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ORIGINAL ARTICLE

Outcome of Primary Cemented Total Hip Arthroplasty in Fracture Neck of Femur in Elderly Cases

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ABSTRACT

Background: Managing femoral neck fracture is a challenge worldwide – specifically for the elderly who become immobile, workless or unproductive and burden to family or society. In this study Cemented Total Hip replacement procedure was applied to observe its outcome in elderly patients.

Method: This observational study was performed at National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Dhaka, from May 2017 to August 2019. Total cases were 22 of both genders, selected through purposive sampling. All cases underwent cemented Total Hip Arthroplasty (THA) through lateral approach.

Results: Mean age was 64.59±4.5 years with a male predominance (59%). Main cause of injury was fall on slippery ground (63.64%). The most common type fracture was Garden type IV (81.82%, n=18). Abductor weakness was the most common complication (2 cases, 9.09%). Mean Limb length discrepancy (LLD) was 0.57±0.62 cm and in 11 (50%) cases there were no LLD. On follow up: 36.36% cases had no pain and 63.64% cases complained slight pain; mean flexion, abduction and adduction of hip were 119.320±12.840, 31.360±6.210 and 30.680±6.950 degree respectively; internal rotation and external rotation were 29.550±7.060 and 28.680±6.930 respectively. Finally, 10 (45.45%) cases were excellent, 11 (50%) were good, 1 (4.55%) was with fair outcome.

Conclusion: There was slight pain postoperatively but the deformity and disability was resolved significantly by the procedure and range of motion was increased. Outcome of Cemented Total Hip Arthroplasty was found good in older age group of people.

Key words: Femoral Neck Fracture, Total Hip Arthroplasty, Modified Harris Hip Score.

INTRODUCTION

Since hip is one of the major weight-bearing joints of the body, its normal function is necessary for a peaceful and enjoyable day-to-day life. Post-traumatic fracture of the neck is one of the common causes of dysfunctional hips. It is more common in elderly people due to fragile osteoporotic bone [1]. Worldwide, in the year 2000, there were estimated to be nearly 9 million osteoporotic fractures each year, of which 1.6 million were at the hip [2]. In the U.S.A, Nationwide Inpatient Sample database from 2003 to 2013 identified 808,940 femoral neck fractures in patient ≥60 years old with an average of 57,781 cases per year [3]. In Europe, the incidence is even higher. In Poland, the incidence of hip fractures increased in both women and men by 19.4% and 14.2%, respectively [4]. The primary goal of the treatment of a femoral neck fracture is to return the patient to his or her pre-fracture functional status. For displaced fractures of the femoral neck, reduction and rigid internal fixation by hip screws are required if a union is to be predictable [5]. So, many surgeons recommend primary prosthetic replacement as an alternative in elderly ambulatory patients [6]. In most Western European countries and in U.S.A arthroplasty is the mainstay of surgical treatment of intracapsular femoral neck fractures in patients older than 60 years who are actively mobile [7]. In recent years total hip arthroplasty for displaced fracture neck femur in elderly patients has been considered as a primary treatment because of its excellent outcomes, low revision rates and even cost-effective [8]. The cementless implant is dependent on bone ingrowth and biological stabilization process which is slow in elderly patients as

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they have limited reserves. Older patients often have a wide diaphyseal diameter which would require the use of a larger sized stem, if cementing, to accommodate adequate cement mantle [9]. Cemented THR has proved to be effective in reducing pain and improving range of motion. The almost immediate pain relief and improvement in post-surgery disability-related quality of life is shown in previous studies [10]. The success of THA depends on careful patient selection, evaluation as well as meticulous attention to operative technique and strict asepsis. Pre-operative planning to match patients and implants, restoration of hip center and biomechanics are important components. Similarly, intraoperative attention to offset, leg length, component orientation, stability and motion without impingement are critical. The surgical expertise and experience affect the outcome of total hip arthroplasty [11].

