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Coxa femoral reconstruction with cemented bipolar in unstable intertrochanteric fractures.

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Abstract:
Background*: Stable non-osteoporotic intertrochanteric fractures recover well with dynamic hip screws and trochanteric nails. Osteoporotic comminuted unstable intertrochanteric fractures which are treated with proximal femoral nails have limitations, early mobilization can be detrimental, have postoperative complications. Hence converting unstable osteoporotic intertrochanteric fractures in to stable by cemented bipolar hemiarthroplasty followed by calcar reconstruction with tension band wiring gives good results.* ***Aims and objectives of the study:*** *To reduce the post operative complications of unstable osteoporotic intertrochanterics fractures by converting them in to stable fractures by hemiarthroplasty and calcar reconstruction.*
Materials and methods*: A total 40 patientsin the age group 60 to 86 years were treated with cemented bipolar hemiarthroplasty and calcar reconstruction. Mean age of patients was 72 yrs. Calcar fracture was anatomically reduced and stabilized with cemented bipolar hemiarthroplasty, abductor mechanism is reconstructed with tension band wiring.*
Results: *37 patients of 40 patients in our series had no calcar displacement, no dislocations, no implant failure and abductor mechanisum was satisfactorily reconstructed.*
Conclusion*: Bipolar hemiarthroplasty, calcar reconstruction with greater trochanter tension band wiring gives stable mobile hip.*
Keywords: *bipolar hemiarthroplasty, calcar reduction reconstruction, tension band wiring, dynamic hip screws, trochantric nails.*

I. Introduction

Incidence of intertrochontric fracture femur is very high in elderly population[1] with osteoporosis. Worldwide estimate of hip fractures to raise[2]. Stable intertrochantric fractures have been fixed well achieved early mobilization and good recovery[2-7]. Identifying unstable fractures is of great importance because these fractures have high failure rates with internal fixation[8]. Unstable fractures , communited fractures , osteoporotic fractures, have impaired vascularity to head resulting in to external rotation deformity after fixation with implants, and have high chances of implant cut out. Reoperations are common with sliding plate devices[9-1.3] ¨Femoral neck fracture with peritrochantric fractures occur in older patients with baseline function and medical co morbidities [13-14.] Intramedullary nails currently preferred for these fractures, are associated with complications and in all cases early mobilization is not possible. In view of early mobilization, better post operative care and short term recovery from bed an alternative procedure is tried by retaining calcar in its position and cementing bipolar arthroplasty. Outcome assessed over a period of time. Cemented bipolar with calcar reconstruction projected good results, moreover, had advantage of early mobilization and recovery without much complications in all cases[15-17].Intertrochantric fractures with hemiarthroplasty needed calcar bearing prosthesis, which are expensive and not readily available. Cement alone has poor control on rotation of forces. In calcar reconstruction early mobilization, prevention of bed sores is an advantage. Calcar length of neck is also retained and stabilized with cement and implant which gives stability to the joint.

II. Aims and objectives of the study.

To reduce the post operative complications of unstable osteoporotic intertrochanteric communited fractures by converting those in to stable fractures by cemented hemiarthroplasty and calcar reconstruction, and to assess long term out come.

III. Materials and methods.

Study design: we conducted prospective cohort study.

Sample size and study place: Current study was conducted in MNR medical college, Sangareddy, Telangana, India for a period of three years from 2013 January to 2016 December. Total 40 patients between age 60 to 86 years were studied in detail, mean age was 72. Out of which 32 were female patients and 8 were males. 37 patients observed prospectively over a period of 3 years, 3 patients lost follow up as they died over 6 months due to various other co morbidities, all were females and aged above 70 .Ethical clearance and informed consent was taken from all patients.

Inclusion criteria:

Cases were selected according to OTA classification[18]. All patients with intertrochantric fractures with more than 60 yrs of age were included the study. Patients excluded were those who were bed ridden before fractures and patients unfit for anesthesia due to other comorbities.

OTA classification of intertrochantric fractures[18].

