

De-rotation boot cast and traction in intertrochanteric fracture hip: An implant guy's envy and a government surgeon's pride

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Abstract

Introduction: In this genre of AO principles, most of the fractures are fixed surgically unless it's a hairline fracture or a very high risk patient with co-morbidities.

Material & methods: Our study involves 23 patients visiting a remote government medical college with hip intertrochanteric fracture (IT) which were managed non-operatively due to co-morbidities and/or patients not willing for operative management. All those patients were applied de-rotation boot cast and applied 10% traction of their body weight over it. Clinical and functional outcome was measured by Harris hip score at admission, 6, 12 and 18 months follow-up. Radiological evaluation done by radiographs of hip-AP and lateral views.

Results: Statistical analysis was done using SPSS software for descriptive data. Paired 't' test was applied to see improvement in functional & clinical outcome (Harris hip score), first between 6 month follow up and 12 month follow up & 18 month follow up and results were tabulated. The 'p' value was < 0.01 for Harris hip scores analysis by 't' pair test between 6, 12 and 18 months follow-ups and was significant.

Conclusion: Operative treatment of intertrochanteric fractures though gives early mobilization and less hospital stay, after one year of injury both non-operative and operative management are of less significance with respect to mortality, functional outcome and medical complications.

Keywords: Intertrochanteric fracture, de-rotation boot cast, hip fracture

Introduction

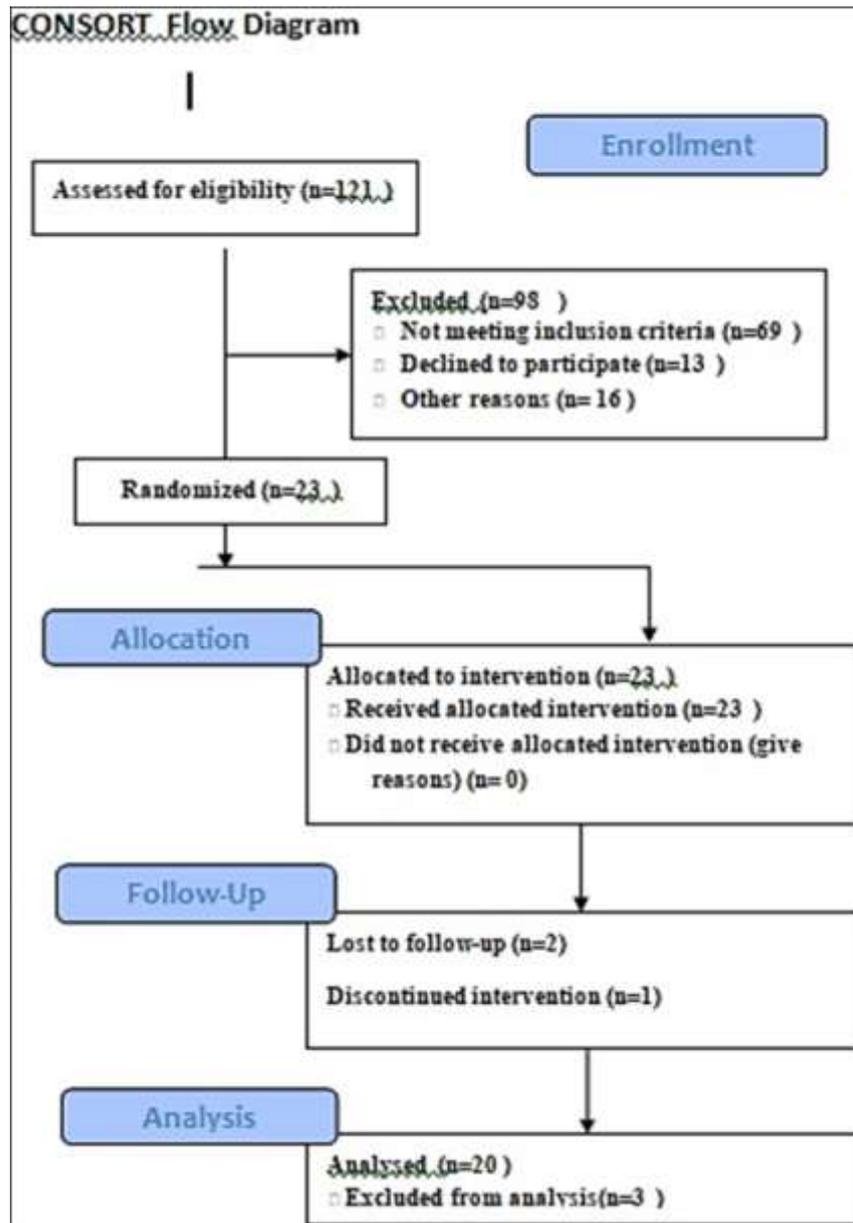
In the elderly, hip intertrochanteric (IT) fracture is one of the most common fracture types ^[1]. Its incidence continues to increase as the number of geriatric and osteoporotic patients increase ^[2]. Overall studies estimate that the number of hip fractures worldwide will range from 7.3 to 21.3 million by the year 2050 ^[3]. IT fractures are treated usually by osteosynthesis using intra-medullary or extra-medullary implants ^[4]. Biomechanical data suggest that the energy generated from simple fall with a direct impact to the lateral upper thigh or buttock is 16 times higher to the energy required to fracture