Some work has been done earlier in the field of total hip arthroplasty in our country. But none is done to evaluate the functional outcome of cemented primary total hip arthroplasty in displaced fracture neck of femur to the best of my knowledge.

MATERIAL AND METHODS

A observational study was carried out among 22 patients of both gender who fulfill the inclusion and exclusion criteria in National Institute of Traumatology and Orthopaedic Rehabilitation, from May 2017 to August 2019. Data were collected through structured data collection form. Statistical analysis of different variables was analyzed according to standard statistical method by using Microsoft Excel 2010 and SPSS. Data quality has been strictly maintained in every stage of data collection, interpretation, analysis. The study subject were informed verbally about the study design, the purpose of the study and the right for withdrawing themselves from the project any time, for any reason. The functional status of the hip was then graded as “excellent”, “good”, fair” or “poor” on the basis of points obtained in the final Harris Hip Score out of total score 100.

RESULTS

The ages of the respondents were between 60 to 80 years; the mean age was 64.59 ±4.5, where 13 (59%) were male and were female 9 (41%). Regarding occupation, the study showed that businessmen 10 (45.45%), housewife 8 (36.36%), service holder 2 (9.09%) and other occupations were 2 (9.09%). Regarding causes, it was found that 14(63.64%) due to fall on slippery ground, 5(22.73%) due to motor vehicle accidents and 3(13.64%) due to fall from height (Figure I). Among the 22 patients 4 (64%) had left-sided and 8(36%) had right-sided femoral neck fractures. Regarding fracture type, 18 (81.82%) were Garden type IV fracture and the remaining 4 (18.18%) were Garden type III fracture. Considering postoperative hospital stay showed the mean duration was 5.09 ± 1.41 days ranging from 4 days to 10 days. Of patients, majority 14 (63.63%) patients had hypertension, 5 (22.72%) had diabetes mellitus, 9 (40.9%) had ischemic heart disease, 1 (4.54%) had bronchial asthma and no associated disorders was 2 (9.09%) (Table 1). Among patients, 19 patients (86.36%) had no complication post-operatively (immediate, early and late). Abductor weakness has occurred in 2 (9.09%) cases and superficial surgical site infection occurred in 1 patient (4.54%). Regarding Limb length discrepancy (LLD), in 11 (50%) cases there was no LLD. In 1 (4.55%) case, LLD was 0.5 cm. One cm LLD was found in 6 (27.27%) cases and 1.5 cm LLD in 4 (18.18%) cases. Mean LLD was 0.57±0.62 cm. Of patients, 8 (36.36%) cases had no pain, and the remaining 14 (63.64%) cases had slight pain. The functional status of the cases was measured according to the Harris hip score (Harris, 1969). Thirteen (59.09%) cases did not limp at last follow up and 9 (40.91%) cases limped slightly. Ten (45.45%) cases walked without support whereas, 10 (45.45%) needed a cane for a long walk and 2 (9.09%) needed cane most of the time. Eight (36.36%) could walk unlimited distance while 14 (63.64%) could walk six blocks. Fifteen (68.18%) could comfortably sit on an ordinary chair for at least 1 hour but 7 (31.82%) could sit in a high chair for 30 minutes. Thirteen (59.09%) could enter public transport. No help was needed to climb stairs in 7 (31.59%) and aid of railing was needed for 15 (68.18%) cases. Fifteen (68.18%) could put on socks/ shoes easily whereas 7 (31.82%) could do it with difficulties (Table 2). At last, follow up, in 1 (4.54%) case there was at least one out of four deformities, defined by Harris (1969), present. In the rest 21 (95.45%) cases, there was no residual deformity. The mean flexion of hip at last follow up was 119.320±12.840. Again, the mean abduction and adduction were 31.360±6.210 and 30.680±6.950 respectively. Internal rotation and external rotation at last follow up was 29.550±7.060 and 28.680±6.930 respectively. The mean HHS after 6 weeks of surgery was 57.14±7.05. At 12 weeks, it has increased to 78.91±6.72. At final follow up, which was at the end of 24 weeks, mean HHS was 87.82±6.12. From 6 weeks to 24 weeks, the HHS has increased significantly (p value= 1.7 x 10-19) (Figure II). After the last follow up, the final outcome was assessed with the HHS tool. Out of 22 cases, 10 (45.45%) were excellent, 11 (50%) were good and 1 (4.55%) were fair. No case remained poor.

