method:

A prospective study was done to evaluate the subjects who underwent unilateral hemiarthroplasty. All the subjects younger than 60 years, operated between 2019 and 2022 were included in the study. All the preoperative details were obtained from the records of the hospital. All the subjects were informed about the study and the subjects willing to come for follow up were included in the study. All Subjects with radiographs showing no or little acetabular involvement were included in the study whereas those with advanced protrusion or osteoarthritis were excluded from the study. Lateral decubitus position was used to perform all the surgeries. Joint capsule was excised if diseased. Superficial smoothing of the acetabulum was performed in few cases. Snug fitting of the trial cups was confirmed and care was taken that there is no gross movement between outer cup and acetabulum. All the subjects were allowed to ambulate with assistance on 5th postoperative day and continued the same for 4-6 weeks. All the subjects were regularly followed up clinically and radio-graphically. Clinical follow up was done by using Harris hip score (HHS) system.

Results

All patients, were regularly followed up and longest follow up is 3 years in five patients and shortest follow is three months in three patients. The HHS significantly improved from a preoperative value of 39.3 (range, 54-30) to a postoperative value of 89.12 (range 74-96). According to HHS grades, the final outcome was excellent in 14 hips, good in 8 and fair in 3 hips. Complications seen were wound infection in one case. There was no incidence of hip dislocation or dissociation of the bipolar cup and no case

required revision. On AP neutral and abduction X-rays there was no appreciable movements noted between the outer cup and the acetabulum in any of the case.

Overall observations were found to be very satisfactory 22 studied cases at present are free from pain, limping and limitation of movement and leading normal life. Three cases however have slight limping due to shortening of limb in the range of 1 to 1.5 cm. Most of the patients are sitting cross leg and squatting.

Discussion

Since acetabular erosion and protrusioacetabuli are more the problem of middle aged active patients than elderly inactive patients⁽¹⁰⁾, so routine hemiarthroplasty should not be performed in this age group. But in the case of avascular necrosis in relatively younger patients total hip replacement is not advisable. We have used the modified bipolar endoprosthesis in all such type of patients who are relatively younger and have developed avascular necrosis following fracture neck of femur. One to three years follow up of these patients revealed quite good results in the form of painless and good range of hip motion. No further degradation of acetabulum was observed.

Surface replacement is treatment option available for young subjects with avascular necrosis, but it has limited indications and is a highly demanding method with increased cost⁽¹¹⁾. The studies published for surface replacement are also not uniform and there is lack of long term follow up^(12,13,14) Total hip arthroplasty is the treatment of choice for the management of advanced avascular necrosis of the head of femur^(14,15). However, because of its overuse there can be increased wear and requirement for early revision amongst young adults⁽¹⁶⁾. Numerous studies have shown the functional utility of Total hip replacement reduces to approximately 80% by 10 years, 33% by 16 years, therefore requiring a revision surgery.

We believe that Bipolar prosthesis is easy to implant and can be done in the above age group instead of conventional hemiarthroplasty and more extensive surgery like total hip replacement. Due to double mobility it protects the acetabular cartilage for a quite long time with the increased range of motion in the hip joint⁽¹⁷⁾

Conclusion

Bipolar hemiarthroplasty with tight fitting cup for avascular necrosis of femur neck has a few chances of groin pain, erosion of acetabulum, and revision during follow up. Further studies need to be conducted on large scale to determine the exact incidence of the postoperative complications.

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