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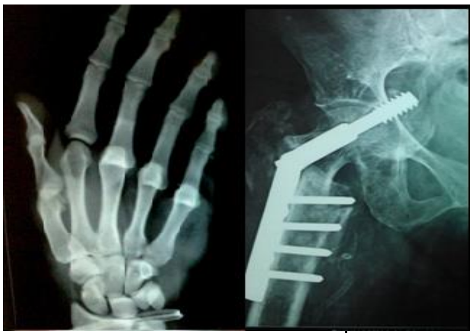

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Prospective study of outcome of intracapsular fracture of femoral neck in Dorr's type b elderly patients operated with hydroxyapatite coated uncemented modular bipolar prosthesis

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Abstract
Background: Bipolar hemiarthrpplasty is one of the most common procedures performed on elderly women. The discussion about cement or cementless is still on. Cementation increases perioperative mortality by causing significant hemodynamic changes or embolism.
Methods: We report a series of 25 elderly patient (age >60 years) of Dorrs Type -B -Femur neck fracture. Operated with cementless modular bipolar prosthesis (hydroxy apaptite coated) over a year (from november 2023 to october 2024) all patients via a southern approach (Posterior approach). Clinical and radiological follow-up were conducted at a 12-month follow-up.
Results: A total of 25 cases were manipulated. The average subsequent test was 12 months. No intraoperative mortality was observed. One patient developed femoral splitting while preparing the canal. One patient suffered from a surgical infection. One patient was then given an explanation of the length of the limb (<1 cm). Twenty-three patients reached final follow-up, with an average Harris Haft score of 85.

Keywords: Cementless, elderly, Dorr type b, fracture neck femur, hemiarthroplasty

Introduction

Femoral fractures are an important issue, especially as the high incidence of relevant morbidity and disorders, and effective surgical interventions are required in the elderly. Prosthetics as arthroplasty were introduced by Judet *et al.* [1] for various hip pathology. Template was used to reduce the risk of intraoperative fractures. However, osteoporotic bones in older people make it difficult for the prosthesis to maintain cementless prosthesis and increase the incidence of complications such as perimeter musculoskeletal fractures [2].
In this context, we investigate the techniques, results, and effects of uncemented hemiarthroplasty using hydroxyapatite-coated stems in Dorrs-type-B3, 9 necks of femoral fractures, highlighting advances over orthopedic surgical practices.

Methods

This is a prospective observation study conducted at Dr. S.N Medical College, Jodhpur Rajasthan, India between November 2023 to October 2024 with approval from ethical committee. All the elderly patients above 60 years of age with who presented with displaced fracture neck of femur (Dorr's type B) and who met the inclusion criteria were operated through Southern approach. Same type of modular bipolar prosthesis with hydroxyapatite coated stem was used in all the patients.

Inclusion criteria

Patients having fracture neck of femur (Dorr's type B) in more than 60 years of age

Exclusion criteria

- Dorr's Type A & C

- Patients with arthritic changes involving the acetabulum.
- Pathological fracture.

All surgeries were performed with spinal or combined spinal-epidural anesthesia. Axial and rotational levels of stability were assessed prior to femoral shaft introduction. In the case of DVT prevention, the patient maintained the body (ankle pump) and chemoprevention during the hospital pump. All patients took intravenous antibiotics for an additional 5-7 days after surgical surgery patient.

Patients were checked postoperatively at 2 weeks, 6 weeks, 3 months, 6 months, 9 months, 12 months. Patients were evaluated clinically and radiologically at all follow-ups. Radiologic assessments included standard anterior and lateral x-rays, with 3, 6, 9 and 12 months initially being performed.

Xrays were performed for evidence of stem drop, dissolution or loosening, acetate erosion, lead or ectopic ossification. Figures 1a to 2d.

Results

Total 25 patients with 11 male and 14 female patients were included in the study. The range of age group varied from 61 to 83 years with mean age of 69 years.

Table 1: Number of patients with different systemic comorbidities.

Systemic Co-morbidity	Number of Patients	Percentage
Cardiac Disease	5	20
Diabetes mellitus	4	16
Respiratory disease	2	8
Hypertension	6	24
No co-morbidity	8	32

The average bleeding per patient was about 180 ml as shown in Table 2.

Table 2: Intra-operative bleeding (average bleeding = 180 ml).

Intraoperative bleeding in ml	No of patients
100-150	5
150-200	14
>200	6

Table 3: Complications.

Complication	Number of patients	Percentage
Superficial infection	1	4
Deep infection	0	0
Wound dehiscence	0	0
Subluxation/dislocation	0	0
Pressure sores	0	0
Limb Lenghthing (<1cm)	0	0
Respiratory problems	0	0
Intra op fracture	1	4

Table-4 shows that the majority of study patients (64%) had a trans-cervical type of fracture with 20% patients having a basi-cervical and 16% patients having sub- capital fractures

Table 4: Anatomical type of fracture

Anatomical Type	Number of Patients	Percentage
Trans-cervical	16	64
Basicervical	5	20
Sub-capital	4	16

Table 5: Post-operative physiotherapy and mobility status.

