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FEMORAL NECK FRACTURE TREATED BY HEMIARTHROPLASTY, A COMPARATIVE STUDY BETWEEN WATSON-JONES AND MOORE APPROACHES

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Abstract

The treatment options for fractures of the femoral neck whether displaced or nondisplaced, are osteosynthesis, hemiarthroplasty, and total joint arthroplasty. Numerous reports have favored osteosynthesis over hemiarthroplasty. However, the high rates of non-union and a vascular necrosis associated with osteosynthesis, has led others to advocate femoral head replacement over internal fixation.

This is a prospective study carried on 96 patients (36 male and 60 female) having intracapsular femoral neck fractures who were admitted to the department of the orthopaedic surgery in Sulaimaniyah Teaching Hospital between September 2008 and September 2013.

The patient's ages ranged from 62-88 years (average 71 years). All patients were treated by hip hemiarthroplasty (partial hip replacement) with two types of approaches. Watson Jones (antero-lateral) approach was used in 40 cases (41.7%) and Moore (posterior) approach in 56 cases (58.3%). The aim of this study is to compare the outcome between these two approaches peroperatively and postoperatively to determine which approach is better for hip hemiarthroplasty.

The outcome of these two approaches were studied and analyzed monthly and the results of both approaches compared with each other and compared also with other studies.The duration of follow-up ranged between 12-48 months with average of 34 months.

In conclusion, rate of dislocation, infection, deep vein thrombosis and sciatic nerve injury were more in Moore approach, while liability to fracture femur during operation and time of surgery were more in Watson-Jones approach.

Introduction

Femoral neck fractures continue to pose significant decision-making problems for the busy practitioner. Indirect factors over which the orthopaedic surgeon has little control include the patient's preinjury medical status, metabolic bone quality, and fracture classification[1]. The treatment options for fractures of the femoral neck whether displaced or nondisplaced, are osteosynthesis, hemiarthroplasty, and total joint arthroplasty.

Numerous reports have favored osteosynthesis over hemiarthroplasty citing better short-term outcomes[2], decreased hospital stay[3], blood loss, operative times and infection rates; as well as lower perioperative mortality[4].

Internal fixation has been favored if surgical fixation will not be delayed[5,6], or if the patient is physiologically young[7]. Hip pain is more frequently a complaint of younger patients, perhaps because of increased activity[8]. However, the high rates of non-union and a vascular necrosis associated with osteosynthesis[9], as well as the significant reoperation rate [2,10], has led others to advocate femoral head replacement over internal fixation[5,11].

Failure of osteosynthesis for femoral neck fracture is associated with difficulty of reduction and varus malalignment[11]. Some have favoured primary total hip arthroplasty over hemiarthroplasty, citing decreased groin and thigh pain and better overall function[12,13]. Conversion to total hip arthroplasty after failed osteo-synthesis or primary hemiarthroplasty for femoral neck fracture is also associated with complications mainly high dislocation rates[12,14].

Patients and Methods

This is a prospective study carried in sulaimaniyah teaching hospital on 96 patients (60 females and 36 males) with age ranged between (62-88 years) complained from intracapsular fracture neck femur from September 2008 till September 2013.

Most of the patients presented with a history of a fall, followed by pain in hip. These patients were evaluated by taking good history, meticulous examination and investigations with routine tests and sometimes sophisticated imaging.

On examination, the leg is shorter and externally rotated, attempts of movement cause intense pain. The tenderness founded over the femoral neck anteriorly and/or over the greater trochanter.

Routine laboratory investigations (haemoglobin, blood glucose, blood urea, serum creatinine, electrocardiogram) were done for them, then after application of Thomas splint with skin traction, and they were sent to radiological department for radiological assessment to elicit the grade of femoral neck fractures.

General assessment for all patients was done in cooperation with the anaesthesiologist and the physician. Spinal anaesthesia was used for 67 patients and the other 29 patients underwent general anaesthesia. Prophylactic antibiotics in a form of 1 gram ceftriaxone were used intravenously at time of induction of anaesthesia and repeated 12 hourly postoperatively for at least 72 hours. Prophylactic anticoagulant drugs (Clexane 4000 I.U.) were used for 84 patients whom considered at risk to prevent DVT (like smokers, heart failure patients and prolonged bed ridden). The anticoagulant agents continued for at least 2 weeks postoperatively.

The patients were divided into two groups according to the approach used for the unipolar cementless hemi-arthroplasty; the first group (56 patients) the prosthesis was inserted through the posterior (Moore) approach and the second group (40 patients) underwent anterolateral (Watson-Jones) approach. The selection of the approach was according to the preference of the surgeon.

