

## Evaluation of Management of Unstable intertrochanteric Fractures of The Femur By Bipolar Hemiarthroplasty In The Elderly

Hesham Fathy, Bahaa Zakarya, and Mohamed Attia

Orthopaedic Surgery Department, Faculty of Medicine, Menoufyia University, Menoufyia, Egypt  
[dr\\_mohamedattia@yahoo.com](mailto:dr_mohamedattia@yahoo.com)

**Abstract: Aim of the work:** to evaluate clinical and radiological outcome after treating twenty patients having unstable intertrochanteric fracture femur by Bipolar Hemiarthroplasty. **Methods:** In this study; the method divided into preoperative planning, operative technique, post-operative management and follow up. **Patient selection:** Age: 55 years old or older, Radiological diagnosis of an unstable intertrochanteric femoral fracture. Type of the fracture According to AO classification. 31-A1.3, 31-A2.1, 31-A2.2& 31-A2.3 Osteoporosis According to Singh index grade 4, 3, 2 and 1 are included in our study. So X ray to the neck of the opposite side femur was done for assessment of the bone quality of the patient. Surgical approach and positioning Lateral (modified Harding) approach was used in all patients with the patients in the lateral decubitus. The pelvis in rigidly immobilized and the limb draped separately. Functional outcomes (pain, activities, gait and range of motion) were assessed based on the Harris hip scoring system. **Results:** all patients were 55years old or above. Follow up period ranged from 2 weeks to 6 months. 16 patients out of 20 have completed the follow up period.: at last follow up, the Harris Hip Score ranged from 93 to 72 with a mean value about 82.5. Intra-operative Fracture (case 13): during application of the femoral stem an intra-operative fracture of the femur has been occurred which was fixed using cerclage wire. One patient has developed deep infection two weeks postoperatively. Haematemesis(case 5): in the same day after operation the patient developed haematemesis from bleeding stress ulcer. **Conclusion:** Hemiarthroplasty using bipolar prostheses for the unstable intertrochanteric fractures of the femur in elderly has good clinical results; early post-operative ambulation with no post-operative DVT, chest infection nor bed sores. This will have a direct effect on the general condition and the post-operative rehabilitation.

[Hesham fathy, Bahaa Zakarya, and Mohamed Attia. **Evaluation Of Management Of Unstable intertrochanteric Fractures OF The Femur By Bipolar Hemiarthroplasty In The Elderly.** *J Am Sci* 2014;10(10):203-210]. (ISSN: 1545-1003). <http://www.jofamericanscience.org>. 29

**Key words:** Femur, unstable, intertrochanteric, fracture, Bipolar, Hemiarthroplasty.

### 1. Introduction

Fractures of the proximal part of the femur in elderly patients are generally the results of a single fall and are more common in women than men.<sup>(1)</sup> Unstable intertrochanteric fractures in elderly constitute one of the major disabling morbidity in this age group.<sup>(2)</sup> The age incidence of these fractures varies according to sex and geographical distribution.<sup>(3)</sup> Patients who have intertrochanteric fractures are as a group, slightly older and have higher rate of morbidity and mortality compared with patients who have fracture of the femoral neck.<sup>(4)</sup>

People in this age group usually have other systemic diseases such as diabetes, liver & cardiovascular diseases. The impact of these diseases cause rapid deterioration of the general condition of those patients especially in the bed ridden condition. The main goals of the treatment of these patients are to restore the pre-fracture activity status of the patients, to allow early full weight bearing, and to try to avoid possible second operation to correct one of the complications of the first one.<sup>(5)</sup>

As a general rule, preservation of the natural bones of the patient is the ideal aim. In osteoporotic

elderly patients with unstable intertrochanteric fracture this ideal aim will not help the patient to restore back his activity if internal fixation was done. Weak purchase of the internal fixation device due to osteoporosis and comminution of the fracture will increase the incidence of failure of internal fixation e.g. cutting throw of the screws, collapse at the fracture site.<sup>(2)</sup> Moreover, metal failures has been documented by disengagement and intra-pelvic protrusion of the sliding screw and by cutting out of the side plate screws.<sup>(6)</sup>

### 2. Material and Methods

**Patients:** Twenty patients presented by unstable intertrochanteric fracture of the femur. They have treated by bipolar hemiarthroplasty at Menoufyia University Hospital during the period from January 2013 to October 2014 The mean age was 69.5 ranged from 55-84 years old.

