Original article:

Evaluation of Outcome of Bipolar Hip Arthroplasty in Young Adults as Treatment of Avascular Necrosis of Femoral Head

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ABSTRACT

Background: Surgical management of femur’s head avascular necrosis include various treatment options like core decompression, bone grafting both vascular and avascular, osteotomies, hip resurfacing, hip arthroplasty and total hip arthroplasty. 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.

Materials and methods: A prospective study was done to evaluate the subjects who underwent bilateral hip arthroplasty in the Department of Orthopedics, Government District Hospital, Dungarpur, Rajasthan. Classification of subjects was done on the basis of Ficat’s classification. Superficial smoothening of the acetabulum was performed in all the 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 data was arranged in a tabulated form and analyzed using SPSS software. Student t test was used to compare the results. Probability value of less than 0.05 was considered significant.

Results: The present study was conducted using 36 subjects these 14 were females and 22 were males. There were 12 subjects belonging to Ficat 3 class group and 24 subjects belonging to Ficat’s 4 class group. The mean range of movements in Ficat 3 and Ficat 4 group was 108±9.2 and 97.16±9.14 respectively. There was a significant difference in the mean range of movements between both the groups. There were total 4 cases of groin pain. Outer cup migration was seen amongst 6 subjects.

Conclusion: Bipolar hip arthroplasty with tight fitting cup for avascular necrosis of femur neck has a few chances of groin pain, erosion of acetabulam, and revision during follow up.

Keywords: Arthroplasty, Acetabulum, Hip, Necrosis.

INTRODUCTION

Surgical management of femur’s head avascular necrosis include various treatment options like core decompression, bone grafting both vascular and avascular, osteotomies, hip resurfacing, hip arthroplasty and total hip arthroplasty. 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. Bilateral hip arthroplasty was initially restricted to hip osteoarthritis, non united fractures and acute femur fractures. It was Bateman and Giliberty who first performed bilateral hip arthroplasty in Ficat Stage 3 type of avascular necrosis on basis of the hypothesis that “acetabular floor has a regenerative property, that regenerates bone in the area of subchondrum, if weight bearing stimulation is given by an accurately fitted cup” and gave the theory that preferential motion at inner side will decrease the erosion of cartilage erosion. Studies have shown both satisfactory and unsatisfactory results by bilateral hip arthroplasty.
Prevalence of groin pain in this treatment varied between 11.5% to 42% in the 18-20 and prevalence of acetabular erosion and protrusion varied from 0% to 45%. 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. 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.

MATERIALS AND METHODS

A prospective study was done to evaluate the subjects who underwent bilateral hip arthroplasty in the Department of Orthopedics, Government District Hospital, Dungarpur, Rajasthan. All the subjects younger than 60 years, operated between 2000 and 2015 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. Ethical committee clearance was obtained from the institute’s ethical board. Classification of subjects was done on the basis of Ficat’s classification. 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 and smoothed. Superficial smoothening of the acetabulum was performed in all the 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 radiographically. Analysis of the subjects was also done on the basis of subgroup that was divided according to Ficat’s classification. All the data was arranged in a tabulated form and analyzed using SPSS software. Student t test was used to compare the results. Probability value of less than 0.05 was considered significant.

RESULTS

The present study was conducted using 36 subjects these 14 were females and 22 were males. The Male:Female ratio was 1.57:1. The mean age of the study subjects was 43.21±7.8 years. The age range of the subjects enrolled in the study was 31-58 years. The mean duration of follow up of the study was 3.4 years. (Table 1)

Table 2 shows the comparison of variables between Ficat 3 and Ficat 4 subjects. There were 12 subjects belonging to Ficat 3 class group and 24 subjects belonging to Ficat’s 4 class group. There was a significant difference in the frequency of both the groups. The mean age of subjects in Ficat 3 and Ficat 4 group was 36.90±6.50 and 43.40±6.89 years respectively. The preoperative and postoperative harris hip score in Ficat 3 group was 47.80±4.90 and 92.22±3.19 respectively. The preoperative and postoperative harris hip score in Ficat 4 group was 36.53±3.20 and 89.14±7.44 respectively. There was a significant difference in the preoperative harris score amongst both the groups. The mean range of movements in Ficat 3 and Ficat 4 group was 108±9.2 and 97.16±9.14 respectively. There was a significant difference in the mean range of movements between both the groups. There were total 4 cases of groin pain. Outer cup migration was seen amongst 6 subjects.

