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Short term results following hip arthroplasty (total/hemi) in elderly patients with femoral neck fracture in a tertiary care hospital

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Abstract

Background: Intracapsular fractures of the neck of femur are a major cause of morbidity and mortality in elderly population in India. The primary goal of treatment in these patients is to get the patients to the preinjury level of functionality as early as possible and with minimal complications. Multiple modes of operative treatment in the form of fixation devices (screws, plates, nails) and replacement (hemi or total replacement) are available for this fracture. However, a high rate of complications and revision surgeries has been found after internal fixation in this population group owing to the unique challenges to fixation in the form of co morbidities and osteoporosis among others. Instead of internal fixation, replacement is thus a viable option.

Materials and Methods: 100 patients (age >65 years) with a femoral neck fracture were treated over a two-year period (May 2018 to April 2020) with some form of hip replacement after appropriate anesthetic fitness.

Results: We had good results in majority of the patients in terms of return to pre-fracture level of functionality, independent ambulation and satisfaction with the results. A majority of patients treated with hemiarthroplasty recovered without incidence while all patients of total hip replacement progressed without incidence. There were 10 cases of suture line infection which recovered satisfactorily with a change of antibiotics, 4 cases of deep infection for which debridement and implant removal was required, 3 cases of deep vein thrombosis and 7 cases of dislocation.

Conclusion: Hip replacement is a viable option for treatment of femoral neck fractures in patients more than 65 years of age. Return to preinjury level of functionality is pretty satisfying and early if the patient is actively mobilized as early as possible postoperatively. There are no risks of nonunion, malunion and implant related complications as compared to internal fixation devices.

Keywords: Elderly patient, femoral neck fracture, hip hemiarthroplasty, total hip arthroplasty

Introduction

Intracapsular fractures of the femoral neck are one of the most common fractures in patients above 65 years of age ^[1]. The improvement in medical facilities and improved standard of living has led to an increase in the average life span. This has also resulted in an increased incidence of these fractures. Owing to unique problems in this age group such as osteoporosis, multiple comorbidities, increased incidence of falls from standing height and fragility there is an increased risk of fractures of the femoral neck. An increased prevalence of complications arising in treatment of these fractures is also seen. These elderly patients often become bedridden for prolonged periods of time due to this fracture. In this age group there is observed a rapid rise in risk of mortality due to being bedridden. Hence the primary goal of treatment in this age group is to ensure that the patient receives such treatment that ensures early weight bearing on the operated limb and can be mobilized rapidly. With a wide array of treatment options available it has become difficult and a matter of debate as to which is the best method to treat these fracture patients. These fractures were considered to be 'unsolvable' in previous years ^[2] owing to the high risk of nonunion, avascular necrosis due to the precarious blood supply. Also an increased incidence of failure has been observed due to the precarious blood supply and the muscle forces acting on the fragments leading to difficulty in maintaining reduction ^[2-4].

Factors pertaining to this age group also need to be considered, viz. bone density, age of the patient, comorbidities, socioeconomic status as well as the conditions at home for the patient’s post op rehabilitation besides the fracture morphology.

Nonoperative treatment in this age group is extremely rare and used only for those patients who are not at all fit for surgery. Open reduction and fixation has a high rate of revision surgeries and it is not a feasible option in this age group [2-6]. As against that, hip arthroplasty is an attractive and viable option [7-11].

Here we have tried to present our results of hip arthroplasty over a course of 2 years in these patients, most of whom are not stable socioeconomically. Our results are from a tertiary care hospital where although better than lower levels resources are still limited and we have done our best effort to give justice to these patients.

Materials and Methods

We have reviewed 100 elderly patients (age, >65 years) with a femoral neck fracture treated at our institute over a two-year period (May 2018 to April 2020).