In this study; the method divided into preoperative planning, operative technique, post-operative management and follow up.

1) Preoperative planning: a) Patient selection:

□ Age:55 years old or older

□ Radiological diagnosis of an unstable intertrochanteric femoral fracture.

□ Type of the fracture According to AO classification: 31-A1.3, 31-A2.1, 31-A2.2& 31-A2.3

□ Osteoporosis. According to Singh index grade 4, 3, 2 and 1 are included in our study. So X ray to the neck of the opposite side femur was done for assessment of the bone quality of the patient.

#### b) Patient counseling:

Before operation we discussed the whole issue with the patient starting from explaining the type of the fracture and the available methods of management and the advantages and disadvantages of each. Also the patients were given detailed information about our proposed method of management including preoperative investigation, operative details, and information about postoperative rehabilitation program. This step was very essential in order to get maximum cooperation with the patient.

#### C) Preoperative medications:

I) **Antibiotics:** Because of all operations were performed in theaters where there was no laminar flow; all patients received prophylactic antibiotics which was started one hour preoperatively and for about 10 – 15 days postoperatively. It was in the form of third generation cephalosporins with the dose of 1 gram every 12 hours by the intravenous route.

II) Low molecular weight heparin (LMWH): It was routinely used for prophylaxis against deep venous thrombosis. It was started on patients' admission to hospital. We stopped it 12 hours preoperatively and then continued postoperatively for 5 weeks.

III) Morphine for analgesia.

IV) Proton pump inhibitor: For all the patients for fear of stress ulcer.

V) Blood transfusion: Two to four units of blood were prepared for every patient. Which was used when needed.

**d) Radiological assessment:** One of the most important steps in preoperative planning is to get consistent and appropriate radiographs. This will help us for diagnosis of the fracture and preoperative planning. For accurate diagnosis and proper understanding of the geometry of the fracture that will lead us to assessment if this fracture is stable or unstable type; minimum of two views are required, (AP view and lateral views).

**e) Templating:** Restoring proper hip biomechanics was a primary objective of hip arthroplasty. <sup>(7)</sup>In order to achieve that we did for all the patients a preoperative templating of appropriate radiographs. This is done to estimate the size of the implant which will be used during surgery.

#### 2) Anaesthetic technique:

It was General or Regional (spinal and epidural) anaesthesia according to the general condition and other systems condition of the patients. Six patients got general anaesthesia, seven Patients got spinal anaesthesia and in seven patients epidural anaesthesia were used.

#### 3) Operative Technique:

As in any case of arthroplasty a great care was performed to minimize any postoperative infection as follows;

- Moving in and out of the theater was minimized.
- Disposable gowns and drapes were used whenever possible.
- Shaving of the skin at the operative site was done in the induction room just before the operation.
- Skin preparation using betadine soap for approximately 5 minutes. This soap is then rinsed with alcohol, and the dried skin is then painted with betadine or an iodine solution.

#### Surgical approach and positioning

Lateral (modified Harding) approach was used in all patients with the patients in the lateral decubitus. The pelvis is rigidly immobilized and the limb draped separately. Skin incision starts about 5 cm above the tip of the greater trochanter.

Deep dissection is done by splitting the ilio-tibial band in the line of the incision and blunt splitting of the most anterior fibers of the gluteus maximus muscle to expose the greater trochanter with the muscles attached to it. Next, gluteus medius is identified and split is done anteriorly along its fibers opposite the tip of the greater trochanter, this leaves the major part of the abductor portion of the gluteus medius attached to the greater trochanter. Splitting of the gluteus medius is confined to no more than 3-4 cm coronal to the tip of the greater trochanter to avoid injury of the superior gluteal nerve which leaves the pelvis through the greater sciatic notch to pass under the gluteus medius muscle, running in a transverse course 5 cm above the level of the greater trochanter on the deep surface of the muscle. The distal part of the gluteus medius is released from the anterior border of the greater trochanter using electrocautery. After proper exposure of the proximal femur, excision head and neck using the ordinary cork screw.

Femoral canal preparation and cementation technique: The goal is to optimize the cement–bone interface.

#### Steps of cementation

1) Canal preparation: The femoral canal is prepared with intramedullary reamer then a series of broaches that create an envelope for the implant to settle in.