Fig 1. classification peritrochantric fracture**.**

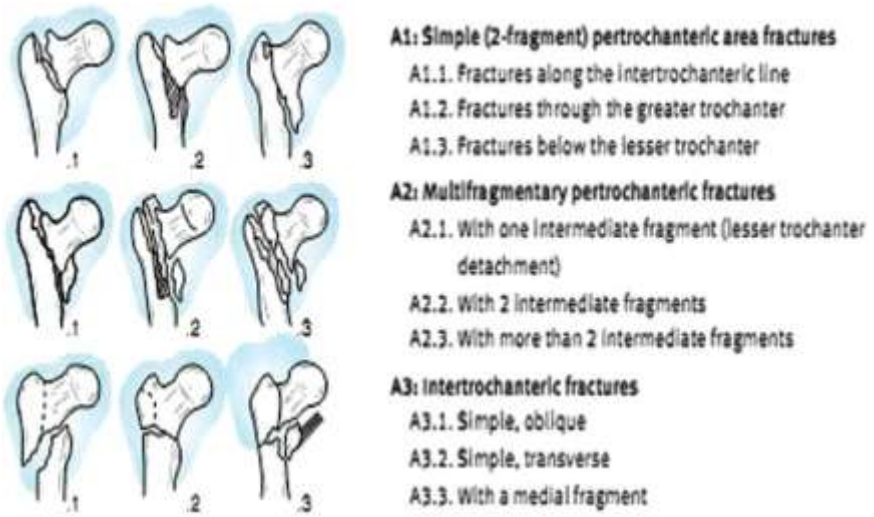

Fig 2. classification ota intertrchatric fractures.

Study age group was 60 to 86 yrs. Each patient was examined clinically and radiologically, detailed status of neurovascular structures and soft tissue injuries were noted. All the patients were operated within 48hrs of presentation, after evaluation of cardiac, respiratory systems, diabetes and other co morbidities. Injection tetanus toxoid and prophylactic antibiotics were administered. Patients were transfused with two to three pints of blood preoperatively as patients were anaemic. Cemented bipolar with tension band wiring done for greater

trochantric fractures with impending avulsion for all patients with osteoporosis. There was no significant blood loss during surgery. Cefperazone with salbactum combination was used up to 8gm of injections, for next four days oral antibiotics were used.

Fig 3. Intertrochantric fracture.

Fig 4. Osteotomy above calcar.

Fig 5. Calcar reconstruction with anatomically aligned commented bipolar, Tension band wiring done which increases stability with abductor mechanism being retained.

All procedures were done under epidural analgesia in lateral position, approach was anterolateral. Iliotibial tract was cut vastus lateralis was split anterior 1/3 and posterior 2/3, anterior capsule was elevated, extracapsular fracture was converted to intracapsular fracture (another proximal fracture was made to fracture). Femoral Head was excised distal fracture fragment was aligned well with femur. Through medial to greater trochanter entry point to femoral canal and was prepared. Anteversion maintained to calcar line or in axises of medial condyle, after checking head size cemented bipolar done in proper version. Length offset kept in position till cement settled well. Tension band wiring performed from tip of trochanter to medial aspect femur below fragment. Thus trochanter and abductor mechanism retained. Joint was reduced .For all patients greater trocahnter was fixed with tension band wiring except one patient, where greater trochanteric fracture was horizontal, cirulage was done for that patient. Stability was checked. Wound closed with drain.

Active ankle movements were allowed from same day of surgery after patient recovered from anesthesia. Partial weight bearing walking with walker, most important personal needs of hygiene and toilet training were allowed from next day. Once pain relieved, full weight bearing was allowed gradually over a period of 6 weeks. All patients were followed on day7, after 1st month, 3rd months, 6 months and year. Harris hip score was calculated for all the patients.

Fig 6. Pre op intertrocantric fracture.

Fig 7. Cemented bipolar with tension band wiring.

Fig 8 . Pre op fracture peritrocantric fracture. **Fig 9 and 10.** Tension band wiring with cemented bipolar prosthesis.

IV. Results

40 patients with osteoporotic intertrochanteric fractures underwent cemented bipolar surgery with tension band wiring. Female: male ratio was 4:1.The mean follow up was two years, patients were followed from day one of surgery. Active ankle movements were allowed from the same day of surgery once patient recovered from anesthesia. Partial weight bearing walking with walker, most important personal needs of hygiene and toilet training were allowed from next day, full weight bearing was allowed gradually over a period of 6 weeks. All patients were followed on day7, after 1st month, 3rd months, 6 months, 1 year and 2 years. Harris hip score was calculated for all the patients. Limb shortening was 1cm in 3 pts, which was not significant. No other significant complications were noticed. The mean Harris hip scores at 6 months for 40 patients are, for 29 patients scores are excellent, 6 patients fair, one patient had poor hip score. 3 patients lost follow up, remaining 37 patients were walking independently at house hold after 6 weeks of surgery, and 14 patients used cane while they were going for long walks. There were no dislocations, heterogeneous ossifications or periprosthetic fractures.

Table 1. Sex wise distribution.

Sex	No of cases	Percentage %
female	32	80%
Male	8	20%

Table 2. Side wise distribution.

Side	No of cases	Percentage%
Right side fracture	28 patients	70%
Left side fracture	12	30%

Table 3. Age wise distribution.