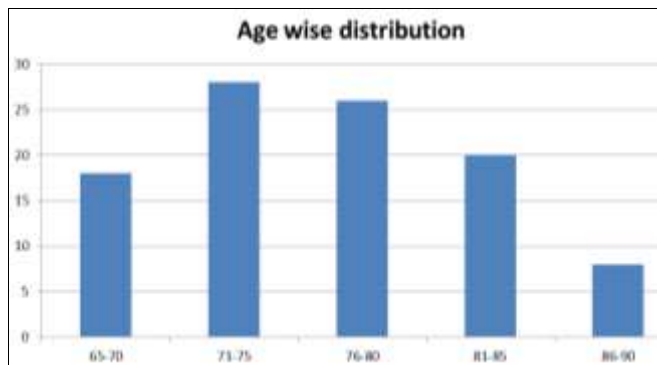


Chart 1: Age wise distribution of the femoral neck fracture patients.

There were 43 male and 57 female patients with the average age of 76 years (age range was 65-90 years). There were various associated comorbidities such as diabetes mellitus, hypertension, hypoproteinemia, and anemia. Two patients had a history of renal disease. It was found that a majority of patients were hypertensive and many of them had diabetes. 46% of patients had two or more co morbidities together.

Table 1: A variety of comorbidities were seen in our series with hypertension being most prevalent.

Comorbidity	No. of patients
Diabetes Mellitus	41
Hypertension	56
Pulmonary disease (Asthma/COPD)	23
Cardiac problems	10
Hypoproteinemia	22
Anemia	25
Renal disease	2

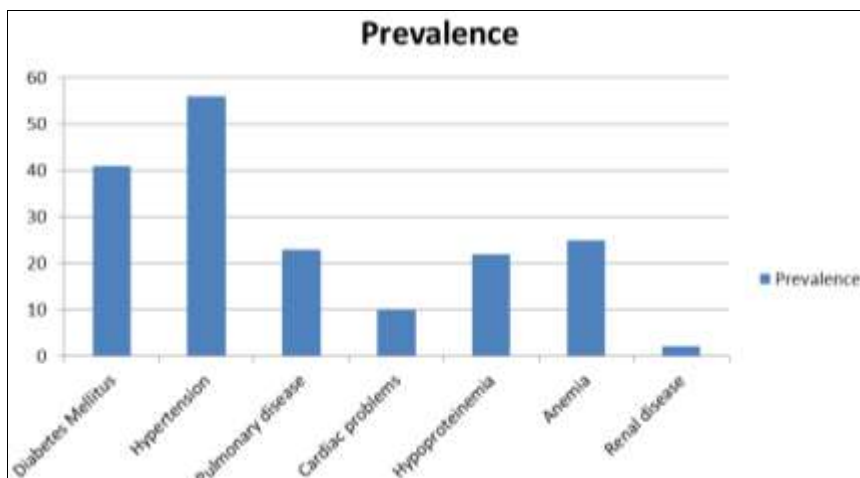


Chart 2: The prevalence of comorbidities in our case series

Majority of them had presented almost immediately post trauma while some had presented after a delay, mainly in the form of treatment by a quack or after a failed attempt at home of rest with one female presenting after almost six months.

All of these patients were treated operatively after due medical and anesthesia fitness being done. All of them were treated with arthroplasty in some form.

Table 2: An overview of the distribution of arthroplasty in our study group.

Age range	Number of patients	Treatment plan	No. of patients	
65-70	18	Hemiarthroplasty (Austin Moore prosthesis / Bipolar prosthesis)	Cemented	2
			Uncemented	8
		Cemented total hip arthroplasty		8
71-75	28	Hemiarthroplasty(Austin Moore prosthesis / Bipolar prosthesis)	Cemented	10
			Uncemented	6
		Cemented total hip arthroplasty		12
76-80	26	Hemiarthroplasty (Austin Moore prosthesis / Bipolar prosthesis)	Cemented	7

			Uncemented	6
		Cemented total hip arthroplasty		13
81-85	20	Hemiarthroplasty (Austin Moore prosthesis / Bipolar prosthesis)	Cemented	10
			Uncemented	6
		Cemented total hip arthroplasty		4
86-90	8	Hemiarthroplasty (Austin Moore prosthesis / Bipolar prosthesis)	Cemented	8
			Uncemented	-
		Cemented total hip arthroplasty		-