2) In most of our cases we used plastic plugs. Plugging allows for greater intrusion pressure and

better filling. The plug placed 1 to 2 cm distal to the level of the tip of the femoral component.

3) the femoral canal cleaned using a pressurized lavage system. This serves two purposes: By removing marrow fat and blood. This in turn improves cement intrusion into the bone.

4) The canal is dried using suction and the use of hydrogen peroxide. A dry femoral canal at the time of cement insertion further helps to optimize this interface.

5) Bone cement of standard and low viscosity was used in this study.

6) In 6 cases cement insertion was done using cement gun, where the cement is applied in a retrograde fashion. In 14 cases manual insertion of the bone cement was the only available method.

7) Now the stem is to be applied in the femoral canal with a great respect to its centralization in the canal and the 10 degrees of anteversion.

8) Then a trial reduction is done using trial head and calcar head with sizes that had been got during preoperative templating, to confirm the proper length of the neck and the head size. After that the definite head is applied and final reduction is done. Reconstruction of the greater trochanter is done in 12 patients by using wire loop.

9) Putting suction drain followed by closure of the wound in layers.

**Postoperative radiograph:** Anteroposterior view of the pelvis which included the entire stem length was done while the patient in bed in the first day postoperatively.

#### **Rehabilitation:**

The physiotherapy starts on the first postoperative day using the following protocol;

1. Chest exercise.
2. Elastic stocking.
3. Gradual mobilization using a walker
4. Active hip and knee movement to increase the range of movement and for muscle strength.

**On discharge:**

For the first 2 weeks post-operatively:

1. Plain x-ray for the operated hip joint (AP view) was done.
2. We place two pillows between the legs on turning on the side while in bed and not to turn on the affected side.

-We advice patient to

- a) avoid sitting on low chair.
- b) Avoid use of low toilet.
- c) Avoid car driving, bicycling and sexual activity.
- d) Use shower rather than bath.
- e) Avoid any jerky movements.

f) Report immediately if any sensation of chest pain, leg excessive swelling, redness or discharge from the wound.

3- Removal of suction drain after 48 hours.

4- Removal of stitches after 14 days.

#### **Follow up:**

Clinical and radiological follow up was done after 2 weeks and every month for the first 6 months.

**Clinical follow up:** Harris hip score was used for clinical evaluation. Results rated as excellent (91-100 points), good (81-90 points), fair (71-80 points) and poor (= or < 70 points).

**Radiological follow up:** Standard radiographs were done for the patients immediately post operative, before discharge and every month for the first 6 months post-operative.

Evaluation of the femoral component stability was done using a zonal analysis. This system divides the femur into seven zones on the AP radiograph. To define a loosening of cemented femoral component one of the following criteria should be present: <sup>(8)</sup>

1. Implant subsidence or changes in its position in the serial radiographs.
2. New metal-cement radiolucency (not present in the initial postoperative radiographs).
3. Fracture of the cement mantel.
4. Implant fracture.

#### **3. Results**

In the present study, all patients were 55years old or above. Follow up period ranged from 2 Week to 6 months. 16 patients out of 20 have completed the follow up period.

-the mean of total hospital stay period was 10,5 day (ranged from 6 to 15 days).

**Table 1: Show hospital stay.**

Number of patients	Hospital stay
5 patients	6 days
4 patients	9 days
8 patients	11 days
3 patients	15 days

-the mean interval time between the trauma day and the day of operation was 7 days.(Table2).

**Table 2:show interval time between the trauma day and the day of operation.**

Number of patients	Interval time between the trauma day and the day of operation
6 patients	4 days
4 patients	7 Days
7 patients	8 Days
3 patients	9 Days

-the mean intra-operative blood loss was 567 cc (ranged from 350 to 1000 cc) (Table 3)

**Table 3: Intra-operative blood loss.**

Number of patients	Intra-operative blood loss
3 patients	450 cc
9 patients	750
11 patients	100

-post-operative mortality: no patient died within the first 3 months post-operative.

-infection rate: 1 patient was opened again because of infection.

-fixation of the proximal femur: 12 patients were fixed and the remaining were not (Table 4).

**Table 4: Fixation of the proximal femur.**

No. of patients	Fixation of the proximal femur or not	%
12 patients	with Fixation	60%
8 patients	No Fixation	40%

a) Clinical results: at last follow up, the Harris Hip Score ranged from 93 to 72 with a mean value about 82.5.