The patients were followed monthly clinically and accordingly radiologically in the outpatient or the private clinics. Radiographs were examined for evidence of subluxation, dislocation, or any fracture.

Clinically, the patients were examined periodically for skin incision healing, presence of signs of infections, any deformity, range of hip motion, gait, deep vein thrombosis (DVT) and limb length discrepancy.

Also, all the patients were questioned for the presence of pain, stiffness and ability to perform daily activities. All the above results were recorded continuously.

The results were assessed according to Severen's criteria 15 in which the patients are classified into excellent, good, fair, and poor results. See Table (I).

Table I: Severen's criteria for clinical assessment of patients after hip surgery[15]

	Group	Pain	Gait (limp)	Movements
1)	Excellent	No pain	No, or trivial limp	Full movements, or simply restricted <10 degrees
2)	Good	No pain	Slight limp	Mildly restricted movements 10 to 20 degrees
3)	Fair	Occasional pain	Noticeable limp	Moderately restricted movements 20 to 30 degrees
4)	Poor	Regular pain	Marked limp	Severely restricted movements >30 degrees

Results

Age, sex and side distribution of fracture:

The patients were 62-88 years of age with an average of 71 years, 53 patients (55.2%) were aged between 70-75 years. 60 patients (62.5%) were females and 36 patients (37.5%) were males, in 64 (66.66%) of them the right femur was fractured and in the other 32 (33.33%) the left femur was fractured.

Approaches used:

There are 56 cases (58.3%) of endoprosthetic replacement been done through Moore approach and 40 cases (41.7%) done through Watson-Jones approach.

Causes of the fractures:

In 72 cases (75%) caused by fall on ground, 12 cases (12.5%) were because of road traffic accidents, 8 cases (8.3%) gave history of fall from height and in 4 cases (4.1%) the cause was nonunion of old fracture neck femur treated by internal fixation by three cancellous screws.

Types of fractures

According to the anatomical classification of fracture neck femur; 20 cases (20.8%) were with sub capital fracture, 60 cases (62.5%) were with mid cervical fracture and 16 cases (16.6%) were with basal fracture.

Classes of fractures:

According to Garden's classification; 20 cases (20.8%) were with Garden's class II, 40 cases (41.7%) were with class III and

36 cases (37.5%) were with class IV femoral neck fracture.

Duration of surgery

The average duration of surgery in Moore approach was 65 minutes while in Watson-Jones approach was 96 minutes. Follow up duration ranged from 12 to 48 months with average of 34 months.

Complications

Per operative complications: see Table (II)

Fracture during operation

In Moore approach 5 cases (8.9%) developed fracture in intertrochantric

region (simple crack); treated conservatively by delaying weight-bearing time.

In Watson-Jones approach 6 cases (15%) developed fracture in intertrochantric region; 2 of them treated with two circumferential wire loops and the other 4 were simple crack treated conservatively by delaying weight bearing time.

Sciatic nerve injury

In Moore approach 4 cases (7.1%) developed signs of sciatic nerve injury with foot droop after operation; treated conservatively and complete recovery occurred after 4 weeks (it was just neurapraxia). Sciatic nerve injury not recorded in Watson-Jones approach.

Post-operative complications: Table (II)

Dislocation of prosthesis

There were 4 posterior dislocations (7.1%) in Moore approach occurred within first

two months from the surgery. No dislocation recorded in Watson-Jones approach.

Infection:

Wound infection:

In Moore approach 4 cases (7.1%) developed superficial wound infection and treated by IV and oral antibiotics. In Watson-Jones approach 2 cases (5 %) developed superficial wound infection and treated also by IV and oral antibiotics.

Deep infection:

In Moore approach 2 case (3.5%) developed implant infection and treated by I.V. antibiotics, total debridement with irrigation system with rifampicin antibiotics one of them cured and the other one end with girdle stone for 6 months and later total hip arthroplasty done for the patient. No implant infection recorded in Watson-Jones approach.

Deep vein thrombosis (DVT):-

In Moore approach 2 cases (3.5%) developed DVT two weeks after operation; treated conservatively and recovered on anticoagulant therapy.

DVT not recorded in Watson-Jones approach.

