

ORIGINAL ARTICLE

RISK FACTORS FOR FAILURE OF CANNULATED SCREWS FOR THE MANAGEMENT OF FRACTURED FEMUR: A CLINICAL STUDY

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ABSTRACT:

Background: Fractures are commonly seen following road accidents, fall from building or tree, fight etc. Long bone fractures are commonly seen during road side accidents. The present study was conducted to assess risk factors associated with early failure following internal fixation using cannulated screws in the treatment of intracapsular fractures of the proximal femur. **Materials & Methods:** This study was conducted in the department of orthopaedics in 2015. It included 240 patients having fracture femur. All patients underwent internal fixation of an intracapsular fracture of the proximal femur with cannulated hip screws. Pre-operative radiographs were analyzed for the degree of displacement according to the Garden classification.⁵ Operation notes and intra-operative radiographs were assessed for the number of screws used. Placement of the screws was noted whether it was placed in a parallel, diverging or converging manner. The angle made by the screws was recorded with a parallel placement defined as less than five degrees of divergent or convergent angle in both anteroposterior (AP) and lateral views. **Results:** This study consisted of 240 patients (males-72 (30%) and females 168 (30%). 180 patients showed no failure (males-54, females-126) and 60 patients showed failure (males-42, females-18). The difference was significant (P<0.01). Fractures were divided into type I, II, III and IV. Type I was seen with failure (4) and no failure (26). Type II was seen with failure (8) and with no failure (42). Type III was seen with failure (26) and with no failure (71). Type IV was seen with failure (22) and with no failure (39). The difference was highly significant (P<0.001). AP reduction with no failure and not in range was 27% and with failure was 73%. AP reduction with no failure and in range was 73% and with failure was 27%. Number of patients with no failure and in range was 74 while with failure was 6. Screws are in parallel to both AP and lateral view with anterior angle with no failure was 34 and with failure was 29. Screws are in parallel to both AP and lateral view with posterior angle with no failure was 70 and with failure was 36. The difference was highly significant (P<0.001). Number of screws used was 2 or 3. When 2 screws were used failure was seen in 4 cases and no failure in 138 cases. When 3 screws were used failure was seen in 46 cases and no failure was seen in 44 cases. The difference was significant (P<0.01). **Conclusion:** Our study revealed that successful reduction is key to prevent early failure of femur union. Whether fracture is displaced or we want to treat undisplaced fracture, reduction is mandatory.

Key words: Femur, Fractures, screws

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INTRODUCTION

Fractures are commonly seen following road accidents, fall from building or tree, fight etc. Long bone fractures are commonly seen during road side accidents. Fracture of the proximal femur contributes 12% of all fractures. There is different opinion regarding treatment of femur fractures. Hence surgical treatment for intracapsular fractures remains controversial.¹

NICE guidance suggests that displaced fractures should be treated with an arthroplasty. primary 10-15% dislocation rate are seen with arthroplasty.² According to SIGN guidelines “older” or less fit patients should be treated with an arthroplast while “young” patients or those with

undisplaced fractures should undergo internal fixation. Nonunion and avascular necrosis are among the complication following internal fixation which results into reintervention rate. Some authors suggested that hemiarthroplasty have a better functional outcome whereas other studies have shown lower mortality with that internal fixation.³

Thus there are no specific guidelines for the management of proximal femur fracture. Patient age and the quality of fracture reduction have been reported as risk factors for failure of internal fixation. Biomechanical studies have suggested that placement of a screw proximal to the medial calcar strengthens the construct but an optimal position for

screw placement has not been proven.⁴ The present study was to conducted to assess risk factors associated with early failure following internal fixation using cannulated screws in the treatment of intracapsular fractures of the proximal femur.

MATERIALS & METHODS

This study was conducted in the department of orthopaedics in 2015. It included 240 patients having fracture femur. All patients underwent internal fixation of an intracapsular fracture of the proximal femur with cannulated hip screws. Pre-operative radiographs were analyzed for the degree of displacement according to the Garden classification.⁵ Operation notes and intra-operative radiographs were assessed for the number of screws used. Placement of the screws was noted whether it was placed in a parallel, diverging or converging manner. The angle made by the screws was recorded with a parallel placement defined as less than five degrees of divergent or convergent angle in both anteroposterior (AP) and lateral views. If three screws were used then the two most peripheral screws on each view were used to calculate these angles. Successful reduction was defined as an AP femoral neck angle of 130 to 150 degrees and 0 to 15 degrees of anteversion on the lateral image as suggested by previous studies. The AP and lateral spread of the screw tips was measured from the threads of the two outermost screws on the respective views. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

This study consisted of 240 patients (males-72 (30%) and females 168 (70%). The difference was significant (P<0.01) (Table I). Table II shows number of males and females with failure treatment. 180 patients showed no failure (males-54, females-126) and 60 patients showed failure (males-42, females-18). The difference was significant (P<0.01). Graph I shows that fractures were divided into type I, II, III and IV. Type I was seen with failure (4) and no failure (26). Type II was seen with failure (8) and with no failure (42). Type III was seen with failure (26) and with no failure (71). Type IV was seen with failure (22) and with no failure (39). The difference was highly significant (P<0.001).

