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Primary total hip arthroplasty in fracture neck of femur

Orthopaedics

KEYWORDS: Femoral neck fractures; functional outcome; total hip replacement.

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ABSTRACT

Femoral neck fractures in the elderly populations represent a significant health care problem. A prospective study was carried out in Coimbatore medical college in the department of orthopaedics, between the period of July 2010 to August 2015 in healthy adult patients who underwent total hip replacement for the displaced fracture neck of the femur under State health insurance scheme in low socioeconomic and education patients. We have done primary uncemented total Hip replacements in 74 patients who sustained displaced fracture neck of femur, Gardens type 3 and type 4 fractures. The functional outcome was excellent to good in almost 90% of our cases. Primary total hip replacement is a good option for displaced fracture neck of femur in elderly patients otherwise physically active before injury. The functional outcome and complication rates are comparable or better to other methods of treatment in this age group.

INTRODUCTION

Fracture neck of femur is the most common injury in the elderly population. These fractures continue to be unsolved in terms of management guidelines which are still evolving.

The management at different age groups poses different problems, for undisplaced or valgus impacted fracture neck of femur pinning and dynamic hip screws are the appropriate treatment. For displaced fracture neck of femur internal fixation with cancellous screws in younger age groups and in elderly co-morbid patients, it is appropriate to use hemiarthroplasty. The issues are non-union, osteonecrosis and femoral neck shortenings for internal fixation and complications of hemiarthroplasty includes periprosthetic fractures, acetabular erosion causing severe pain, dislocations and infections which added to poor clinical outcomes and need a revision surgery. Repeat surgery has the high incidence of morbidity and mortality.

The aim of Total Hip Arthroplasty (THA) in these elderly populations of fracture neck of the femur is to restore them to pre- fracture status as quickly as possible, avoiding the complications of failed osteosynthesis and of hemiarthroplasty. Ligang Yu MM et al compared THA with Hemiarthroplasty in their meta-analysis concluded that even though there were more dislocations, total hip arthroplasty benefitted patients with displaced neck of femur fractures with a lower re-surgery rate and with higher functional scores (1).

Yiqiong Zhao et al recommended THA over hemiarthroplasty in elderly active patients with femoral neck fracture (2). Various other studies have supported similar findings (3-7).

Leonardsson et al observed, after correction for gender, type of component and the surgical approach the revision rates were similar in the primary and secondary fracture THR groups. Total hip replacement is therefore a safe method for both the primary and secondary management of fracture of the hip (8).

AIM

To study functional outcome in the patients treated by primary uncemented total hip replacement in fresh fracture neck of the femur and nonunion neck of femur following neglected femoral neck fracture in low socioeconomic population.

Patients and methods

This is a prospective study which was carried out in Coimbatore medical college in the department of orthopedics between the period of July 2010 to august 2015 in patients who underwent 'Total hip replacement' for femoral neck fractures and in nonunion neck of femur in neglected fracture neck of femur. All the patients belong to low socioeconomic and education status and were done under State health insurance scheme.

Inclusion Criteria:

1. Age older than 60 yrs of age and were physically active before injury.
2. Garden's type 3 and type 4 fractures neck of femur
3. Nonunion neck of femur head where salvage is not possible.

Exclusion Criteria:

1. Patients younger than 60 years of age.
2. Patients above 85 years of age
3. Physically inactive before injury
4. Psychiatric patients
5. Pathological fracture neck of the femur.

A total of 74patient , 29 females and 45 males with a mean age of 65.5 years were operated with a minimum follow up period of one year were included in the study. Of these 4 patients expired before one year follow up and 2 patients died after one year follow up.

Patients were operated by different surgeons. All cases were performed by lateral Hardinge approach. Uncemented total hip replacement was done in all patients with metal on poly articulation (Smith &Nephew.inc).

Standard pre and Post – operative protocol was followed. High risk patients were given DVT prophylaxis with low molecular weight heparin. Patients were followed up in the first, third, sixth months and one year after the surgery and yearly after that with complete evaluation of hip joint function, scoring and radiographs. The longest follow up was six years and the shortest follow up is one year.

RESULTS

Functional outcome

Functional outcome of the patient was evaluated using modified Harris hip score, 45 patients had excellent outcomes (60.8 %), 22 patients had good outcome (29.7%), 5 had fair outcome (6.8%) and 2 had poor outcome (2.7 %). The mean post -operative Harris hip score was 88.31.

Complications

Of the seventy four patients, one had dislocation which occurred in the immediate postoperative period, two patients had infection (2.7%). three patients had persistent pain (4%), two patients had limb length discrepancy (2.7%) and one patient sustained intraoperative periprosthetic fracture of the proximal femur (1.3%).

Dislocation occurred one month following surgery. Close reduction was done under anesthesia for the dislocation and the patient was kept non weight bearing for three weeks and then ambulated. No further dislocation was encountered till last follow up of three years. Of the two infected hips one was treated with wound debridement and intravenous antibiotics and the other one required two stage revision.