According to Harris Hip Score

- 4 cases were excellent
- 12 cases were good
- 2 cases were fair
- 2 case were poor.

**1-pain:**

At last follow up 14 patients (70%) had no pain; while 2 patients (10%) had slight pain and only 4 patients (20%) had mild pain. With the mean score for the pain was 6.6%. (Table 6).

**2-function:**

A) Limp: 7 patients were have no limp at all; 12 patients had slight limp while 2 patients had moderate limp. (Table 7).

**Table 5: Show Harris Hip Score at last follow up.**

Patient	Score	Percentage %
3	90-100	18%
9	81-90	56%
2	71-80	8%
2	= or < 70	8%

**Table 6: Postoperative degree of pain.**

Degree of pain	Number of patients	%
No pain	14	70%
Slight pain	2	10%
Miled pain	4	20%

**Table 7: Postoperative Degree of limping.**

Degree of limping	Number of patients	%
No limping	7	35%
Slight limping	11	55%
Moderate limping	2	10%

B) **Support:** Post-operatively 19 patients were able to walk using frame in the third day postoperatively. Only one patient (patient No.17) was restricted from post-operative weight bearing. This was due to intra-operative crack occurring during application of the femoral stem. Weight bearing was delayed for 6 weeks. However, non weight bearing mobilization using fram was used. At last follow up for this patient, the Harris Hip Score was rated fair (score 71). 15 patients were not in need to use any kind of support during walking, 3 patients were dependent on 1 stick only on long walking and about 2 patients were in need to it all the time.

c) **walking distance:** 7 patients were able to walk unlimited, 10 patients were able to walk up to 600 meters, 2 were able to walk up to 200-300 meters, 1 patient was able to walk only in doors. (Table 8).

**Table 8: show walking distance.**

Walking distance	Number of patients	%
Unlimited	7	35%
Up to 600	10	50%
200-300	2	10%
In room only	1	5%

**3) Activity:**

The mean score of activity item in this study is:

a) **Stairs:** only one patient was not able to climb stairs while 9 patients were able to do it normally. However 7 patients were able to do it using the rail and 3 patients were in need more than the rail for assistance.

b) **Put on socks:** 4 patients were able to put on socks with ease while 12 patients could do it but with difficulty. 4 patients were not able to do it at all.

c) **Setting:** 15 patients were able to sit comfortably on any chair for one hour and only 5 patients could only sit on high chair.

d) **Public transportation:** only 8 patients were able to get into the public transportation, while the rest of our patients were not able to do it. (Table 9).

**Table 9 show public transportation.**

Patients	Public transportation	%
8 patients	Able	40%
12 Patients	Not able	60%

**4) Absence of deformity:**

At last follow up, all our patients were have no deformity according to the Harris hip Score criteria.

5) **Range of motion (ROM):** according to the Harris Hip Score, 8 patients got score 5 (210-300 degrees), 10 patients got score 4 (160-209 degrees) and only 2 patients got score 3 (100-159 degrees) and there is no cases got below it.

**-Radiological result:**

Radiological follow up:

It was done by reviewing the standard radiograph(AP view) which was done for patients immediately postoperative, before discharge and (AP lateral views) every 3months for the first 6 months then every 6 months post operative.

-Regarding the cement mantle grading:

Evaluation of the femoral component stability was done using azonel analysis. This system divides the femure into seven zone on the AP radiograph.

According to Gruen Scoring of the cementation our patients graded as: (Table 10).

\*15 patients got A

\*3 patients got B

\*1 patients got C1

\*1 patients got C2

**Table 10:cement mantle scoring.**

Scoring	Number of patients	%
A	15	75%
B	3	15%
C1	1	.05%
C2	1	.05%

**Complications****General complications:**

-One patient develop urinary tract infection (patient No.3) and another patient develop anaemia (patient No.13)( Hb 8).

**Intra-operative complication:**

**-Intra-operative Fracture** (case 13): during application of the femoral stem an inta-oprative fracture of the femur has been occurred which was fixed using cerclage wire.

weight bearing has been allowed 6 weeks postoperatively.