Table III shows that AP reduction with no failure and not in range was 27% and with failure was 73%. AP reduction with no failure and in range was 73% and with failure was 27%. Number of patients with no failure and in range was 74 while with failure was 6. Screws are in parallel to both AP and lateral view with anterior angle with no failure was 34 and with failure was 29. Screws are in parallel to both AP and lateral view with posterior angle with no failure was 70 and with failure was 36. The difference was highly significant (P<0.001).

Graph II shows that number of screws used was 2 or 3. When 2 screws were used failure was seen in 4 cases and no failure in 138 cases. When 3 screws were used failure was seen in 46 cases and no failure was seen in 44 cases. The difference was significant (P<0.01).

Table I Distribution of patients

Total- 240		
Male	Female	P value
72 (30%)	168 (70%)	0.01

Table II Number of patients with failure

	No failure (180)	With Failure (60)	P value
Male	54 (30%)	42 (70%)	0.01
Female	126 (70%)	18 (30%)	

Graph I Distribution of patients based on Garden classification

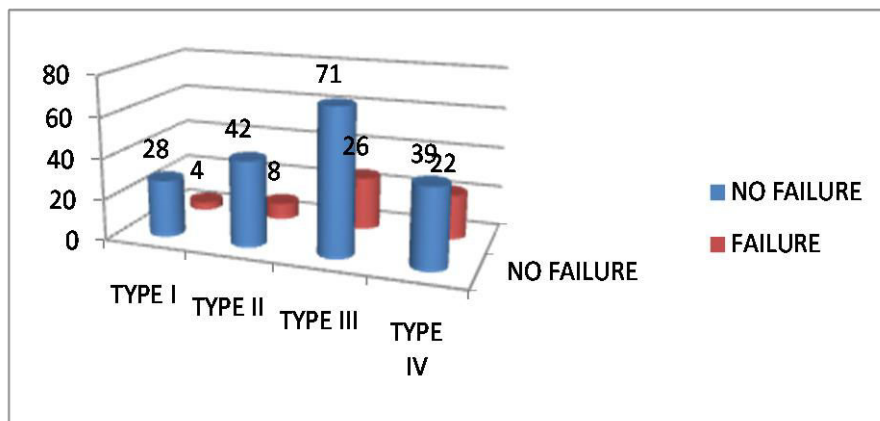
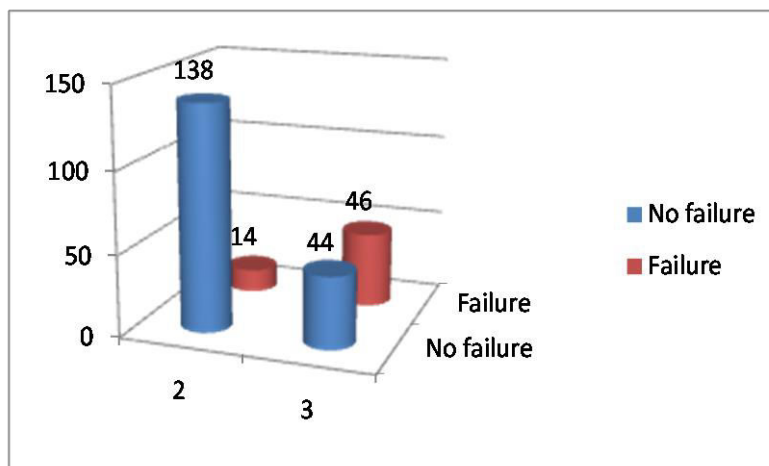


Table III Reduction and placement of screws

		No failure	Failure
AP reduction	Not in range	48 (27%)	44 (73%)
	In range	132 (73%)	16 (27%)
Lateral reduction angle	In range	74	6
	Anterior angle (>15°)	34	29
Screws are in parallel to both AP and lateral view	Posterior angle (<0°)	70	36
	No	36	20

Graph II Number of screws used in patients



DISCUSSION

Femur fracture contributes to 12% of all fractures main reason being road side accident. The present study was to conducted to assess risk factors associated with early failure following internal fixation using cannulated screws in the treatment of intracapsular fractures of the proximal femur.

This study consisted of 240 patients (males-72 (30%) and females 168 (30%). 180 patients showed no failure (males-54, females-126) and 60 patients showed failure (males-42, females-18). Foote C found similar results in his study. Fractures were divided into type I, II, III and IV. Type I was seen with failure (4) and no failure (26). Type II was seen with failure (8) and with no failure (42). Type III was seen with failure (26) and with no failure (71). Type IV was seen with failure (22) and with no failure (39). Our results are in agreement with Frihagen et al.⁶

We also evaluated reduction in our study. AP reduction with no failure and not in range was 27% and with failure was 73%. AP reduction with no failure and in range was 73% and with failure was 27%. Number of patients with no failure and in range was 74 while with failure was 6. Screws are in parallel to both AP and lateral view with anterior angle with no failure was 34 and with failure was 29. Screws are in parallel to both AP and lateral view with posterior angle with no failure was 70 and with failure was 36. This is in accordance to Grogery et al.⁷

In present study we found that when 3 screws were used 50% of failures were seen. This is in accordance to Larsson et al.⁸

We have shown a significant relationship between fracture displacement and adequate fracture reduction with the early failure of patients undergoing cannulated screw fixation.

CONCLUSION

Our study revealed that successful reduction is key to prevent early failure of femur union. Whether fracture is displaced or we want to treat undisplaced fracture, reduction is mandatory.

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