Original Article

Fixation of Intertrochanteric Femoral Fractures by Dynamic Hip Screw

Intertrochanteric Femoral Fractures

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ABSTRACT

Objective: Aim of the study was to evaluate the results of DHS fixation union rate, complications and functional outcome.

Study Design: Experimental / clinical trial study

Place and Duration of Study: This study was carried out at Bolan Medical Complex Hospital Quetta from January 2014 to December 2015.

Materials and Methods: 45 patients were surgically treated with use of dynamic hip screw (DHS) to stabilize the intertrochanteric fractures. Out of total 45 patients 35 (74%) were males and 10(14%) females. Age ranged between 25 -71 years average 63.9 years. Most common mode of injury was mixed in 28 patients. All the cases were classified according to Jensen's classification. All the cases were performed under image use of 135' angle plate with hip screw.

Results: Out of 45 patients 03 patients died, two in the hospital and I at home. It was observed that patients from rural areas arrived late (19.8 days) after their injuries and these from urban areas reached within two days and thus affected the reduction and operation time. Time lapse between the injury and operation was 11.7 days. Overall union time was 20.02 weeks. No nonunion was seen. Complications were seen in 12 patients.

Conclusion: Excellent to good results were achieved in 96% of cases which concludes that DHS is bio-mechanically stronger and better implant for fixation of intertrochanteric fractures.

Key Words: Dynamic Hip Screw, Fracture, Intertrochanteric Femur

Citation of article: Khan MR, Kakar AK, Tareen MS. Fixation of Intertrochanteric Femoral Fractures by Dynamic Hip Screw. Med Forum 2016;27(4):16-19.

INTRODUCTION

Intertrochanteric fractures classically occur along a line between greater and lesser trochanter[1], are common among elderly due to osteoporosis, malnutrition, decreased physical activity, impaired vision, neurological impairment and altered muscular weakness.

Proximal femoral fractures are extra capsular and heal well because of adequate blood supply. For the extra capsular proximal femoral fractures most appropriate implant is dynamic hip screw which consists of lateral plate and a barrel connected through a sliding screw located in the posterior inferior pole of femoral head. They are by for the most popular devices used today.

Basically two categories of implants are being used to stabilize the intertrochanteric fractures, extra medullary fixation devices include Jewett nail plate Condylar blade plate, Dynamic hip screw system and intra-medullary devices; include reconstruction nails and Gamma nail. Gold men et-al[3] compared the results of compression hip screw and gamma nail and found clinical healing similar but 3-6% re-fracture rate with removal of gamma nails. Simon et-al[4] compared the result of comparison of Gamma nail with dynamic hip screw and reported secondary femoral fractures with gamma nail and found no significant different between the two devices. Apart from extra and intramedullary modalities external fixation have been used for the stabilization of intertrochanteric fractures. Mikovie et-al[5] reported that external fixation is a minimally invasive and suitable device for high risk elderly patients.

Surgical intervention is required to stabilize these fractures and to mobilize the patients as early as possible. These fractures predominantly occur as a results of low energy trauma in old aged patients and high velocity trauma in old age patients and high velocity trauma in young patients. Trochanteric fractures are extra capsular with adequate blood supply which heals well.

Objective of treatment of intertrochanteric fractures is early stabilization and mobilization to avoid complication of immobilization like deep vein thrombosis pulmonary embiolism, bed sores, hypostatic pneumonia and enhanced osteoporosis. Treatment is surgical stabilization with biomechanically stronger fixation device to make the patients. In our local circumstances BMCH, intertrochanteric fractures are mostly stabilized with dynamic hip screw with help of

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Received: January 29, 2016; Accepted: March 15, 2016

image control. Many patients in our local set up report late due to socioeconomic and quicker treatment problems.

MATERIALS AND METHODS

45 patients were studied for the period of two years at BMCH Quetta from January 2014 to December 2015. Out of 45 patients there were 34(77.78%) males and 10(22.22%) females with male to female ratio 3.5:1. Average age was 63.9 years ranging between 25 to 73 years. Mode of fractures was road traffic accidents 28 (62.22%) patients, fall 13(28.89%) and 04(8.89%) had fire arm injuries. According to Jensen's modified Evan's classification of intertrochanteric fractures; there were 30 unstables and 15 stable fractures. All the patients were divided into two groups' early presentation (arriving within week time) and late presenting group (arriving after 1 week time).