Day/Time Point	Number of Patients
Bedside turning on 1st Post-Operative Day (POD)	23
Standing on 1st POD	24
Walking with toe touch on 2nd POD	24
Corridor walking on 5th POD	24
Walking with full weight bearing on 6th Week	24
Pre-injury mobility status on final follow-up	23

From the day of admission, all patients were set to DVT prevention with low molecular weight heparin and continued until the day of removal. Postoperative elastic stockings were used in both lower extremities of all patients. No cases of periprosthetic fractures, migration, heterotrophic ossification, osteolysis, or significant subsidence were observed in this study. All the patient recovered well. 1 patient develops an intraoperative fracture treated with encirclage wire. The patient was placed on warfarin and responded well. Twenty-six (84%) patients returned to the final follow up of their preschool status (average 54 months). Two patients regularly used walking sticks and three patients died during the study. Four patients (13%) are used only for long walks and piloted for protection only. The average Harris hip score at the final follow-up was 84.5.

Final harris hip score and clinical result

In our study, the final Harris Hip Score as evaluated at 12 months follow-up averaged 85.12 with the maximum score being 94 and the minimum score being 65. Overall, 11 patients (36.66%) achieved Excellent result, 14 patients (46.66%) achieved Good result, 3 patients (10%) achieved fair result and 2 patients (6.66%) achieved poor result. 83.32% of the patients achieved an excellent or good result showing similarities to study done by SKS Marya *et al.* [11] in their study of 29 patients.

Fig 1a: Left side fracture neck of femur.

Fig 1b: Immediate post op X ray.

Fig 1c: 6-Month post of x ray.

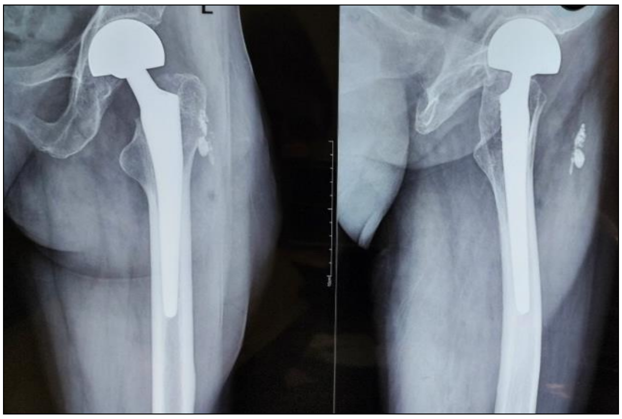

Fig 1d: 12-Month post of x ray

Fig 2a: Left side neck femur fracture.

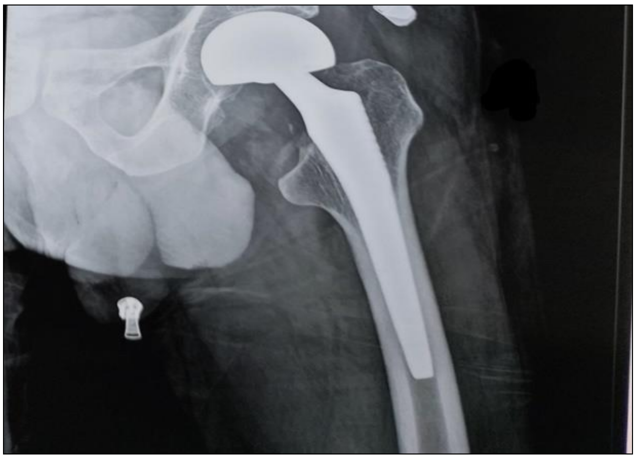

Fig 2b: Immediate post op x ray

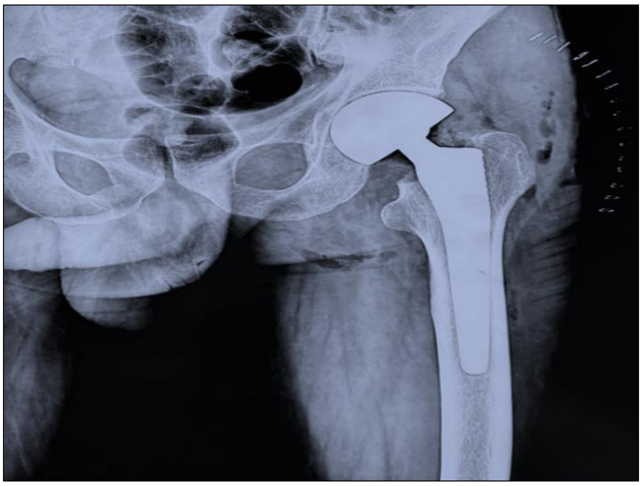

Figure 2c: 12-month post op x ray.

