Original Article

Functional outcome of primary cemented total hip arthroplasty following displaced fracture neck of femur in elderly patients

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ABSTRACT

Background: *Displaced femoral neck fracture (FNF) is one of the most common injury in the elderly patients. Effective surgical treatment is crucial to restore normal functioning hip and mobilize as early as possible. The aims of this study were to assess functional outcome after primary cemented total hip arthroplasty (THA) due displaced FNF in elderly patients by modified Harris Hip Score (HHS) and report postoperative complications.*

Methods: *This prospective observational study included 60 patients above 60 years diagnosed with displaced FNF from January 2023 to December 2024 at National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR) by convenient sampling technique. All patients underwent cemented THA through lateral (Hardinge) approach. The patients were followed up at 3rd week, at 6th week, at 3rd month and 6 monthly interval for 2 years. In each postoperative follow-up, modified HHS was done and complications were noted.*

Results: *The mean age of the patients was 69.5 years; 37 (62%) were female and 23 (38%) were male. Left side was affected in 65% patients and fall accounted for majority (70%) cases. Hypertension (32%) and diabetes mellitus (20%) were two most common comorbidity. Five percent patient had operated limb shortening and 3.3% had superficial wound infection. Modified HHS on final follow-up showed excellent 35%, good 56.7% and fair 8.3%. Satisfactory result was obtained in 92% and unsatisfactory in 8% of the patients.*

Conclusion: *Surgical treatment with cemented THR provided improved functional status of the patients in more than 90% cases with minimal postoperative complications.*

Key words: *neck of femur, cemented total hip, elderly, fracture.*

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INTRODUCTION

Fracture neck of femur (FNF) is common in the elderly people and is responsible for over 50% of all hip fractures.[1] Globally, approximately 1.3-2.2 billion FNF occur each year and the incidence is increasing due to ageing population.[2] Upto 80% FNF are reported to be displaced.[3] The choice of treatment is surgical and can be either internal fixation or arthroplasty depending on

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patient's age, bone quality and fracture displacement.[4] In patients above 60 years, arthroplasty is routinely performed instead of fixation due to risk of poor healing and avascular necrosis of the femoral head associated with fixation which will require a second surgery in the form of joint replacement.[5] The options for replacement include hemiarthroplasty and total hip arthroplasty (THA).[6] The disadvantages of hemiarthroplasty are persistence of hip pain, rapid wear of acetabular cartilage, femoral component loosening, early stem migration which ultimately requires conversion to THA.[6-8] Primary cemented THA has been shown to reduce perioperative complications, improve functional outcome and reduce pain in elderly patients.[9] In older patients, osteoporosis is the main problem accompanying low quality of the bone, leading to failure of osseointegration in cementless fixation of the acetabular cup and femoral stem.[10] Bone cement or polymethylmethacrylate (PMMA) cement, is most commonly used to fix joint replacement prosthesis to host bone. It acts as a grout, adapting the surface irregularities of the surrounding bone tissues to the surface of the inserted prosthesis.[11] So, the current trend has shifted towards cemented THA for FNF in the elderly patients considering the benefits. The aims of this study were to report functional outcome after primary cemented THA after displaced FNF in the elderly patients by modified HHS and report postoperative complications.

METHODS

This was a prospective observational study involving 60 patients diagnosed with displaced FNF conducted in National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Dhaka, Bangladesh from January 2023 to December 2024. Ethical clearance of the study was obtained from Institutional Review Board, NITOR (4238) according to Declaration of Helsinki and informed consent were obtained prior to surgery. The patients were selected by convenient sampling technique and diagnosis was based on history, clinical examination of hip and radiology. The preoperative HHS was documented in data collection sheet. All patients underwent cemented THA through direct lateral approach to the hip (Hardinge approach). Ultra-high-molecular weight polyethylene (UHMWP) acetabular cup, polished titanium-steel alloy femoral stem, cobalt chromium femoral head and PMMA cement were used in all cases. Preoperative templating was done to determine approximate size of the acetabular and femoral component. Injection cefuroxime 1.5 gm was loaded at the time of induction of anaesthesia and 1 gm 8 hourly was maintained postoperatively for 5 days. Prophylactic low molecular weight heparin was administered 12 hours before surgery and continued once daily for 5 days after surgery in high-risk patients like diabetes, hypertension and coronary heart disease. In immediate postoperative period, abduction pillow was used to keep operated limb abducted at 15° to prevent dislocation. The patients were mobilized on 1st postoperative day and allowed weight bearing with help of a walker if pain was tolerable. Drain was removed after 48 hours and patients were discharged. Sutures were removed after 2 weeks. The patients were followed up at 3rd week, at 6th week, at 3rd month and 6 monthly interval upto 2 years. In each follow-up, the hip was evaluated functionally by modified HHS and documented in data collection sheet. The modified HHS is classified as excellent, good, fair and poor. Excellent and good is categorized as satisfactory while fair and poor as unsatisfactory. Radiology of pelvis with both hip and proximal femur antero-posterior view (A/P view) and lateral view of the operated hip was done to inspect implant alignment, periprosthetic fracture, loosening, dislocation and subsidence (if any). After 6 weeks, walker was discontinued and full weight bearing was advised.