the proximal femur [5] But, only a small proportion of such incidences result in the fracture which suggests that in addition to the poor bone stock, the loss of the body's protective responses like inadequate reflexes, loss of local shock absorbers like fat and muscle, as well as prolonged reaction times during the fall is important. Patients who present late with a fracture which has begun to heal, co-morbidities, lack prospects for any functional recovery or refuse surgery are the indications for non-operative management [6].



Material & Methods

Our study involves rural population visiting a remote government medical college with Boyd & Griffin type 2, 3, 4 intertrochanteric fractures managed conservatively due to life threatening co-morbidities or patient's refusal for surgery. All patients were applied plaster of Paris de-rotation boot cast and 10% body weight traction was applied over it. Pressure sore care by position change intermittently along with traction release was done. After initial few days of pain management as in-patient hospital stay, patients were discharged home with relevant advise of pressure sore care, pop cast care, diet and hygiene along with medications. It's an observational study conducted from 1st February 2017 to 31st January 2019 with minimum 18 months follow-up after institutional ethical committee clearance. A total of 23 patients participated in the study, out of which two patients expired after an year and another patient lost for follow-up at 18 months. So finally 20 patients completed the 18 months follow-up and were considered for statistical analysis.

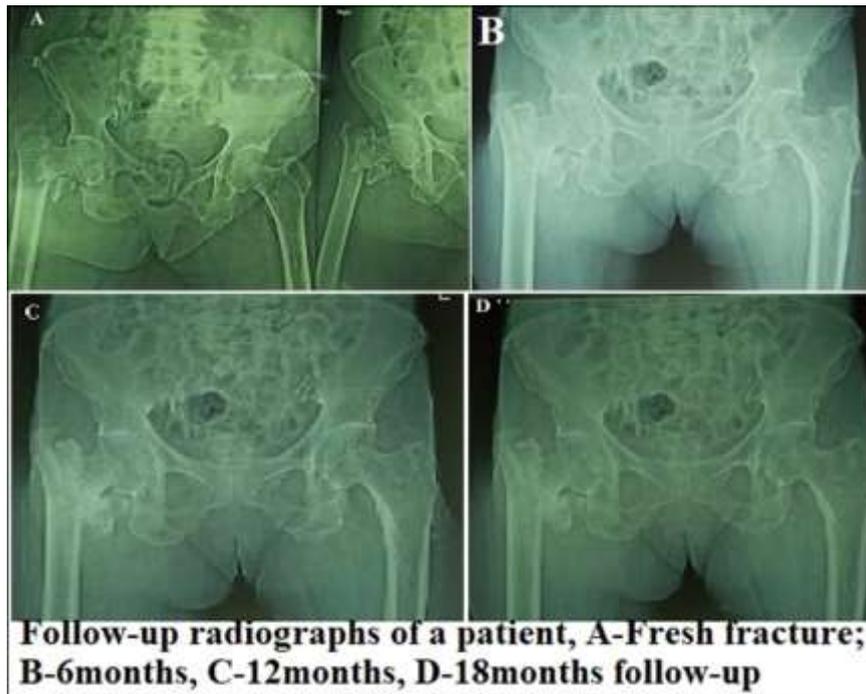


The Harris hip score was used to assess clinical and functional outcome using multiple standard parameters like pain, walking ability, motion, deformity, function etc. (90-100 points = excellent, 80-89 points = good, 70-79 points = fair and <70 points = poor) [7, 8]. Pre-casting scores were obtained at the interview with the patient and/or relatives. Post-cast scores were obtained at 12 months and 18 months follow-up.

