

Outcome Analysis of Ipsilateral Neck with Shaft of Femur Fractures Treated by Cephalomedullary Nail

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ABSTRACT

Background: The incidence of ipsilateral neck of femur with shaft of femur fracture was around 1–9%. The diagnosis of femoral neck fractures is frequently missed during the initial assessment due to more focus of femoral shaft fractures. There are hardly any literature regarding outcomes of ipsilateral neck and femur shaft fractures. The aim of the study is to assess the functional outcome of ipsilateral neck with shaft of femur fracture treated with cephalomedullary nail.

Materials and methods: This is a prospective study done at Sri Ramachandra Medical College between April 2014 and December 2018 in the Department of Orthopedics. The inclusion criteria were patients above 18 years having ipsilateral neck with shaft of femur fracture. The exclusion criteria were isolated shaft or neck of femur fracture and patients who lost follow-up and open fractures. We had 15 patients who had full follow-up. The minimum follow-up was taken as 1 year. Patients' age group was between 24 years and 58 years with an average of 40 years. All the patients were followed up by modification of Wilde et al.'s Neer scoring system for outcome.

Results: We had excellent results in five patients, seven patients had good results, and three patients had fair results. There was no poor result in our cases. In our study, 67% of the cases had no complications. The average time of union of the fracture was 25 weeks.

Conclusion: Even though cephalomedullary nailing is technically demanding for ipsilateral neck of femur and shaft of femur fracture management, in our series with decent clinical outcome and fewer complications, it can be considered as an acceptable option in the management of these fractures.

Keywords: Fracture, Ipsilateral, Neck of femur, Nonunion, Shaft femur.

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INTRODUCTION

The incidence of ipsilateral neck of femur with shaft of femur fracture was around 1–9%.¹ The diagnosis of femoral neck fractures is frequently missed during the initial assessment due to more focus of femoral shaft fractures and diversion by treatment of life-threatening injuries. Bennett et al.² found a delayed diagnosis rate of 31%, and Swiontkowski found a rate of 19%.³ The femoral shaft fractures can occur at any portion of the shaft, but there is an increased incidence of midshaft and ipsilateral femoral neck fractures. This accounts for approximately 52–80%.⁴ The shaft fracture, in contrast to femoral neck fracture, is often open or comminuted or both due to the high-energy absorption. The goal of any treatment plan should be anatomical reduction of the neck fracture and stable fixation of both the fractures, so that the patient can be mobilized earlier.⁵ There is a big ongoing debate among the orthopedic fraternity whether to use a single implant or two implants in case of ipsilateral femur neck and shaft fracture.

Aim

To assess the functional outcome of ipsilateral neck with shaft of femur fracture treated with cephalomedullary nail.

MATERIALS AND METHODS

This is a prospective study done at Sri Ramachandra Medical College between April 2014 and December 2018 in the Department of Orthopedics. The inclusion criteria were patients above 18 years having ipsilateral neck with shaft of femur fracture. The exclusion criteria were isolated shaft or neck of femur fracture and patients who lost follow-up and open fractures. We had totally 18 patients as per our inclusion criteria. Three patients lost the follow-up,

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and data were calculated based on the 15 patients who had full follow-up. The minimum follow-up was taken as 1 year. Patients' age group was between 24 years and 58 years with an average of 40 years. There were 11 male patients and 4 female patients. All the patients in our study had closed ipsilateral neck with shaft of femur fracture. The mode of trauma in 11 patients was high-velocity road traffic accident while 4 sustained fracture from falling from height. Six patients had left-sided fracture, while nine had it on their right. Eight patients out of 15 had associated fractures along with the ipsilateral neck and shaft of femur fracture. Six of the neck fractures were undisplaced basicervical fractures. There were nine minimally displaced fractures with seven basicervical and two transcervical. Shaft fractures consisted of 11 Winquist grade 0 and 4 Winquist grade I levels of comminution. All the patients were followed by modification of Wilde et al.'s Neer scoring system for outcome.⁶

