Original Research Paper

Volume - 10 | Issue - 6 | June - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Orthopaedics

EFFECT OF RISEDRONATE IN IMPROVING CLINICAL OUTCOME AND PREVENTING FEMORAL SUBSIDENCE IN PATIENTS OF FRACTURE NECK FEMUR TREATED WITH BIPOLAR HEMIARTHROPLASTY

Dr. Vikram Sharma* Associate Professor, Department of Orthopaedics KD Medical College Mathura. *Corresponding Author

Dr. Vivek Chandak Senior Resident, Department of Orthopaedics KD Medical College Mathura.

KEYWORDS : Risedronate, Bipolar Hemiarthroplasty, Femoral Stem Subsidence

INTRODUCTION

Fracture of neck of the femur is one of the most common osteoporotic fractures.(1) Such fractures are commonly treated with bipolar hemiarthroplasty for early mobility. Cementless arthroplasty, in recent years, has helped overcome problems associated with cement (2). Bone resorption around femoral stem in cementless hip arthroplasties is a known phenomenon (3,4).This affects the biologic fixation and leads to the subsidence of the femoral stem(5). In some studies bisphosphonates like Risedronate and Zoledronic acid have been shown to be efficacious in decreasing periprosthetic bone loss (5,6,7,8,9) and subsequently subsidence of femoral stem(6), but the literature on this subject is sparse. This study was designed to test whether risedronate 35 mg orally, taken weekly improved clinical outcomes and whether it had at any impact on subsidence of the femoral stem.

MATERIALS AND METHODS

This study was carried out at KD Medical College, Mathura a 500bedded hospital with teaching facilities. All the patients who suffered fracture of neck of femur and underwent cementless bipolar hemiarthroplasty in this institution between January 2017 and December 2018 were included in this study. The surgery was done by a standard lateral approach and the appropriately sized implant was implanted.

Uncemented hydroxyapatite coated stem with ring lock modular head was used in all the patients Post operatively patients were mobilized full weight bearing on the next day with the help of walker and the walking aid was gradually weaned off.

The patients were randomly divided on the second postoperative day in 2 groups. Group 1 received risedronate 35 mg once weekly for 6 months and Group 2 did not receive risedronate. All the paients also received Calcium and Vitamin D supplementation. Standard anteroposterior radiographs of the pelvis and "frog-lateral" radiographs of the hip were obtained immediately after the operation and at each follow-up visit following the same X-ray protocol. The patient was positioned supine with his/her feet together. The X-ray tube was positioned over the symphysis pubis 1 m from and perpendicular to the table. Magnification error was addressed using the known diameter of the prosthetic femoral head as an internal reference.

Using post-operative radiographs, we recorded the position of the femoral stem (valgus, neutral or varus), femoral stem-canal ratio, and radiolucent lines around the prosthesis.Femoral stem-canal ratio was measured as the ratio of the width of the femoral component to the width of the medullary canal.

Subsidence was measured as the perpendicular distance from the tip of trochanter to the "shoulder" of the stem (Fig. 1).

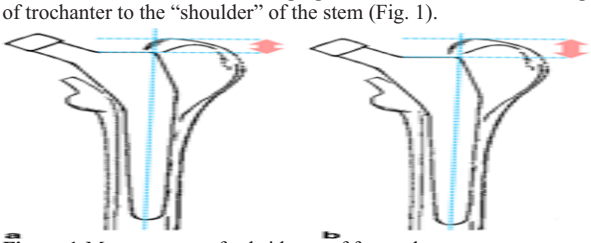

Figure 1: Measurement of subsidence of femoral stem

Functional assessment was done using the Harris Hip Score Exclusion Criterion. The following categories of patients were excluded from the study.

·With less than 12 months of follow up

·Who were receiving anti osteoporosis treatment prior to the fracture.

·Pathological fractures

RESULTS

Between January 2017 and December 2018 total of 74 (40 in Group 1 and 34 in Group 2) patients met our inclusion criterion. The mean follow up time was 14 (12-19) months.8 patients (5 in Group 1 and 3 in Group 2) died during the period of study of causes unrelated to the surgery. 2 patients one each in both the groups had periprosthetic fractures and were managed accordingly. These 10 patients were excluded from the final analysis.

A total of 64 patients,34 in Group 1 and 30 in Group 2) were available for final analysis.

Average Harris Hip Score was better in Group 1 than in Group 2 on every follow up visit. Difference between the HHS between the 2 Groups was less at 6 weeks (80 and 74 respectively) and it increased at 3 months (84 and 74 respectively) and further at six months (90 and 76 respectively). Over a period of 12 months patients in Group 1 showed more improvement (from 80 to 90) compared to Group 2 (from 74 to 79)

Table 1: Average Harris Hip Scores in patients of Group 1 and Group 2 from 6 weeks to 12 months postoperative.