Fracture healing was assessed radiological by the presence of a bridging callus on at least three of four cortices (on antero-posterior and lateral hip radiographs) [9]. Radiographs were taken pre-cast and at the time of follow-ups. The fracture reduction was assessed by three criterions-

- 1) AP view, the anatomical neck-shaft angle should be between 125° and 135° .
- 2) Lateral view, the anterior or posterior angulation should be less than 20° .
- 3) Cortical congruence at the calcar area should be restored and the displacement of the fracture should be equal or less than 4 mm [10, 11, 12].

With these criteria grading of radiographs was given as “Not acceptable/Satisfactory/Excellent” respectively. Complications like decubitus ulcers, pneumonia, urinary tract infection and mental confusion were observed.



Results: Statistical descriptive analysis was performed using SPSS 25.0 software (SPSS Inc., IBM, NY, USA). Numerical variables were tabulated as means and standard deviations, and categorical variables were tabulated as frequencies and percentages. Means were compared by using paired t-test. Functional, clinical and radiological outcome using Harris hip score and radiographs was satisfactory after 12 months and 18 months follow up though prolonged immobilization was the only drawback along with higher incidence of decubitus ulcers and cardio-respiratory complications secondary to it.

Results

- 1) Minimum age = 56 yrs, maximum age = 82 yrs, Mean +/- SD = 68.65 +/- 7.975 yrs
- 2) Paired samples 't' test was applied to see improvement in functional & clinical outcome (Harris hip score), first between 6 month follow up and 12 month follow up & 18 month follow up and results were tabulated.

Table 1: Harris Hip score

M +/- SD	T value	CI	P value
-10.813 +/- 7.013	-7.395	-13.845 to -7.781	<0.01
-25.930 +/- 6.622	-17.510	-29.029 to -22.831	<0.01