RESULTS

Total 60 patients were operated. The average age of the patients was 69.5 years. Seventy-five percent of the patients were above 65 years. Female patient was predominant and male: female ratio being 0.62. Left hip involvement was in 39 (65%) compared to 21 right hip involvement (35%). The most common cause of injury was fall 45 (75%) followed by 15 cases of road traffic accident (25%). Hypertension was present in 19 patients (32%), diabetes mellitus in 12 (20%), coronary heart disease in 7 (12%) and chronic obstructive pulmonary disease in 3 (5%) patients. Four patients had both hypertension and DM (6%). (Table I). Out of 60 patients, 5 patients (8.3%) had postoperative complications. Three patients had leg length discrepancy (5.0%) where 2 patients (3.3%) had 0.5 cm shortening and 1 patient (1.7%) 1.0 cm shortening. Only 2 patients (3.3%) had superficial wound infection (Table II).

Following THA, the modified HHS on last follow-up, 21 patients (35.0%) had excellent score, 34 patients (56.7%) had good score and 5 patients (8.3%) had fair score. So satisfactory result was obtained in 92% and unsatisfactory in 8% cases approximately (Table III).

Table I. Demographics and comorbidity of the study patients (N=60).

Age group (years)	n	%	Mean ±SD
61-65	12	25	69.5 ± 4.4
66-70	24	35	
71-75	18	30	
76-80	6	10.	
Gender Distribution			
Male	23	38	
Female	37	62	
Side predilection			
Left	39	65	
Right	21	35	
Causes of injury			
Fall	45	75	
Road traffic accident	15	25	
Comorbidity			
No comorbidity	15	25	
Hypertension	19	32	
Diabetes mellitus (DM)	12	20	
Coronary heart disease (CHD)	7	12	
Chronic obstructive pulmonary disease(COPD)	3	5	
DM + Hypertension	4	6	

Table II. Postoperative complication of the study subjects (N=60).

Complications	Patient no.	%
1. Leg length discrepancy (LLD)	3	5.0
0.5 cm shortening	2	3.3
1.0 cm shortening	1	1.7
2. Infection		
Superficial wound infection	2	3.3

Table III. Functional outcome of the patients by modified HHS (N=60).

Score range	Classification	n	%
90-100	Excellent	21	35.0
80-89	Good	34	56.7
70-79	Fair	5	8.3
<70	Poor	0	0

DISCUSSION

Displaced FNF has become a major public health issue due to their increasing frequency and considerable morbidity.[5] Mean age of presentation is reported to occur in young elderly (age 65-74).[12] Reported mean age in literatures was above 60 years.[1,5.6,13,14] In our study, mean age was 69.5 years and 42 patients (70%) were between 66 to 75 years. Male: female ratio is 0.62 with female predominance (62%) which coincides with the literature.[3,13-17] In elderly Asian women, both age and post-menopausal osteoporosis are strongly related to hip fractures associated with risk of fall.[18] This accounts for higher incidence of neck fracture in women compared to men.

Parkkhari et al.[15] reported that over 90% of hip fracture occurred as a result of fall. In our study, fall was the most common cause accounting for 70% cases. We did not find any study depicting the side of neck fracture predilection for FNF. In our study, left hip was involved more. Hypertension is the most common comorbidity in elderly and 40-65% of elderly patients suffer from it.[19] Kundu et al.[20] stated that diabetes is increasing in Bangladesh and it is estimated that by 2045, around 13.7 million individuals will be affected. Bodiuzzaman et al.[21] out of 1043 elderly patients revealed that hypertension was present 35.37% and DM in 28.37% cases while both conditions had involved 9.2% patients. Hypertension and DM were the two most common comorbid conditions in our study with 32% and 20% respectively. Both hypertension and DM was present in 6% patients.

Three patients (5%) developed postoperative limb shortening which were asymptomatic and did not require any shoe modification to walk. LLD data varies from literature to literature. Subash et al.[13] reported 17.8% of his study subjects had limb shortening which were asymptomatic.

Obada et al.[16] reported 1.71% of his patients had limb shortening after THA for FNF. Only 2 patients (3.3%) developed superficial skin infection at surgical site in early postoperative period. Treatment was given with broad-spectrum antibiotic coverage and local wound care. No patients required revision surgery. Before all cases, loading antibiotic dose was ensured, so our infection rate was low. This is in accordance with the literature reporting less than 5% infection rate with antibiotic coverage before initiating surgery.

Regarding functional outcome, Subash et al.[13] reported 38% excellent, 53% good, 9% fair and no poor outcome (91% satisfactory and 9% unsatisfactory). Adhitiyaa E et al.[24] reported 32% excellent, 52% good, 12% fair and 4% poor outcome (84% satisfactory and 16% unsatisfactory). Ugrappa H et al.[25] had 90.6% satisfactory outcome while Gregory et al.[26] reported 94% satisfactory result in their study. In our study, 35% excellent, 56.7% good and 8.3% had fair score and no poor score. So satisfactory result was obtained in 92% and unsatisfactory in 8% cases approximately. The results from the literature support the findings in this study. It can be concluded from the study that primary cemented THA is a useful procedure for FNF in elderly patients. The procedure offers functional and durable option in such patients with minimal complications.

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