Patients admitted through the emergency or OPD were initially managed by resuscitation and application of skin traction to relieve pain. Detailed history, clinical examination and routine investigations were done. Radiographs anterior review and lateral views were taken to asses the fracture geometry. Pre-operative planning was performed to arrange appropriate implant. Most of the patients were operated under spinal anesthesia with use of lateral approach to proximal femur. Patients were operated with supine position and after induction of anesthesia fractures were closely reduced with the help of traction table. In all cases closed reduction was tried first but in those cases where close reduction was unsatisfactory open reduction of the fractures was carried out. After confirmation of the position of guide pin with image. After reaming lag screw of appropriate size was inserted and 135' angled side plates was glided on to the screw and fixed to the bone with 4.5mm cortical screws. Wound was closed in layers over one to three drains. Prophylactic antibiotics were used preoperatively and for future seven days to avoid infections. During the post-operative period patients were advised to sit up move the bed next day and partial weight bearing was allowed as soon as patients could tolerated the pain. Patients were discharged and reviewed every 03 weeks for 03 months and then every 02 months for one year.

RESULTS

Total 45 Patients underwent operative stabilization 03 patients died 2 patients in the postoperative period within 14 in the hospital and one died at home 10 weeks after operation with mortality rate of (6.66%). There were 35 patients and 15 females with male to female ratio of 3.5:1. The ages of the patients ranged between 25 to 71 (average 63.9) years highest age 7th decade of life. As regards the mode of injury was road traffic accident in 28 (62.22%) patients, fall in 13(28.89%) patients, fire am injuries in 04 (8.89%) patients.

Table No.1 : Age Group

Age group	No. of Patients	Percentage
25 -40	02	4.44%
41 -50 years	05	11.11%
61 – 70 Years	30	66.66%
➢ 70 tears	04	8.88%

Regarding the stability of fractures there were 30 (66.67%) unstable fractures and 15(33.33%) stable fractures. All the patients were divided into two groups, early group who arrived within 01 week time and late group arriving after one week. Most of the patients received from rural areas belonged to late group and from urban areas were of early group. There were 24 patients from urban and 21 patients from rural areas.

Table No.2: Mode of Injury

Distribution of patients according to residential area (urban and rural)

Mode of injury	Urban area (n= 24)		Rural area (n= 21)		Total (n = 45)	
	No. of Pts	%	No. of Pts	%	No. of Pts	%
RTA	14	62.5	14	61.9	28	62.2
Fall	08	33.33	05	23.8	13	28.8
Firearm	02	8.33	02	9.5	4	8.8

Table No.3: Types of Fractures

Classification of fractures according to jensen6 (evans modified classification) n=45

Fracture type Jensen type	No. of Patients	Percentage
Type – I	02	4.44%
Type II	03	6.66%
Type – III	10	22.22%
Type –IV	17	37.77%
Type V	13	26.88%
Reverse obliquity	00	0%

Time lapse between the injury and the admission was 11.7 days time in early group while 19.8 the late group which reflects the late arrival of rural area patients due to lack of transport, poverty and poor health education.

Table No.4: Types of Fractures

Delay in admission	Early group	Late group	Overall
0 days	8	-	8
1 - - 7 days	12	-	12
8 - - 14 days	-	8	8
15 - - 21 days	-	5	5
22 – 28 days	-	6	6
.> 28 days	-	6	6
Average	1.75	19.8	11.7 days

Operation time in early group ranged between 90 minutes in 165 minutes and average of 104 minutes but

the average operation time in late group was 135 minutes. This excessive time of 30 minutes was due to open reduction after failure at close reduction and also as more dissection was required in the late arrival group.

Table No.5: Operation Time

Group of patients	Average operation time
Early group	104 minutes
Late group	135 minutes
Overall	120 minutes

Fracture Union. In our series we achieved union in all cases. No delayed or non union occurred. Union time ranged from 16 weeks to 24 weeks with average 20.02 weeks, average union time in early group was 21 weeks and late group was 19.2 weeks.