Clinical pictures

Active abduction

Full flexion

Active SLR

Cross leg sitting

Discussion

The goal of preliminary femoral surgery with Fracture neck-femur is an early return to daily activities. This is especially true for older people who are prevented from complications. This causes bone cement syndrome (BCIS), which manifests as embolism and hypoxia, hypotension, loss of consciousness, bradycardia, and even cardiac arrest.BCIS is thought to be more likely to be caused by the toxic effects of methacrylic acid than the embolism effect of cementation4.

Additional complications include acute pulmonary hypertrophy, pulmonary edema, cardiac arrest and hypothermia. We didn't see any notable change in the blood parameter intraoperatively. The mean age of patients in this study was 68.8 years. The purpose of assessing age is to estimate patient overlap and ability to comply with rehabilitation protocols provided to the patients post operatively.. The results of our study showed that patient age had a minimal impact on the final clinical outcome.

All study patients had displaced neck femur fractures. The majority of study patients (64%) had transcervical fracture, five had basicervical fracture and four patients with sub-capital fractures.

Diabetes was found to have observed the most common comorbidities about 18% of patients included for the study. All patients with type II diabetes who are on oral hypoglycemia were shifted to insulin in advance and their blood sugar levels were optimized before being planned for surgical procedure. Other comorbidities were hypertension (22%), heart disease (18%), and COPD (9%).

It was observed that postoperative rehabilitation of patients was significantly affected by the presence of the above-mentioned comorbidities. This also affected the final functional outcome of the procedure. Bhat Ta *et al.* [6] they hadreported about 31 patients of cardiopulmonary disease with neck femur fracture operated with hydroxyapatite coated modular bipolar prosthesis. Majority of patient had blood loss between 150-200ml. requiring a blood transfusion after the surgery. Juneja J *et al.* [13] (2022) in a report on a study in 50 patients with femur neck fracture patients undergoing surgery with a posterior approach, with 150 mL of moderate blood loss and few postoperative blood transfusions. Less operating time and less blood loss in comparison to cemented bipolar prosthesis is definitive advantage of uncemented bipolar prostheis12. Bipolar. Nome of our patient shows limb lengthening due to preoperative tempating. Surprisingly superficial infections were observed in diabetic patients (4%). It was managed by regular-dressing with proper control of diabetic status and appropriate antibiotics based on cultural outcomes. The infection dissolved without consequences and did not reactivate it late. S. Craxford *et al.* (2021) [10] reported a 1.7% deep surgical site infection rate for bipolar surgery in 3,966 patients and 0.45% with superficial surgical site infection. None of our research patients have been suffered from bed sores it's may be due to small sample size in our study. Late postoperative complications such as loosening, failure, erosion, secondary arthritis and protrusio-acetabuli were not seen in our study. Due to their relatively short activity, long-term acetabular erosion cannot be expressed.

All patients were followed regularly after 6 weeks, 3 months, 6 months, 9 months, and 12 months. Only patients who completed a 12-month follow-up were included in the final analysis. Harris' hip values were recorded at all follow-ups. In our study, the final Harris hip score was 85.12 after 12 months, with a maximum score of 94, at least 65. A total of 9 patients (36%) achieved excellent results in 12 patients (48%). Two patients (8%) still achieved fair outcomes, while two patients (8%) achieved bad outcomes. 84% of our patients achieved excellent or good outcomes. F. rivera *et al.* (2015) [7] reported more than 244 patients undergoing surgery with hydroxyapatite coated stem with Harris hip score of maximum 88.9 at 1 year follow-up and minimum 55.80. Marya and Thuirr *et al.* (2011) [8] Report on a study of 29 patients undergoing surgery with HA coated stem.

Their study had Harris hip score at one year with maximum score of 96 and minimum score of 69. Many studies have shown better results in perioperative mortality and similar results in functional out come in comparative studies between cemented hemiarthroplasty and cementless hemiarthroplasty with porous coated or modular HA coated stems [13]. HA coated stems shows Osteointegration even in weaker osteoporotic bones as reported by many authors14-16. In these studies they had not included patient on the basis of Dorr's classification but in our study we had included only Dorr's type-B patient, showing the result of hydroxyapatite coated uncemented stem even in a poor quality bone.

Our results are comparable to the standard study of modular bipolar prosthesis coated with hydroxyapatite performed for the fracture neck of femur M fu *et al.* [5].

Our research is not without its own flaws. First, the duration of months is very less and the final conclusion is drawn accoridng to longevity and functional endurance of the prosthesis which needs a long follow-up.

Conclusion

In Dorr's type-B patients, HA coated sbipolat hemiarthroplasty provide rapid regression for unsupported activities with better freedom of movement, freedom of pain, and acceptable complication rates.

This is a treatment suitable for femoral neck fractures in patients with high risk clinical problems, especially in patients with cardiopulmonary characteristics. This method reduces the risk of hypotension and fat embolism in relation to cemented hemi-arthroplasty operations. Long-term outcomes of using uncemneted hemiarthroplasty in elderly patient especially with poor bone quality must be examined in larger samples over a longer period of time.

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