DISCUSSION

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. The studies published for surface replacement have shown poor results and increased complications.

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replacement are also not uniform and there is lack of long term follow up. Total hip arthroplasty is the treatment of choice for the management of advanced avascular necrosis of the head of femur. However, because of its overuse there can be increased wear and requirement for early revision amongst young adults. 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. When this procedure is compared with bilateral hip arthroplasty, confusing and conflicting results were seen. According to the study conducted by Chan and Shih, there was no difference in the incidence of osteolysis, pain, rate of dislocation and rate of revision between bilateral and total hip arthroplasty. They concluded that amongst young subjects with Ficat Stage 3 avascular necrosis, bilateral hip arthroplasty can be considered useful alternative for total hip arthroplasty. Furthermore revision is easier in bilateral hip arthroplasty as compared with total hip arthroplasty because of intact acetabulum. According to the study conducted by Lee et al., there were 23% cases of outer cup migration, 15% cases of gluteal pain and 20% cases of groin pain after performing bilateral hip arthroplasty. According to our study, there were 12 subjects belonging to Ficat 3 class group and 24 subjects belonging to Ficat’s 4 class group. There was a significant difference in the frequency of both the groups. The mean age of subjects in Ficat 3 and Ficat 4 group was 36.90 ± 6.50 and 43.40 ± 6.89 years respectively. The preoperative and postoperative Harris hip score in Ficat 3 group was 47.80 ± 4.90 and 92.22 ± 3.19 respectively. The preoperative and postoperative Harris hip score in Ficat 4 group was 36.53 ± 3.20 and 89.14 ± 7.44 respectively. There was a significant difference in the preoperative Harris score amongst both the groups. The mean range of movements in Ficat 3 and Ficat 4 group was 108 ± 9.2 and 97.16 ± 9.14 respectively. There was a significant difference in the mean range of movements among both the groups. There were total 4 cases of groin pain. Outer cup migration was seen amongst 6 subjects. As per Ito et al. there were 42% radiological failures, 42% cases of groin pain that required revision surgery. Similar kind of results were found in studies by Cabanela and Lachiewicz and Desman. Pain in groin and erosion of acetabulum were the chief reasons for bad results of bilateral hip arthroplasty. Due to the retention of groin capsule, there are chances of groin pain due to irritation of the nerve endings. According to a study conducted by Pellegrini et al. there are higher chances of revision with acetabular reaming whereas according to Muraki et al. they concluded that acetabular reaming increases the chances of migration in superomedial direction.

CONCLUSION

Bipolar hip arthroplasty 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.

REFERENCES


Table 1: Preoperative characteristics of the study population

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<tr>
<td>Mean age</td>
<td>43.21±/78 years</td>
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<tr>
<td>Age range</td>
<td>31-58 years</td>
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<td>Mean follow up duration</td>
<td>3.4 years</td>
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Table 2: Comparison of variables between Ficat 3 and Ficat 4 subjects

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<tr>
<td>Frequency</td>
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<td>24</td>
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<tr>
<td>Age</td>
<td>36.90±6.50</td>
<td>43.40±6.89</td>
<td>&gt;0.05</td>
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<td>Preoperative harris hip score</td>
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<td>Postoperative harris hip score</td>
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<td>89.14±7.44</td>
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<td>Range of movements</td>
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<td>97.16±9.14</td>
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<tr>
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<td>Outer cup migration</td>
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<td>4</td>
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