Table No.6: Union time of Fractures

Minimum	16 weeks
Maximum	24 weeks
Average period	20.2 weeks

Pre-operative complications occurred in 3 patients, one developed fracture of the lateral part of trochanter during operation, one patient had hip joint penetration of screw and 1 lag screw cut out of the neck of femur.
Post-operative complication was in 8 patients, 2 patients developed superficial infection, 2 patients had external rotation deformity, 1 patient had varus angulation, 1 patient leg shortening., 03 patient died 2 in the hospital 1 at home 10 weeks after the surgery.

Table No.7: Overall Complications

S.No.	Complication	Patients	%age
1	Pre-operative		
	Fracture lateral part of greater trochanter	01 01	2.22 2.22
	Hip joint penetration	01	2.22
	Placement of lag screw out of neck		
2	Post Operative		
	Haematoma	02	4.44
	Superficial infection	02	4.44
3	Follow-up		
	External rotation	02	4.44
	Varus angulation	1	2.22
	Leg shortening	1	2.22

Functional Outcome: All the patients were assessed by the Stinchfield hip assessment system of based on disability according to pain, movement and ability to walk. Excellent results were achieved in 33 patients, good in 05 patients fair in 03 patients and poor 1 patient excellent to good results were achieved in 96% cases.
Infection rate in our series was 4.44% and infection rate in case series presented by Desjardins infection rate was 3.5%, series of Radford et-al 4%,

DISCUSSION

Dynamic hip screw is widely accepted in the treatment of inter trochanteric fractures of proximal femur. It is biomechanically stronger and gives excellent results. Kaufer et-al[7] described five variables which determine the mechanical integrity of fracture implant construct following fixation of these fractures. Of these five variables three are directly determined by the surgeon.
1. Reduction 2. Implant used 3. Implant Position.
It has been suggested by McEelvenney et-al[8] that eccentric screw placement allowed tilting of the fracture and impeded union. Mostly posterior-inferior placement is favoured to prevent cut out. Main objective of inter trochanteric fractures is early stabilization to mobilize the patient, achieve fracture union and rehabilitate the patient as soon as possible. There are many factors which can affect the results and out come like age of the patient, time period between the injury & operation and adequate fixation.
We compared the ages of the patients with other studies carried out by the Clark et-al[9] Desjardin et-al[10], Parker-et-al[11], Gargan et-al[12], Baungaertner et-al[13]. Ages of the patient in these studies were more than 80 years in our series patients were younger aged and mode of injury was the trauma. Sex affected in our study and male to female ration was 3.5:1 compared to the studies by the Butt-el-al[14] ration was 0.44:1. Study by Saeed Akhtar et-al[15] the male female ratio was 2.2:1. Our study reveals male predominant ratio because females are less exposed to trauma in our society.
We had 30(66.66%) unstable and 15 stable fractures. Comparative studies presented by the Radford et-al around 60% were stable and 40% unstable fractures. Average operative in our study was 120 minutes, Desjardins et-al, Gargan et-al, Butt et-al average operation was 83 minutes, 47 minutes, 62 minutes respectively. Operation time in our study is low due to available of image confirmation of the pin position as we have the facility of image intensifier.
Butt et-al 4.5%, and infection rate of our study is quit comparable to other studies.
We had no case of fixation failure. Fixation failure was 2% in a study by Clark & Ribbins. Radford et-al younger as compared to other studies; reason may be old age and osteoporotic fractures in other studies. Position of the lag screw should be central or in the inferior part of the femoral head which is debatable. Minds[17]. Thomas et-al[18] has favored the inferior quadrant position of lag screw. However superior position should be avoided because of cut through problem.
Union time in our series ranged between 16-24 weeks average 20.02 weeks. Fracture united in patients below 60 years in 19 weeks. So earlier union occurred in younger patients and advanced age has negative impact on fracture union of intertrochanteric fracture of femur

and this may will be due to the decreased bone stack in neck of femur. Union time in early group was 21 weeks as against 19 weeks on late arrival group. Reason for this could be the more stable fractures in late group.

CONCLUSION

It is concluded that intertrochanteric fractures lead to increased morbidity and mortality. Early and stale fixation is required to avoid various complications. Delayed arrival and traditional treatment of patients by the Quicker and poverty are the factors which affect the results badly.

Patients education, economical solution of poor patients and early surgical intervention can be helpful to the patients.

Various studies including our series have shown that the fixation of intertrochanteric fractures with DHS lead to excellent functional results and has least complications thus it is the best method of managing the fractures.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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