**Early postoperative complications:**

1) **Infection:** one patient has developed deep infection two weeks postoperatively.CRP was 24. Debridment was done. Few days latter recollection has occurred again, and Debridment was repeated several time without any response, the prosthesis was removed and revision THR was done after the wound become clean(good scar and eradication of infection confirmed by ESR and CRP.

2) **Haematemesis**(case 5): in the same day after operation the patient developed haematemesis from bleeding stress ulcer, The patient was admitted to ICU for two days and then the general condition improved.

**Late postoperative complications:**

No patient develop late postoperative complications up to last follow up.

**4. Discussion**

Fractures of the proximal part of the femur in elderly patients are generally the results of a single fall and are more common in women than men.<sup>(1)</sup> Unstable intertrochanteric fractures in elderly constitute one of the major disabling morbidity in this age group.<sup>(2)</sup> People in this age group usually have other systemic diseases such as diabetes and cardiovascular diseases. The impact of these diseases cause rapid deterioration of the general condition of those patients especially in the bed ridden condition. The main goals in the treatment of these patients are, to restore the pre-fracture activity status of the patients, to allow early full weight bearing, and to try to avoid possible second operation to correct one of the complications of the treatment.<sup>(5)</sup>

Several surgical options exist for treatment of unstable intertrochanteric fractures. Traditionally, the general role is to preservation the normal bones by open reduction and internal fixation. The technique is familiar to orthopaedic surgeons, and it is relatively rapid.<sup>(9)</sup> In osteoporotic elderly patients this ideal aim will not help the patients to restore back his/her activity if internal fixation was done as there is no internal fixation device can allow early full weight bearing of the patients with sever osteoporosis and marked fracture comminution. In addition to that; partial weight bearing is very difficult to be controlled by the patients, so, they may shift to full weight bearing on the operated limb causing metal &/or bone failure.<sup>(2)</sup> Arthroplasty is less frequently employed alternative, although it allows the patients' immediate full weight bearing. Many of the complications of internal fixation (as non-union & mal-union) are avoided by performing arthroplasty.<sup>(9)</sup>

Several studies have been published reporting the results of treatment using different techniques. Studies of internal fixation of both stable and unstable intertrochanteric hip fractures reported failure rate of 6-32 %.<sup>(9,4)</sup> The results vary according to the implant used and fracture pattern. Kyle reported 6.8% failure rate; the mean patient's age was 77 years old.<sup>(10)</sup> Hardy reported 6% failure rate and 35% of 1 year mortality with the mean age was 79.5 when he was using dynamic hip screw (DHS)<sup>(11)</sup>. In the same study the failure rate was 14% and the 1-years mortality was 24% when they used Intra-medullary hip screw. The highest failure rate reported by Haidukewych which was 32% with the 1 years mortality was 19% where the mean age of the patients was 78 years.<sup>(12)</sup>

Haentjens and co-workers also reported on a prospective study comparing the results of 37 consecutive patients over 75 years of age who were managed by either bipolar arthroplasty or internal fixation. They concluded that the arthroplasty group had an easier and faster rehabilitation, with a lower

incidence of pulmonary infection, and atelectasis, which they attributed to earlier return to full weight bearing. A 5% dislocation rate was noted in the arthroplasty group.<sup>(13)</sup> They reported 14% failure rate after open reduction and internal fixation of unstable intertrochanteric fractures with 24% of 1 year mortality; where the mean patients' age was 81 years old. Haentgens and his college compared a 42 prospective group of patients having unstable intertrochanteric fractures treated with calcar replacement prosthesis with retrospective control group of patients having the same type of fractures but treated with blade plate. They found that rehabilitation was faster and incidence of pressure sore and chest infection were lower in the group treated with arthroplasty. However there was no difference in the overall mortality rate at both 1 and 3 months.<sup>(9)</sup>

In Unstable intertrochanteric fractures management; after choosing the option of bipolar hemiarthroplasty another question is waiting for us; which prosthesis can we use? The deficient proximal medial femur is one of the challenges in the operation. It is either to be augmented with calcar replacement prosthesis, or the calcar can be reconstructed. Several investigations have reported a good to excellent functional resulted with the used of calcar replacement femoral prosthesis.<sup>(9)</sup>

In this study; Calcar replacement prosthesis was used in two cases. In the first case Harris Hip Score was 82 in the last follow up (6<sup>th</sup> month), cementation was grade B with no intra-operative or postoperative complications. In the second case at last follow up (6<sup>th</sup> month) the Harris Hip Score was 72 with no intra-operative or post operative complications. There were no loosening and cementation score was A.