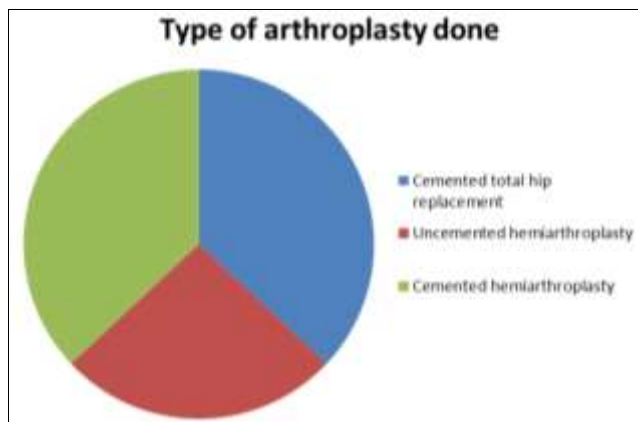


Chart 3: Pie chart showing an overview of the type of arthroplasty done

The decision between whether to do total or hemiarthroplasty was made on the basis of the life expectancy, comorbidities, bone density, condition of the acetabulum (whether diseased or not) and socioeconomic condition of the patient. Due to institutional constraints cementless THA was not an option. The hemiarthroplasty group was treated either with or without cement fixation.

Cement was used in about 74% of the cases. Hemiarthroplasty was done in about 63% of patients with either the Austin Moore prosthesis or the bipolar prosthesis depending on the availability of the implant. A cemented metal on polyethylene total hip replacement system was used in 37% of patients.

Postoperatively the patients were started on active knee and hip exercises the same evening of operation. Cemented arthroplasty patients were started on full weight bearing mobilization the next day as soon as their pain permitted. In uncemented cases patient was mobilized with non-weight bearing for three weeks, partial weight bearing for six weeks and then full weight bearing according to the status of the patient. All patients were initially mobilized with the help of a walker.

The patients were followed up at 2 weeks (suture removal), six weeks, three months, one year and two years and assessed clinicoradiologically. Patients were assessed for pain and limp and ability to perform activities as they used to preinjury. Radiologically each patient was observed for loosening, osteolysis and osteoporosis.

Results

Good results were obtained in almost all the patients in terms of return to pre injury level of ambulation, activities of daily living and satisfaction. A posterolateral approach was used in all the patients and drain was kept in almost all of them. The average intra operative blood loss was about 200 ml with a range from 100 to 500 ml.

Hemiarthroplasty was done in a majority of the patients owing to some institutional constraints. 37 patients underwent cemented hemiarthroplasty while 26 underwent uncemented hemiarthroplasty. 37 patients underwent cemented total hip arthroplasty.



Fig 1: Preoperative and postoperative uncemented bipolar arthroplasty for fracture neck femur



Fig 2: Preoperative and postoperative uncemented Austin Moore hemi arthroplasty for fracture neck femur



Fig 3: Cemented Total hip replacement, in a patient who also had protrusio acetabuli with femoral neck fracture. The suture line was clean and wound healed well.

A variety of complications were seen. These included 10 cases of suture line infection (healed uneventfully after giving appropriate antibiotics), 4 cases of deep infection for which debridement and intravenous antibiotics were required and in 2 of these, implant removal was required. There were 3 cases of deep vein thrombosis requiring treatment with heparin/warfarin. None of them progressed to pulmonary embolism. There were 7 cases of dislocation (6 in hemiarthroplasty group and 1 in the total replacement group). About 4 patients had complaints of chronic thigh pain without any other complications. 10 patients had an incidence of superficial bed sores. No other complications occurred.

Table 3: The variety of complications that occurred in our study group.

Complications	Patients
Deep infection	4
Superficial infection	10
Dislocation	7
Thigh pain	4
Bedsore formation	10
DVT	3