Age group	No of cases	Percentage%
60 to 70	14	35%
Above 70	26	65%

V. Discussion

Treating fractures neck femur in osteopotic adults is difficult as most fractures treated either with dynamic hip screws or proximal femoral nails which gives poor results in these patients. Most osteoporotic fracture ends are poorly vascularised or communited [2], maintaining fracture stable with hardwire till callus formation may be difficult as patients need to be bedridden till callus formation .Peritrochantric fractures, have rotational component with poor vascularised head, patients have high chances of avascular neck femur, Union rates are close to 100% have been achieved in stable fractures in patients with good quality bone, when compared to poor bony architecture in most adults with osteoporotic trochantric fractures. Proximal femoral nails in unstable intertrchonatric fractures shown high incidence of complications[19]. Sinno et al reported 26% unsatisfactory results with dynamic hip screws due to bio mechanical failures[2]. Shortening of limb is seen as common problem with dhs fixation in unstable intertrochantric fractures[10, 11]. Wolfgang et al reported a complication rate of 38.6% during fixation of intertrochantric fractures with sliding hip screws[9.] Study of Crawford et al reported 11% reoperation rate because of screw cut outs or fractures of distal tip of nail [20].There was not much indications for intertrchonatric fracture through literature. Cemented bipolar hemiarthroplasty with calcar reconstruction is alternate option for unstable osteoporotic intertrochanteric fracture in elderly people, have advantage of early ambulance, less chances of bed sores, fixation failures and less reoperations [21]. In posterior medial defect, the use of long stem prosthesis and calcar replacement stem has been reported [19], but these implants are costly and are not readily available. This implant needs large amount of bone removal from femur [21] Bipolar has less bone loss compared to calcar sparing implant. Reconstruction of calcar to anatomical base helps in maintaining normal neck length thus preserving bone length and it can easily be converted to total hip replacement in future. Haentjens et al showed callus formation with prosthetic replacement. In our patients postoperatively calcar appeared normal with calus formation around neck of femur. Communited bone fragments unite with femoral shaft even in absence of fixation due to callus formation[2]. The same callus can be expected to stabilize the calcar graft, and also it binds to extra medullary portion[2]. There were no perioperative complications, post operative infections or other co morbid complaints. Patients achieved early ambulance. The only complication was shortening of limb, was seen in 3 patients with 1 cm shortening , which is clinically insignificant, no patients had bed sores, no painful hip, no dislocations. The mean Harris hip scores at 6 months for 40 patients are, for 29 patients scores are excellent, 6 patients fair, one patient had poor hip score. Our series are good and is comparable with those of other authors listed below.

Table 4.Studies from various authors.

Author	Number of cases	Mean age	Follow up mnths	implant	results	complications
Green et al[22]	20	82.2	13.2	Hemiarthroplasty (calcar replacement prosthesis)	12 patients remained ambulatory 4 non ambulant 4 died.	Greater trochanter nonunion 1, implant failure 1, pain ful hip 4
Kim et al[23]	29	82	35	Un cemented bipolar long stem	Good. All ambualatory	Greater trochanter nonunion 2, dislocation 1
Haentiens et al [24]	37	82	20	Muller femoral component	75% had good and excellent merle D` aubigne scores	Deep infections 1, dislocations 2, post operative periprosthetic infections 1. Trochantric non union
Chan and gill [21]	55	84.2	13.6	Hemiarthroplasty	19 patients maintained pre fracture level. 12 patients died 6 mnths of surgery	Non union trochanter 1,pain due to over sized implant1, painful prosthesis.
Zhang et al [17]	19 (salvage failed internal	64.1	40.3	16 total hip arthroplasty , 3 bipolar		Intraoperative fracture of greater trochanter

	fixation)			hemiarthroplasty standard length, noncalcar replacement stem.		7,dislocations 3,non union greater trochanter 1.
Stern MB, Goldstein[25]	29	79	29.3	Hemiarthroplasty	86% were ambulatory within week of operation.	Infection 3,sinking of implant 1
Takkar cj, savyasachi thakkar.[2]	48	79.2	54.2	Standard length noncalcar bipolar hemiarthroplasty in 33 patients , 17 modular prosthesis (stryker) and 16 were fixed bipolar stems (inor)	11 patients died within 3 yrs of operation. Excellent and good . harris hip scores in 26 patients	Sinking of implant 2, (1 required revision with thr). Non union greater trochanter 1, superficial decubitus ulcer 1.
Present study 2017	40	74 yrs	30	Inor cemented bipolar hemiarthroplasty	3 patients died after 6 months, rest of patients were	There no complications seen.

VI. Conclusion

Our study concludes that cemented bipolar hemiarthroplasty with calcar reconstruction is a good option for elderly patients with intertrochantric fractures. This procedure helps patients to recover early from bed with minimal complications.

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