Regarding the reconstruction of the posteromedial part of the femur; reconstruction of 5 cases using wire loop was performed. However, in 27 cases no reconstruction was done. In this study no great difference was found in terms of the outcome which was the same opinion of Falidini in his study.<sup>(14)</sup>

The reports of calcar replacing femoral component demonstrated that good results that can be obtained with hemiarthroplasty for unstable intertrochanteric fractures. However, calcar replacement stems are not readily available in many hospitals in addition to its higher cost in comparison to the standard stem.

Chan and Gill<sup>(15)</sup> treated intertrochanteric fractures with standard cemented femoral stem. 47 of 55 patients were unstable type, three and four part fractures with the mean age was 84.2 years. They reconstructed the lesser and greater trochanters with cerclage wire. In this study 33 out of 40 patients survived to the six month (83%) and they were all

ambulatory. Two patients required re-operation; one for exchange an oversize femoral component and the other was for conversion to total hip due to hip pain. Two patients got non-union of the greater trochanter.<sup>(15)</sup>

By comparing the results of this study with the results obtained by Faldini<sup>(14)</sup>, Chris<sup>(9)</sup>, Haentjens<sup>(2)</sup> and others it was found that:

1) In this study the **mean age** group was 72.51 years, which was the same targeted age group of those studies. In Faldini's study the mean age was 81 years, it was in Chris's study 80 years and in Rady's study it was 85.04 years. And finally it was 82 years in Haentjens's series.

2) **Harris hip score:** The mean score in this study at last follow up was 78.19, with about 50% of the patients were from excellent to good results and only 12% with poor results. In Haentjens<sup>(2)</sup> series about 78% of the patients got excellent to good results. In Rady's<sup>(16)</sup> study about 63% of the patients got excellent to good results.

One of the reasons that may affect the out come of the operation is the time interval from the trauma to the time of operation which was 2.9 days in this study, 2.81 days in Rady's<sup>(16)</sup> study, while in Faldini's<sup>(14)</sup> study all the patients were operated within the first 48 hours of the trauma resulting in 0% of dislocation, 0% of loosening or infection with mean HHS at 1 year was 76±5.

In this study we were trying very hard to shorten this time interval. About 41.46% of the patients were having other system diseases so that some of those patients were in need to delay their operation for preoperative preparation. In addition to that some times issues other than the medical ones were the reason for delay as the financial issue for example and the issue of providence of the implant as it is not always available inside the hospital at the time of arrival of the patient to the causality department.

3) **Mortality rate** in this study: there was no hospital mortality, however, 1<sup>st</sup> year mortality rate was 12.19%. In Haentjens<sup>(2)</sup> study the 1 year mortality rate was 35% this most probably related to the fact that the mean age in his study was 82 years where the mean age in this study was 72.51 years. In Chris's<sup>(9)</sup> study the 1 year mortality age was 10.3% and the mean age was 80 years. In Rady's<sup>(16)</sup> study the one year mortality was 18.75% where the mean age was 85.04 years. In Faldini's<sup>(14)</sup> study where the mean age was 81 years, 1 year mortality was 19% putting into consideration that Faldini's study<sup>(14)</sup> all the operations done within 48 hours from the trauma. It may be that this time interval from the trauma till the operation may have an effect to get this low mortality rate in this high age group.

In hospital mortality rate for unstable intertrochanteric fractures treated by open reduction

and internal fixation was ranging from 4% -17%.<sup>(2,10-12)</sup> While patients with the same fracture pattern who were treated by bipolar hemiarthroplasty in the hospital mortality rate was ranging from 0% -7.3<sup>(2,9,15,16)</sup>.

**4) Failure and re-operation:** in this study there were 4 cases (5%) of re-operation. One for infection, one for subsidence, one for dislocation where an open reduction was done and one for loosening and acetabular wear.

Regarding the two cases where loosening and subsidence occurred the implant was removed and revision was done. In the case of bipolar dislocations which occurred few days postoperative; a trial of closed reduction was done but it was not successful so open reduction was done. During the procedure it was found no mal-position of the prosthesis. After reduction hip abduction brace was used for 6 weeks with no delay of weight bearing and no further dislocation occurred.