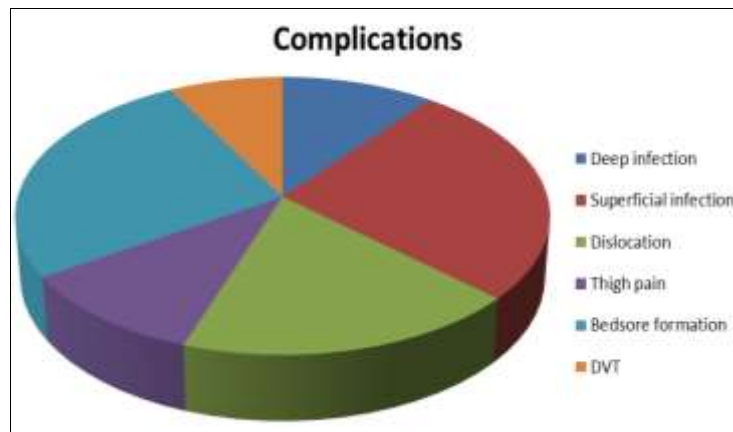


Chart 4: The comparison of complications in our series



Fig 4: A 75 year old female treated with an uncemented bipolar hemiarthroplasty who acquired a deep infection and subsequently debridement and implant removal with a cement spacer

Our study was a prospective non-randomized study and only those patients who were followed up completely for 2 years with regular follow-up were included in the study. Patients that were lost to follow-up due to various reasons were not included in the study group. It has results that were consistent with contemporary literature [8, 11-15].

Discussion

Femoral neck fractures in the elderly population have a severe impact on their living and require a multidisciplinary approach which includes the physician, orthopaedician, psychiatrist and an occupation specialist. Conservative management¹, as practiced in previous years, is complicated by the dangers of recumbency, viz. aggravation of the osteoporosis in the already osteoporotic patient, risk of chest infections, onset of pressure sores. Hence conservative treatment is not a viable option.

A wide variety of surgical treatment options are available for fracture neck of femur. These include cancellous screws, dynamic hip screw system, proximal femoral nails as well as arthroplasty (hemi or total). Various studies have shown that there is a high reoperation rate following open reduction and internal fixation of Intracapsular femoral neck fractures [7-8, 15, 16]. The most common cause of reoperation is nonunion and failure of fixation. There was also considerable late mobilization in these patients with considerable morbidity on starting ambulation. Such poor outcomes and the considerable financial burden that the patient bears when a reoperation is required are not feasible for this age group. All these complications indicate that a better mode of treatment is required. In a study by Parker *et al.* they stated that preservation of the femoral head was important in the age group of 50-60 years⁴. As the life expectancy of the patient decreases it is of paramount importance that the patient can maximally benefit from the treatment in future life, whatever remaining. The patients presenting to our institute are mostly from the poorer strata of society and the earlier their injury is treated and the minimum postop follow-up required the better it is for them. Of course, both methods of treatment are

available to the surgeon but it is important to have the patient's overall condition in mind before giving a certain treatment.

Various randomized trials have suggested that in this age group a cementless hemiarthroplasty is better in patients with limited mobility [7-11]. Each type of arthroplasty has its drawbacks however they do offer the chance of an early recovery to the patient. Also there is less chance of reoperation and better functional outcome as compared to internal fixation in the elderly [13, 18].

Patients with a previous acetabular pathology such as a fractures acetabulum or a symptomatic osteoarthritis will benefit more from a total replacement. It gives a better outcome and but has a higher chance of dislocations compared to a Hemiarthroplasty [19]. Hemiarthroplasty requires lesser operative time, there is less blood loss and dislocations are fewer but the acetabular erosion may limit motion later on [19, 20].

The advantages of total hip arthroplasty as compared to hemiarthroplasty in terms of the better movement range and replacement of the acetabulum, thus eliminating the acetabular complications of hemiarthroplasty make it attractive [13, 17]. However the risk of increased operative time and blood loss also need to be considered.

Holmberg *et al.*²¹ in their study found an increased post-operative mortality rate three weeks later as compared to the internal fixation patients. Lu-Yao *et al.* [22] found a slight increase in mortality 30 days after operation for arthroplasty as compared with internal fixation. However none of the patients in our group succumbed in around 1 month of operation.

Our study, which was a non-randomized, non-controlled prospective study demonstrated acceptable results with other studies [8, 11, 12-14, 23].

Conclusion

In summary, hip replacement is a viable option for population above 65 years with femoral neck fractures. Especially in a tertiary care hospital like ours, where the study was

conducted, and where the presenting patients have limited resources it is successful in terms of getting the patient on their feet early and eliminating the need for a reoperation in the majority of cases. Although there is risk of mortality associated with it the results offered are better for these patients helping them become independently ambulant as soon as possible.

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