A COMPARATIVE STUDY OF CLINICAL AND FUNCTIONAL OUTCOME IN PATIENTS OF FRACTURE NECK OF FEMUR TREATED WITH CEMENTED AND UNCEMENTED BIPOLAR HEMIARTHROPLASTY.

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Abstract

Purpose: To compare and analyze clinical and functional outcomes of cemented versus cementless bipolar hemiarthroplasty for treatment of femur neck fractures.

Materials and Methods: A total of 34 patients aged 55 years and over older who underwent bipolar hemiarthroplasty for treatment of displaced femur neck fractures (Garden stage III, IV) were included in this study. Among the 34 patients, 17 were treated with cemented stems and

17 patients with cementless stems. Clinical outcomes assessed were: i) postoperative ambulatory status, ii)blood loss, and iii) complications. Results: The cemented group had significantly lower occurrence of complications (postoperative infection,

P=0.04) compared to the cementless group. There was no significant difference in postoperative ambulatory status.

Conclusion: For patients undergoing bipolar hemiarthroplasty, other than complications, there was no statistically significant difference in clinical or functional outcomes in our study. Selective use of cemented stem in bipolar hemiarthroplasty may be a desirable treatment method for patients with poor bone quality and higher risk of infections and lead to lower complications.

Key Words: Femoral neck fractures, Bipolar hemiarthroplasty, Cemented stem, Cementless stem

Introduction

Hemiarthroplasty is a common surgery done for displaced fractures of neck of femur [1]. Usually femoral neck fractures are associated with higher morbidity and mortality [2].

Even if union occurs, there is a chance of avascular necrosis of the head of the femur. Moreover, there are high chances of secondary osteoarthritis. All this leads to an increased number of surgeries, which increases the

morbidity and mortality of the patients., so rather than considering internal fixation in these patients, prosthetic replacement is better option for displaced fracture neck of femur. Replacement of the head of the femur alone is hemi replacement arthroplasty. It may be either unipolar or bipolar replacement arthroplasty.

Various prostheses are in use for arthroplasty, but the concern with the prosthesis is stem loosening and migration.

Use of PMMA cement offers definite advantages as it acts as a grouting agent to replace thinning trabecular bone, offering immediate interference stability between implant and bone, thus greatly simplifying rehabilitation. Bipolar arthroplasty was introduced to prevent or retard acetabular wear. Bipolar hemiarthroplasty prosthesis decreases the acetabular erosion and can be used in younger patients. It improves stability due to self-centering or self-aligning mechanism. Recently, many surgeons are evaluating effectiveness of cemented and uncemented hemiarthroplasty for fracture neck of femur. There is evidence for better results in terms of mobility, revision rates and thigh pain after cemented hemiarthroplasty in spite of longer duration of surgery and blood loss during the procedure [3,4].There is evidence for use of cemented hemiarthroplasty resulting in greater anchoring and lesser periprosthetic fracture. However, cemented prosthesis may result in more mortality from haemodynamic instability and cardiopulmonary complications termed as ‘cement reaction’ or bone cement implantation syndrome [5,6]. In contrast, uncemented hemiarthroplasty procedures may result in loosening of prosthesis and post-operative fractures and thigh pain [7]. In addition, the procedure is less strenuous, and blood loss during procedure is low [8-10].

So in view of these varied opinions we desire to compare the efficiency of outcome in patients of fracture neck of femur with cemented and uncemented bipolar hemiarthroplasty**.**

AIM AND OBJECTIVES

AIM-

TO STUDY THE CLINICAL AND FUNCTIONAL OUTCOME IN PATIENTS OF FRACTURE NECK OF FEMUR TREATED WITH CEMENTED AND UNCEMENTED BIPOLAR HEMIARTHROPLASTY.

OBJECTIVES

To study the functional outcome of surgical management of fracture neck of femur in adults using cemented hemiarthroplasty

To study the functional outcome of surgical management of fracture neck of femurin adults using uncemented hemiarthroplasty

To study perioperative complication in cemented and uncemented hemiarthroplasty

MATERIALS AND METHODS

- Single centre
- combined Retrospective and prospective study
- 34 patients of fracture neck of femur in which 17 patients treated with uncememnted bipolar Hemiarthroplasty and 17 patients with cemented bipolar hemiarthroplasty
- All patients admitted and selected for the operative method of treatment underwent the pre-operative work up with complete haemogram investigation, blood group typing and medical and surgical reference whenever indicated for operative fitness.
- Pre injury harris score - surgery ORIF-- post surgery harris score at 6wk,12wk,12months, 18 Months.

Institutional Ethics Clearance was obtained before the start of the study and written informed consent was taken from each patient before they were recruited for the study

OPERATIVE METHOD

Hip was opened by Moore's Posterior approach

After the femoral head was extracted, the femoral neck was nibbled in such a way that enough of calcar (minimum of 0.5 inches) remained to support the medial aspect of prosthesis.

Then an awl or straight curette was inserted in line with femoral shaft to aid in entering diaphyseal medullary canal.

A notch was made in the postero-superior portion of the neck to help maintain anteversion of 10°-15°.

Then with an appropriate rasp medullary canal was rasped in valgus and 10-15 degrees of anteversion relative to the plane in which the knee joint axis lies.