In the case where infection had happened: Two weeks post operative the wound was red, hot with discharge. CPR was 24. Open debridement was done. Few days later re-infection occurred again, and then another debridement was done. Few months later infection reoccurred again, another session of debridement done and prosthesis removed. Then series of debridement was done after that until the wound became clean and healed. The patient kept under observation to make sure clinically and laboratory that infection subsided then another operation for hip arthroplasty may be done later.

In Rady's study<sup>(16)</sup>; the rate of re-operation was 4.1%; 1 case for infection that necessitates implant removal and one case of dislocation which was managed by open reduction. There was no failure or re-operation in Faldini's study<sup>(14)</sup>, however it was 5.4% in Haentjens' series<sup>(2)</sup>.

**5) Blood loss:** In this study the average blood loss was 567 cc. which was higher than its value in Faldini's study<sup>(14)</sup> (247 cc.), and it was 475 cc in Chris's study<sup>(9)</sup> which could be referred to the learning curve as we noticed that in this study the blood loss were decreasing from the beginning of the study to the cases that was performed late in the study.

**6) Postoperative ambulation:** It is highly dependent on the per-fracture status of activity. In Chris study<sup>(9)</sup> there were 66.66% of the patients were able to ambulate in-dependently; and they got improved over the next year (they were independent ambulant pre-fracture). Only 33.33% were in need for assistance of somebody. Before fracture most of them were dependent on someone and they didn't improve at 1 year follow up. None of the patients in their study were non ambulant postoperatively. In this study 13 cases (63%) out of the 20 cases were able to ambulate

(pre-discharge) using walkers, only 7 cases (34%) were in need for insistency of another person. Only one case were not able to ambulate pre-discharge as there was a crack in the femur that happened intra-operative so we decide to delay the weight bearing till fracture healing to occur. In this study the rate of post operative ambulation was (97%). There was no postoperative complication like chest infection, DVT and pulmonary embolism. There was only one case of postoperative bleeding gastric ulcer. In Chris' study<sup>(9)</sup>, there were only one case of DVT and 2 cases of pressure sore for 2 patients who were not ambulant postoperatively. Postoperative ambulation is one of the goals of this method of management of this type of fracture.

In Green's study<sup>(17)</sup> it was found that 15-20 patients were ambulant after an average period of 5.5 days post-operative using calcar replacement bipolar prosthesis for intertrochanteric fractures. Harwin<sup>(18)</sup> reported that 88% of 45 patients were ambulatory within the first week after placement of a calcar replacement prosthesis for unstable intertrochanteric fractures. At an average 28 months follow up they reported no loosening of the femoral stem, no dislocation and no re-operation.

Stern and Angerman<sup>(19)</sup> reported on 105 patients with unstable intertrochanteric fractures treated by calcar replacement prosthesis (their mean age was 80.4 years). All of them were ambulatory before the fracture and 95 were ambulatory after the operation.

In this study; One patient with no history of peptic ulcer developed hematemesis form bleeding ulcer in the day of surgery, and the patient was admitted to the ICU for 2 days, and then the general condition improved. This condition highlights the importance of giving the patients preoperative medication (Proton pump inhibitor) for gastric protection against stress ulcer especially in elderly.

In another case an intra-operative crack of the femur was occurred. It was undisplaced and managed my cerclage wire. Postoperative weight bearing was delayed for 6 weeks. This patient was died 5 months postoperative from complications of liver disease.

## Conclusion

Hemiarthroplasty using bipolar prostheses for the unstable intertrochanteric fractures of the femur in elderly has good clinical results; early post-operative ambulation with no post-operative DVT, chest infection nor bed sores. This will have a direct effect on the general condition and the post-operative rehabilitation. No significant acetabular wear was observed and bipolar prosthesis was functionally stable with good range of motion.

Patient selection is very important as we are directing this ONLY to

- **Unstable intertrochanteric fractures.**
- **in elderly people**
- **with subnormal bone quality**

So, bipolar hemiarthroplasty should be considered as one of the modalities of the treatment of unstable intertrochanteric fractures in the elderly.