Table II: Complications of both approaches

Complications	Watson-Jones approach		Moore approach	
Dislocation	0	0	4 cases	7.1%
Fracture femur during operation	6 cases	15%	4 cases	7.1%
Fracture femur after operation	0	0	0	0
Sciatic nerve injury	0	0	4 cases	7.1%
Wound infection	2 cases	5%	3 cases	5.3%
Implant infection	0	0	2 cases	3.5%
DVT.	0	0	2 cases	3.5%

Clinical assessment results

Follow-up duration ranged from 12 to 48 months with average of 34 months. The above grading (Severen's criteria) was applied to the patients after 2 months of

operation, and final results of this study are as follows:

In Watson-Jones approach
Eight cases (20%) were rated as excellent. Twenty four (60%) cases were rated as good. Eight (20%) cases were rated as fair. No cases were rated as poor. See Table (III)

In Moore approach
Eight (14.2%) cases were rated as excellent. Twenty (35.7%). Cases were rated as good. Twenty eight (50%) cases were rated as fair. No cases were rated as poor. See Table (III)

Table III: Final results of Severen's criteria

Severen's criteria	Watson-Jones approach		Moore approach	
Excellent	8 cases	20%	8 cases	14.2%
Good	24 cases	60%	20 cases	35.7%
Fair	8 cases	20%	28 cases	50%
Poor	0	0	0	0

Discussion

Intracapsular fracture neck femur is a common problem in elderly patients that face the orthopaedic surgeons. We found most of the patients are operated on for hemiarthroplasty with single approach that is Moore approach. Many authors recommend Watson–Jones approach for this procedure. This gave us the stimulus to compare between these two approaches to analyze the outcome and determine which approach got the better results.

Comparing the two approaches

Comparing our results between the two approaches we can notice that Moore approach carries higher rate of complications since we recorded dislocation, fracture during surgery, sciatic nerve neuroprexia, wound and implant infection, and DVT. While only fracture of the femur during surgery and wound infection were elicited in Watson Jones approach. Operating time is much longer in Watson Jones approach as average 96 minute than in Moore approach which was 65 minutes. We believed that Watson Jones approach carries high rate of significant fracture of the femur and the longer operative time are due to the low experience to this approach and due to the unsuitable operative bed.

According to Severen's criteria we can notice that 80% of those operated on by Watson Jones approach got excellent to good results and only 20% got fair result, while fair result were recorded in 50% of those operated on with Moore approach.

We compare our study to the following:

In Essoh J.B. study[16] they performed 84 Austin Moore hemiarthroplasty for displaced femoral neck fracture carried out between 1993 and 2002. The average age of patients was 65 years. Female to male ratio was a 5:1 (70 female and 14 male). In our study female to male ratio was a bout 1.7:1 (female 62.5% and male 37.5%) this is due fact that femoral neck fracture are more common in female due to osteoporosis[17].

Postoperative wound infection occurred in 4 cases (4.8%); while in our study occurred in 4 cases (7.1%) in Moore approach this is my due to multiple factors related to sterilization not to the approach itself.

Dislocation occurred in 2 cases (2.4%) while in our study occurred in 4 cases (7.1%), we thing the cause was technical error or poor soft tissue covering due weak capsule and atrophy of the short rotator muscles or due to patients behavior like sitting on the ground.

Surgical approach and soft-tissue restoration are likely the most important factors contributing to dislocations of hemiarthroplasties. Minor differences in surgical technique such as increase or decrease anteversion of prosthetic hip could influence dislocation.

In Keene GS, Parker MJ study[18] a series of 531 patients presenting with a displaced femoral neck fracture treated by hemiarthroplasty, were studied prospectively to determine the optimal approach for surgery. A total of 302 prostheses were inserted by Watson-Jones approach and 229 by Moore approach. Complications in these two broadly comparable groups are discussed. Dislocation and deep vein thrombosis were more common after Moore approach. While Operative time and infection were greater after Watson- Jones approach.

In our study dislocation, deep vein thrombosis (2 cases 3.5%), infections whether superficial (4 cases 7.1%) or deep (2 case 3.5%) and sciatic nerve injury were more common in Moore approach. While Operative time (96 minutes) and fracture femur during operation (6 cases 15%) were greater in Watson- Jones approach.

The results of clinical assessments according to Severen's criteria 15 was fair in 8 cases (20%) in Watson-Jones approach while in Moore approach it was fair in 28 cases (50%); Table (III).

Conclusion

Moore approach carried higher rate of complications than the Watson-Jones approach since it carried high rate of dislocations, infection, deep vein thrombosis, and sciatic nerve injury, while the Watson-Jones approach more liable to fracture femur during operation than Moore approach. Time of surgery in Watson-Jones approach was more than Moore approach. Finally both approaches are good in hemiarthroplasty for femoral neck fracture because both approaches have advantages and disadvantages. For those patients risky for anesthesia we recommend Moore approach since the time of surgery is shorter. For those patients liable for dislocation such as mentally retarded or epileptic patients we recommend Watson Jones approach since it is more stable. For those patients with bone softening disorders such as osteomalacia or osteoporosis, we recommend Moore approach since liability of fracture femur is less than in Watson Jones approach.

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