One patient had type A2 Van couver fracture of proximal femur intraoperatively which was treated with circlage wiring. Limb length discrepancy was 2cm in two patients.

Discussion

HongweiGao et alstudied the best alternative for type 3 and 4 femoral neck fractures in the elderly population in twenty RCTs with4508 patients who met all the criteria for eligibility. They found out arthroplasty has reduced risk of incidence of reoperation 1 to 5 years after surgery and provided excellent pain relief. The function was good and superior for patients treated with hip arthroplasty than for patients treated by methods of internal fixation with the mortality 1 to 3 years post operatively was similar in both populations (9).

Watson et al in 2000 analyzed thirty-seven patients and concluded that excellent function can be obtained for the primary total hip replacement for type 3 and 4 femoral neck fractures with acceptable morbidity. He stated that most major complication was dislocation (10).

An analysis of 78,098 operations in the Swedish Hip Arthroplasty Register by Hailer et al confirmed that the risk of revision due to dislocation after total hip arthroplasty depends on surgical approach, femoral head size, sex, and primary diagnosis. Posterior approach and fracture neck of femur were associated with increased risk of dislocation (11). Cebatorius et al analysed results from Lithuanian arthroplasty register and stated that on Cox regression adjusting for age, gender and head size showed that the posterior approach had 2.3-times [95% confidence interval (CI): 1.0-5.0, p = 0.04] greater risk of revision for dislocation (12).

In 713 consecutive hips underwent THA for fracture neck of femur Enocson et al observed that the anterolateral surgical approach was associated with a lower risk of dislocation than the posterolateral approach with or without posterior repair (2%, 12%, and 14%, respectively ($p < 0.001$)). The posterolateral approach was the only factor associated with a significantly increased risk of dislocation, with a hazards ratio (HR) of 6 (2–14) for the posterolateral approach with posterior repair and of 6 (2–16) without posterior repair (13).

In our study, we have experienced one dislocation in the immediate postoperative period and it was successfully treated with closed reduction. All our cases were done by anterolateral approach. Our dislocation rate is consistent with the literature.

All of our patients in our study belong to poor socioeconomic status had undergone THA by Chief Minister's State health insurance scheme. Zhan et al reports that people operated with Insurance tends to have lesser complications due to accessible standard health care, prolonged hospital stay, and earlier report rate (14).

Mahomed NN et al conclude that complication are one of the ways of assessing the functional outcomes after total hip replacement and if complication occurs it is due to wound infection, deep vein thrombosis, hematoma, and pneumonia which are reported in high incidence in patients with lower socioeconomic status and education level (15). In our series we had overall 12% complication rate which is comparable to other studies.

Prophylactic antibiotic significantly reduced the infection rate even in individuals with low socioeconomic and education status when compared with Mahmod et al who concluded that individuals with lower income have the higher rate of mortality and wound infection (15). Our results were correlated with Wilson when prophylactic intravenous antibiotic. Our result (2.7%) is inferior to Nelson who reported 1.3 % of infection rate when prophylactic antibiotics were used and 0.6 % infection rate with the use of laminar flow operation theatre (16).

Another complication in our study was the fracture in the proximal femur. Berry et al reported intraoperative fracture of 5.4 % of cementless primary THA (17). According to mayo clinic Total joint registry, fractures occurred in 1 % of primary THA and 4 % in revision THA which is comparable with 1.4 % of our study.

In our study, average Harris hip score was 88.31%, Taine and Armour had reported 70% good or excellent results (18). Gregory et al reported a mean Harris score of 83 with 6 patients having poor results (Score <70)".

In our study, only 4 % patients complained of persistent hip pain with no patient requiring regular analgesics. Coates and Armour reported 89% patients to be pain- free or having mild pain whereas 11% had severe pain which limited function and for which patients required regular analgesics (19). Delamarter and Mooreland reported 76% patients to be pain- free following the operation (20).

No subsidence or migration of the femoral or acetabular components was seen. There was no change in the orientation of the femoral or acetabular components till last follow- up.

Postoperative shortening was found in 2 cases in our studies, but it was not significant and most of the patients were comfortable without an orthotic support.

Major objection worldwide for doing primary THA in fracture neck of the femur is a high rate of dislocation. With good surgical technique and experience, the above complication is avoidable as shown in our series. Only one of our patients had dislocation. Therefore we consider primary THA to be a viable option for treatment in a selected group of previously independently active patients who are older than their physiological age also Total Hip replacement is the best solution for neglected fracture neck of the femur with nonunion in young adults.

Though the sample size is small and the mean follow up is short, our study supplements the other larger trails.

Conclusion.

Primary Total hip replacement is a very useful procedure for displaced fracture neck of the femur in previously active, healthy individuals older than 60 years of age and for patients with nonunion neck of femur even in low socioeconomic group.

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