#### References

1. Greenspan SI, Myers F and Maintland LA: Fall severity and bone mineral density as risk fractures for hip fracture in ambulatory elderly. *JAMA*; 271:128-133, 1994.
2. Haentjens P, Casteleyn PP, De Boek H, Handelberg F, Opdecam P.: Treatment of unstable intertrochanteric and subtrochanteric fractures in elderly. Primary bipolar arthroplasty compared with internal fixation. *J bone Joint Surg (A)*; 71:1214-25, 1989.
3. Kyle RF, Cabanela ME, Russel TA, Swiontkowski MF, winquist RA, Zuckerman JD, Schmidt AH & Koval KJ.: Fractures of the proximal part of the femur. *Instr Course Lect*; 44:227-53, 1995.
4. Alffrain P-A: An epidemiologic study of cervical and trochanteric fractures of the femur in an urban population; Analysis of 1664 cases with special reference to etiologic factors. *Acta Orthop Scand*; 56:1-109, 1964. As quoted by Kyle RF, Cabanela ME, Russel TA, Swiontkowski MF, winquist RA, Zuckerman JD, Schmidt AH, Koval KJ. Fractures of the proximal part of the femur. *Instr Course Lect*; 44:227-53, 1995.
5. Rodop O, Kiral A, Kaplan H, Akmaz I.: Primary bipolar hemiprostheses for unstable intertrochanteric fractures. *Int Orthop*; 26:233-7, 2002.
6. Brodell, J.D., and LEVE, A.R.: Disengagement and Intrapelvic Protrusion of the Screw from a sliding Screw-Plate Device. A case Report, *J Bone and Joint Surg.*, 65-A: 697-701, Jan 1983.
7. Bochner RM, Pellicci PM and Lyden JP: Bipolar hemiarthroplasty for fracture of the femoral neck, *J Bone joint Surg*, 70A: 1001-10, 1988.
8. Gruen TA, McNiece G, amstutz HC.: Modes of failure of cemented stem-type femoral components. A radiographic analysis of loosening. *Clin Orthop*, 141: 17-27, 1979.
9. Haidukewych G, Israel A and Berry D: Long term survivorship of cemented bipolar hemiarthroplasty for fracture of the femoral neck. *Clin Orthop*, 403: 118-126, 2002.
10. Stoffelen D, Haentjens P, Reynders P, Casteleyn PP, Bross P & Opdecam P: Hip arthroplasty for failed internal fixation of intertrochanteric and subtrochanteric fractures in elderly patients. *Acta Orthop Belg.* 60 suppl 1:135-9, 1994.
11. Mehlhoff T, Landon GC, TuilosHS: Total hip arthroplasty following failed internal fixation of hip fractures. *Clin Orthop.* 269: 32-7, 1991.
12. George JH and Daniel JB: Hip arthroplasty for salvage of failed treatment of intertrochanteric hip fractures. *J Bone Joint Surg.* 85 A: 899-904, 2003.
13. Walfgang G. L., Bryant M. H. & O'Neill J. P.: Treatment of intertrochanteric fractures of the femur using sliding screw Plate fixation. *Clin. Ortho.*, 163:148-158, 1982.
14. Faldini C., Grandi G., Romagnoli M., Pagkrati S, Digennaro V., Faldini O., Giannini S.: Surgical treatment of unstable intertrochanteric fractures by bipolar hip replacement or total hip replacement in elderly osteoporotic patients. *J Orthopaed Traumatol.* 7:117-121, 2006.
15. Chan KC, Gill GS.: Cemented hemiarthroplasty for elderly patients with intertrochanteric fractures. *Clin Orthop Relat Res.*; 371:206, 2000.
16. Rady A.E., Sharaf A.A. & Abuelela A.A.: Primary Bipolar Hemiarthroplasty in Unstable Intertrochanteric Fractures in elderly. 24<sup>th</sup> SICOT meeting (International Society for Orthopaedic Surgery and traumatology) Cairo, Egypt, 2003.
17. Green S, Moor T, Proano F: Bipolar prosthesis replacement for the management of unstable intertrochanteric hip fractures in elderly. *Clin Orthop Relat Res*; 224:169-177, 1987.
18. Harwin SF, Stern RE, Kulick RG: Primary bateman-Leinbach bipolar prosthesis replacement at the hip in the treatment of unstable intertrochanteric fractures in elderly. *Orthopaedics*; 13:1131, 1990.
19. Stern MB and Angerman A.: Comminuted intertrochanteric fractures treated with a Leinbach prosthesis. *Clin Orthop Relat Res*; 218:75, 1987.

10/15/2014