All the patients underwent surgery within 24 hours to a maximum of 9 days. All patients were given antibiotics

postoperatively for 5 days. Drain removal was done on the second postoperative day. Suture removal was done on postoperative days 12–14. Patients were advised non-weight-bearing activities for 6 weeks. Partial weight-bearing activities were advised for another 6 weeks. Radiological and functional examination was done 3 weeks, 3 months, 6 months, and 1 year. Complete healing was defined as radiologically complete bone regeneration at the fracture site and a pain-free patient with full weight bearing on the injured limb. Delayed union was defined as absence of healing 3 months after the operation. Nonunion was defined as absence of healing 6 months after the operation.

RESULTS

The results of the study were analyzed using modified Wilde et al.'s Neer scoring system. The duration of follow-up ranges between 9 months and 18 months with an average of 12 months. The average time interval between the injury and the surgery was 5 days. The average intraoperative time in our study was 161 minutes. The operating time included from positioning the patient. In our study, the mean blood loss was found to be 257 mL. At the most recent follow-up of 15 patients, the average flexion of the hip was 100° and knee was 110° (range from 90–120). As per modification by Wilde et al.'s Neer scoring system, we had excellent results in five patients, seven patients had good results, and three patients had fair results (Table 1). There was no poor result in any of our cases. In our study, 67% of the cases had no complications. The complications were tabulated in Tables 2 and 3. The average time of union of the fracture was 25 weeks. All the fractures were united in our study.

DISCUSSION

Internal fixation of ipsilateral neck and shaft of femur fractures gained widespread acceptance recently as implants and technology had improved. The main principle in the fixation is that it restores the anatomical alignment and allows early mobilization of the patient and the limb. Factors favoring healing in combined ipsilateral neck and shaft of femur fracture were minimal gap, adequate stability, and sufficient vascularity.⁷ Ipsilateral neck with shaft of femur fracture was more common in young individuals, predominantly male, sustaining high-velocity injuries. Several methods of fixation have been described and controversy exists regarding the best approach.

Table 1: Outcome as per modified Wilde et al.'s scoring system

Result	No.	Percentage
Excellent (16–20)	5	33
Good (11–15)	7	47
Fair (6–10)	3	20
Poor (1–5)	0	0

Table 2: Complications

Components	Number	Percentage
Knee stiffness	2	17
Limb shortening	1	8
Infection	0	0
Heterotopic ossification	1	8
No complications	11	67
Nonunion	0	0

Table 3: Master table of 15 cases

Cases	Modified Wilde et al.'s score	Results	Complication
Mr Sur	12	Good	Nil
Mrs Nag	16	Excellent	Nil
Mr Sha	09	Fair	Knee stiffness
Mr Raj	11	Good	Nil
Mr Ayy	07	Fair	Heterotopic ossification (Figs 1 to 3)
Mr Rav	14	Good	Knee stiffness
Mrs Suj	19	Excellent	Nil
Mr Kum	17	Excellent	Nil
Mr See	17	Excellent	Nil
Mr Mut	18	Excellent	Nil
Mr Gop	14	Good	Nil
Mrs Dai	11	Good	Nil
Mr Vee	13	Good	Nil
Mrs Par	11	Good	Nil
Mr Ste	09	Fair	Shortening



Fig. 1: Preoperative X-ray with neck and shaft of femur

The advantages of using a single implant were many. The significant point of interest was that a single implant can be utilized to balance out the two fractures. The compression of neck of femur fracture can be accomplished with the utilization of the partially threaded proximal locking screws and decreasing the frequency of nonunion, and the length and rotation of the femoral shaft fracture can be overseen by static interlocking screw. A biomechanical cadaveric study of femur exhibits that strength of cephalomedullary screw in neck of femur fracture is higher than with cancellous screw.⁸ There is less likelihood of varus neck disfigurement due to the higher rate of compression achieved by the cervical bolts.⁹ The main drawback of the cephalomedullary nail is that if the nail is not placed properly, then only one screw will be embedded into the head and neck.¹⁰ There were various literatures analyzing the pros and cons of single vs. double implant not able to come to a concrete result.^{11,12}