Preparation of bone cement

Regular PMMA bone cement is supplied as two sterile components. Powder packet – contains particles (10 to 150 microns in diameter) of PMMA, about 10% barium sulphate and a polymerization initiator (approx. 1% benzoyl peroxide) and Liquid vial–contains methyl methacrylate monomer and an activator (about 3% of DMP toluidine) that promotes cold curing process.
Manual mixing technique is used, in which the liquid is added to the powder and mixed by stirring. Initial period is the dough time, the time from the beginning of mixing until the cement does not stick to non-powdered surgical gloves, usually 2-3 minutes.
Working time is the time from the end of the dough time until the cement is too stiff to manipulate usually 5-8 minutes.

Setting time is the sum of two and is typically 8-10 minutes.
Once the dough of the cement is made the packed ribbon gauze is removed and the cement inserted into the medullary canal by cement gun after the cement restrictor is inserted.

Insertion of prosthesis

The appropriate size of prosthesis was seated in the prepared medullary canal with the 10-15 degrees of anteversion and valgus position.

The prosthesis was impacted with gentle blows in to the medullary canal. After the cement is set properly the prosthesis was reduced into the acetabulum by gentle traction in the extended position of the knee, with minimal external rotation terminally.

Difficult reductions were achieved using Murphy's skid. While reduction, care was taken to prevent dislodgement of the outer head, and there was no dislodgement of the prosthesis in present study.

The hip was tested for full range of movements and stability intra-operatively while closure of the wound, capsule and external rotators were sutured back.

The wound was closed meticulously in layers over a suction drain maintaining haemostasis throughout the procedure and sterile dressing was applied. Same procedure was followed in the uncemented cases without the cementing step.

POST OP PROTOCOL

Post operative care-abduction bar, antibiotics and analgesics for 2 weeks

After getting check X–ray and confirming the prosthesis position, patients were made to ambulate with the help of walker.

In cemented hips full weight bearing was done immediately and in case on uncemented type it was progressed from partial weight bearing to full weight bearing over a period of 4-6 weeks. By the time of discharge, patients were made to ambulate with the help of walker.

The follow up was carried out at 6 weeks, 3 months, 6 months, 1 year and every year afterwards. At each follow up clinical evaluation was done for limb length discrepancy, thigh pain, rotation of the limb, gait pattern and range of movements. Harris Hip Score evaluation was done at each follow up. Radiological evaluation was done at each follow up for calcar length, periprosthetic fractures. Other complications like superficial infection, deep infection, urinary tract infection, bed sores, and any medical complications if present were noted.

RESULTS :

CEMENTED GROUP

GRADE	HARRIS HIP SCORE	NO.OF PATIENTS	PERCENTAGE
EXCELLENT	90-100	4	26.66
GOOD	80-90	8	46.66
FAIR	70-79	3	20
POOR	<70	2	6.66

UNCEMENTED GROUP

GRADE	HARRIS HIP SCORE	NO.OF PATIENTS	PERCENTAGE
EXCELLENT	90-100	4	23.52
GOOD	80-90	9	52.94
FAIR	70-79	3	17.64
POOR	<70	1	5.88

Out of 34 cases, 17 were treated with cemented and 17 were treated with uncemented bipolar hemiarthroplasty. Mean duration of follow up was 18 (±2) months. Mean blood loss in 67% of the patients during hemiarthroplasty was between 150-200 ml.

Number of days of hospital stay most patients in both groups stayed for 8 to 14 days. It varied from 3 days to 14 days, with mean stay of 8.96±1.55 days in the cemented group and 8.75±1.96 in the uncemented group. There was no change in limb lengths in both groups. Shortening was noted in two patients in cemented group and four patients in the uncemented group, which was 1.5 cm. However, a significant gait alteration was not noticed and pain was occasional and subsided with analgesics. These patients were walking with support using walking aid (walker). There was no rotation of limb in most patients. In cemented bipolar group, three patients had external rotation deformity, which ranged from 20 to 30 degree. This was persistent until last follow up. In uncemented bipolar group, 4 patients had external rotation deformity, which ranged from 20 to 35 degree. This was persistent until last follow up.

no post operative infection was noted in any of the patients

No mortality occurred during admission and within 12 weeks after surgery and during followup

There was no statistically significant difference in Harris hip scores in cemented (mean HHS-82.94) and uncemented (mean HHS- 84.64) hemiarthroplasty patients at end of 6 months, 1 year and final follow up.

All cases were followed-up regularly and no case was lost during 1 year follow up. No cases of secondary fractures were noted and no re-operation were done.

Discussion

With increasing longevity, the problems of hip and surgical procedures to address this are also increasing. Osteoporosis and comorbid conditions add to the complexity of management.

In the present study, the blood loss ranged from 100-280 ml. The head sizes used in the present study varied from 37 to 51.No mortality occurred during admission and within 12 weeks after surgery. At the end of 6 months, no mortalities were noted.No case of re-operation was noted in the present study.There were no case of loosening in present study, all patients were happy with the replacement procedure and they were carrying out all the routine activity of pre fall level.Soderman P and Malchau H has validated use of Harris hip score to evaluate the outcome of hip replacement procedures [11].Figved W et al., in their study of uncemented Bipolar arthroplasty reported, an average Harris hip score was 72 after 3 months [6].

In a similar study, Annappa R et al., had reported mean Harris hip score of 89.25 in cemented bipolar group and 83.5 in bipolar group [12].No case of loosening noted in the present study, with follow up of up to 18 months.Final functional outcome between cemented and uncemented bipolar prosthesis on functional basis did not show any significant difference in the long-term follow up.This was the same outcome as compared with the literature [3,4,11,13,14].

Conclusion

- No significant difference was noted between the cemented and uncemented hemiarthroplasty procedures on long term follow up in terms of functionality.
- No re-operations and no mortality reported.
- Cemented hemiarthroplasty had more blood loss and minimal post-operative complications.

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