Table 1: Distribution of patients according to Associated disorders

Associated medical disorders	Number of patients	Percentage (%)
Hypertension	14	63.64
Diabetes mellitus	5	22.73
Ischemic heart disease	9	40.91
Bronchial asthma	1	4.55
No Associated disorders	2	9.09

* Multiple responses

Table 2: Distribution of cases by to functional ability at last follow up

Function	Frequency	Percentage (%)
Limp		
None	13	59.09
Slight	9	40.91
Support		
None	10	45.45
Cane for long walks	10	45.45
Cane for most of the time	2	9.09
Distance walked		
Unlimited	8	36.36
Six blocks	14	63.64
Sitting		
Comfortable in the ordinary chair for 1 hour	15	68.18
On a high chair for 30 minutes	7	31.82
Use of public transport		
Yes	13	59.09
No	9	40.91
Stairs		
Normal	7	31.82
Use railing	15	68.18
Put on shoes or socks		
Easily	15	68.18
With difficult	7	31.82

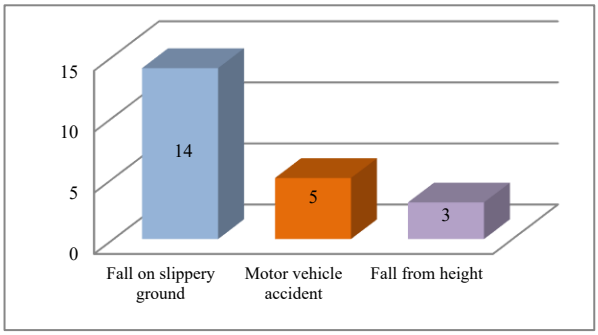


Figure I: Distribution of cases according to the Mechanism of injury

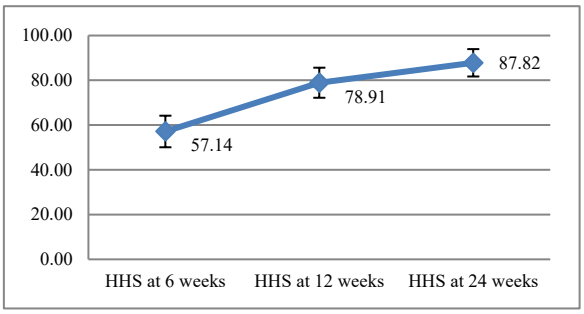


Figure II: Distribution of cases according to HHS at different follow-up

DISCUSSION

The mean age of the respondents was 64.59±4.5 years, which is vindicated by the study of Gjertsen, *et al*., 2007 where the usual age of the patient was older than 60 years [12]. In this study out of 22 patients 13 patients (59%) were male and 9 (39%) were female, while Stafford *et al*., found that 73 % patients were female and 27 % were male [11]. In this study the most common cause of fracture neck femur was minor trauma such as fall on slippery ground which constituted 63.64% of cases. Almost similar incidence was found in Gaurav and Sing's study, 2019 which was 60% [13]. In this study fracture neck of femur of left side involvement were 64% and right-side involvement was 36%, this is supported by the study of Mani *et al.,* (2015) where 65% patients had left sided fracture [8]. Among current study respondents, 18(81.82%) had Garden stage IV and 4(18.18%) Garden stage III fracture. This is consistent with the study findings of Dorr, *et al.,* where majority of their patients were in stage IV [14]. The mean duration of the postoperative period was 5.09±1.41 days ranging from 4 days to 10 days, this is in line with the study of Radoicic *et al.,* where the mean postoperative hospital stay was 5.1 days ranging from 4 to 9 days [15].