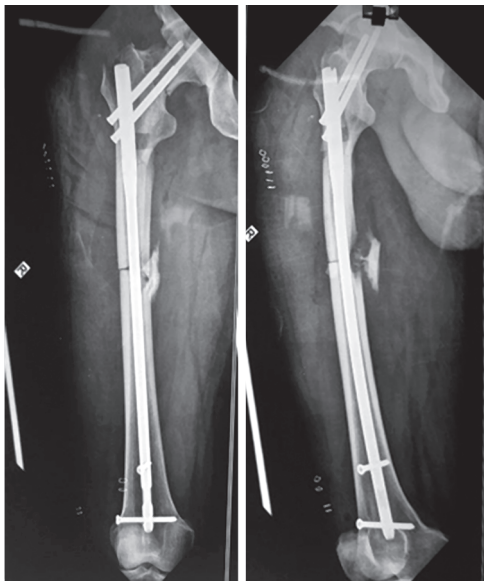


Fig. 2: Immediate postoperative X-ray following cephalomedullary nailing

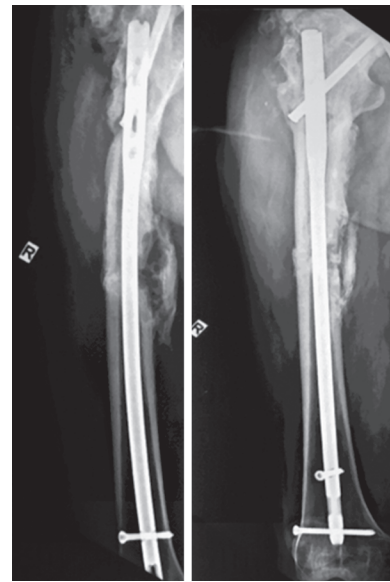


Fig. 3: Delayed union with screw pullout with heterotopic ossification. 1 year postoperative

The neck fracture and shaft fracture union rate in our study was 100%. Randelli¹³ and Hossam¹⁴ showed a similar result of 100% union rate of femoral neck and shaft in their studies. It is easier to maintain reduction in minimally displaced fractures. But achieving reduction in displaced and comminuted fractures is challenging even for the most experienced hands. The average knee flexion in this study is 110°. With 1 year follow-up of 15 patients in our study, there were no cases of osteonecrosis of femoral head. Randelli and Jain showed 4% of osteonecrosis with a follow-up of more than 2 years. Due to dissipation of most of the energy to the femoral shaft in these ipsilateral fractures, the avascular necrosis of the femoral head is very much less when compared with isolated neck of femur fracture. We had two patients with 1 cm shortening of the limb following surgical fixation, but patients were not symptomatic and did not affect the functional outcome. In our study, we had one case with valgus deformity and one case of varus deformity. Although these angulations were noted, these were asymptomatic for the patients.

In our short-term study of 15 patients, we were able to obtain satisfactory results with minimum complication rate. We had several setbacks in our patients: delayed time interval before surgery, need for open reduction in order to achieve alignment in most cases, but in spite of these setbacks, we were able to achieve excellent results in terms of neck union and shaft union. Since our sample size is small, the appropriate treatment method cannot be commented with this study. The long-term follow-up of these patients is required to report on long-term complications like avascular necrosis which may result due to the delayed surgical time interval. In ipsilateral neck and shaft fractures, most neck of femur fractures are undisplaced or minimally displaced.

CONCLUSION

Even though cephalomedullary nailing is technically demanding for ipsilateral neck of femur and shaft of femur fracture management, in our series with decent clinical outcome and fewer complications, it can be considered as an acceptable option in the management of these fractures.

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