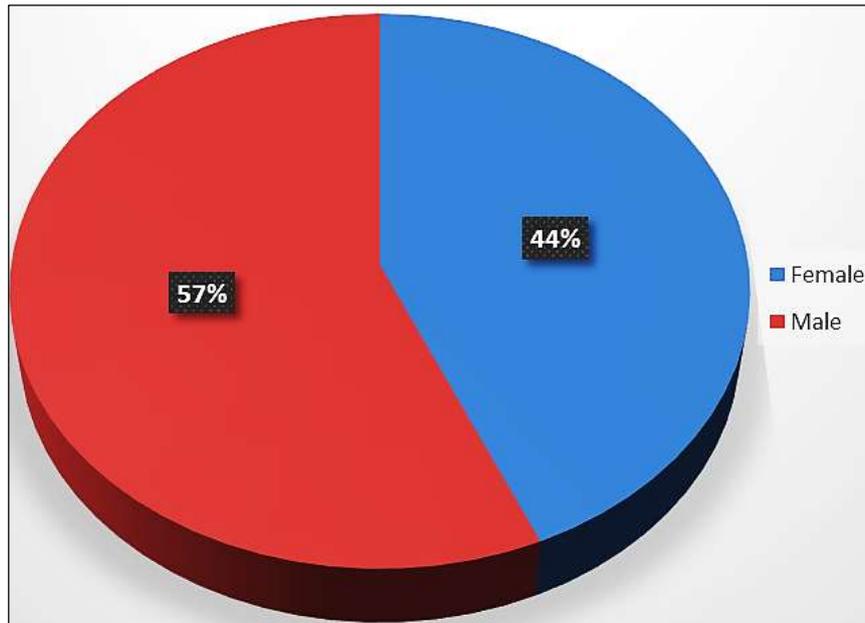


Fig 1: Sex-wise distribution of study subjects (n=23)

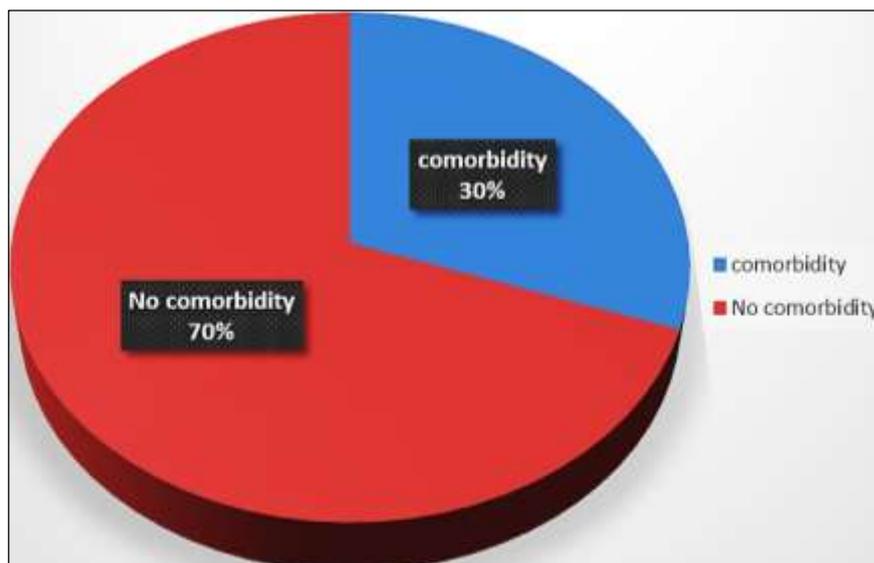


Fig 2: Distribution of patient as per comorbidity status

Discussion

Lu-Yao *et al.* study found that 92.2% of hip fracture patients underwent internal fixation or arthroplasty and 8% received other care (non-operative) [13]. Unpublished data during 1981 to 1994 cohort study of approximately 10,000 U.S. patients shows a 4% incidence of non-operative management [14, 15]. From three large cohort studies, Penrod and colleagues observed a decreased survival and ambulatory function at six months among blacks versus whites admitted for hip fracture [16]. Eileen Tay in his retrospective study found that hip fractures managed non-operatively had mortality risk of four times at one year and three times the operated ones at two years follow-up respectively [17]. S Haleem *et al.* in his review of four decades articles found that hip fractures mortality remains significant with 11-23% at 6 months and 22-29% at 12 months from injury [18]. Our study also showed similar rate of mortality at 12 months. Handoll *et al.* in his Cochrane review found no difference between operative and non-operative management of extra-capsular fractures with respect to medical complications, mortality and long term pain. But operative treatment resulted in fracture healing with no leg shortening and a shorter hospital stay [19].

Conclusion

Though present era trauma management is surgical fixation for most of the fractures, conservative management still has a major role. Whenever the risk to benefit ratio is too high with surgical fixation, intertrochanteric femur fractures can be managed with de-rotation boot cast and traction. This can nearly attain all the three parameters (length, alignment & rotation) needed for a successful fracture union. One year survival rate is almost comparable with both surgical and conservative management in elderly hip fractures.

Limitations

Of this study is being an observational study, it also lacks the control group. Follow-up duration is also less comparatively.

Conflict of interest

All authors confirm that there is no conflict of interest.

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