	6 weeks	3 months	6 months	12 months
Group 1	80	84	90	90
Group 2	74	74	76	79

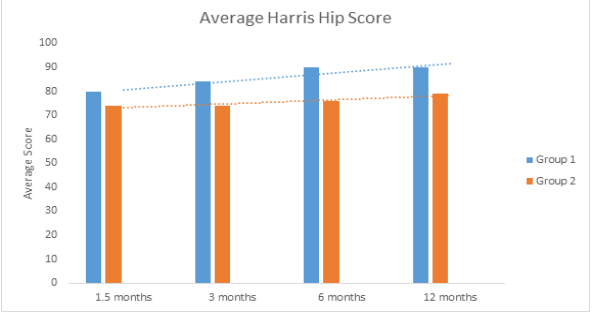

Figure 2: Average Harris Hip Score over period of time

Average subsidence of the stem in Group 1and Group 2 at 6 weeks was same. (1.3mm). However at 3 months subsidence in Group was 2.0mm and in Group 2 was 2.7mm. There was no further subsidence in Group 1 at 6 months and 12 months. However, subsidence in Group 2 increased to 2.9 and3.0 at 6 and 12 months respectively.

Table 2: Average Subsidence of femoral stems in patients of Group 1 and Group 2 from 6 weeks to 12 months postoperative.

	6 weeks	3 months	6 months	12 months
Group 1	1.3	2.0	2.0	2.0
Group 2	1.3	2.7	2.9	3.0

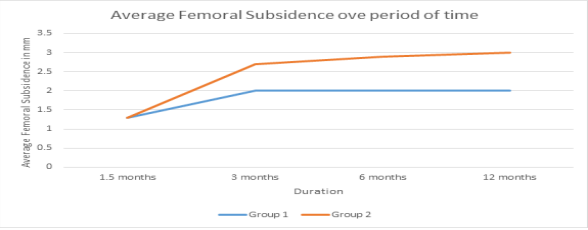

Figure 3: Average Femoral Subsidence over period of time

According to postoperative X-rays, 52 (81.2%) stems were implanted in the neutral position (±2° from the longitudinal axis of the femur) 8 (12.5%) in varus, and 4 (6.2%) in valgus; no changes in this initial position were observed along the follow-up in both the groups. Average stem canal ratio in Group 1 was 87.4 %(+/- 4.7 %) compared to 86.2% (+/-3.9%) in Group 2 at the end of six weeks. There was no changes in these values during the follow up period in either group. There were no radiolucent lines on the prosthesis bone interface in either group. There was no revision surgery required in either of the group. We did not find any relation between subsidence and diameter or the position of the stem.

DISCUSSIONS

In treating osteoporotic femoral neck fractures, the orthopedic surgeon is often the first clinician to address the injury and he should make every effort to, prevent subsequent fractures, and minimize the need for subsequent revision surgery [1, 2, 5–8]. Since bipolar hemiarthroplasty is commonly performed in elderly patients with femoral neck fracture, post- operative administration of anti-osteoporotic drugs is reasonable and may play a valuable role in the treatment (1, 2). Among these anti-osteoporotic drugs, Risedronate is widely used and has been demonstrated to prevent peri-prosthetic bone loss (5, 8, 24), lower the risk of revision surgery after hip arthroplasty (6), and reduce femoral stem migration (7, 8).

Our study suggests that risedronate 35 mg taken once weekly has a positive effect on clinical outcomes as measured by Harris hip score. In patients receiving Risedronate, the average scores were better at each follow up visit and improved much more over a period of 12 months (80 to 90) as compared to the group 2 (74 to 79). We could not find any study in literature that had such comparison

This group also fared better in terms of femoral subsidence .The average value of which at 3 months was less in Group 1 as compared to Group 2 patients (2.0 compared to 2.7). Other studies have also reported subsidence varying from an average of 0.45 to 2.23 mm. (7,8,9,10,11,12,13) Also important was the observation that there was no further subsidence in patients of Group 1 till 12 months (this is in line with the other studies who have noted similar results.(14,15)

whereas in Group 2 it increased from 2.7 to 3.0. during the same period. The limitations of our study were the small sample size and follow up of only one year, although in patients who received Residronate, there was no further subsidence after 3 months, since maximum bone resorption takes place during initial post operative months. Advantages of the study were that same prosthesis was implanted to avoid implant-related confounding factors and the same post operative rehabilitation protocol were used in all patients. Many patients in this age group were already on anti osteoporotic medication prior to the surgery and all such patients were excluded to avoid the confounding factors of medication. This strict inclusion criteria was meant to limit the study variables, but this also reduced the numbers of subjects

CONCLUSIONS

Our study does suggest that Risedronate may be a reasonable supplemental treatment to enhance the stability of cementless femoral stems in elderly patients after hemiarthroplasty for femoral neck fracture. However larger multicenter studies are needed to establish the role of Risedronate in improving functional outcomes and preventing femoral subsidence.

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