Regarding associated medical disorders it was observed that, 20 (90.91%) cases had associated comorbid conditions. Among them, the majority (n=14, 63.63%) of patients had hypertension, 5 (22.72%) had diabetes mellitus, 9 (40.9%) had ischemic heart disease and 1 (4.54%) had bronchial asthma. Only 2 (9.09%) had no associated disorder. A study by Liodakis *et al*., (2016) found associated co-morbid conditions in 91.7 % cases, among them 60.1% had HTN, 20.4% had DM which are similar to our study [16].

Regarding postoperative complications, only 3 (13.64%) had encountered complications. Among them, 2 (9.09%) had abductor weakness and 1 (4.55%) had superficial surgical site infection. A similar study by Liodakis *et al.,* found that 2.9 % had post-operative abductor weakness and Inngul *et al.,* found superficial surgical site infection in 4% cases [16,17]. Regarding Limb

length discrepancy, in 11 (50%) cases there was no LLD. In 1 (4.55%) case, LLD was 0.5 cm. One cm LLD was found in 6 (27.27%) cases and 1.5 cm LLD in 4 (18.18%) cases. Mean LLD was 0.57±0.62 cm. A similar result was observed by Gaurav and Sing (2019), where they found more than 1 cm LLD in 18.66% cases [13]. In the present study at the final follow up 36.36% patients had painless hip and 63.64% patients had slight pain during activity. The mean pain scores were 41.45 ±1.97 (according to pain score in HHS), this is supported by Hedbeck *et al.,* found the mean pain score 43.1±2.3% in the cemented THR group [18]. The functional status of the cases was measured according to the Harris hip score. Thirteen (59.09%) cases did not limp at last follow up and 9 (40.91%) cases limped slightly. Ten (45.45%) cases walked without support whereas, 10 (45.45%) needed a cane for a long walk and 2 (9.09%) needed cane most of the time. A study by Tidermark *et al.,* found that, 92% of patients could walk without support or using one cane which is similar to this study. Eight (36.36%) could walk unlimited distance while 14 (63.64%) could walk six blocks. Fifteen (68.18%) could comfortably sit on an ordinary chair for at least 1 hour but 7 (31.82%) could sit in a high chair for 30 minutes. Thirteen (59.09%) could enter public transport. No help was needed to climb stairs in 7 (31.59%) and aid of railing was needed for 15 (68.18%) cases. Fifteen (68.18%) could put on shoes easily whereas 7 (31.82%) could do it with difficulties [19].

At last, follow up, in 2 (9.09%) cases there were at least one out of four deformities present. In the rest 20 (90.91%) cases, there was no residual deformity. The mean flexion of hip at last follow up was 119.320±12.840. Again, the mean abduction and adduction were 31.360±6.210 and 30.680±6.950 respectively. Internal rotation and external rotation at last follow up was 29.550±7.060 and 28.680±6.930 respectively. Narayan and George, (2006) in their study found mean flexion 100.60±12.030. Again, the mean abduction and adduction were 29.50±6.590 and 30.50±4.120 respectively. Internal rotation and external rotation at last follow up was 29.550±8.290 and 30.50±9.20 respectively which are almost similar to our study [20].

In my study 10 (45.45%) patients recovered with excellent outcomes, 11 (50%) patients with good outcomes and 1 patient (4.55%) with a fair outcome. This result is similar to many studies like Gaurav and Singh, (2019) where HHS in cemented THR was 88.69 points. This similar result found in a study conducted by Hedbeck and team [21].

CONCLUSION

Based on results in the present study, it can be concluded that in our setup cemented THA is a safe procedure showing good and acceptable results. In our country quality of life and life expectancy is improving with overall economic development. Patients seek modern updated quality treatment options. So, the cemented THA can be an excellent procedure for a displaced fracture neck of femur in the active elderly patient in our country.

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