

Neglected basicervical neck of femur fracture treated with closed reduction and internal fixation with a cephalomedullary nail alone: A case report

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ABSTRACT

A fractured neck femur presenting beyond 3 weeks is referred to as a neglected fracture. The current literature is silent about neglected Basicervical fractures. The latter behave more like an intertrochanteric fracture and thus are less prone to complications such as non-union and avascular necrosis. We report a case of an adult male of 42-year-old of age presenting with a 10-month-old history fracture neck of the left femur following high energy injury. We treated the fracture with isolated closed-reduction and internal fixation with PFNA II, as the fracture was basicervical. We have achieved a union in 6 months of surgery. The patient had an excellent functional status 1-year follow-up.

Key words: Femur, Isolated, Neglected, Osteosynthesis, Young adult

The fractured neck of the femur is usually fixed in urgency to avoid avascular necrosis (AVN) and non-union, which can occur in 14.3% and 9.3% of patients following internal fixation, respectively [1]. Despite all recent advancements and precautions, one-third of patients below the age of 60 require reoperation, and one in seven patients undergo a hip replacement surgery following initial fixation [2]. Patients with neglected fractures are further prone to develop such complications [3]. Therefore, most authors advocate managing neglected fractures of the femoral neck in the lines of non-union, with methods aiming either at improving the biology such as non-vascularized and vascularized bone grafts or improving the biomechanics like valgus osteotomy [4].

Basicervical fracture is a rare injury representing 1.8% of all proximal femoral fractures [5]. It is a two-part fracture of the proximal femur where the fracture line is medial to the intertrochanteric line and lateral to the transcervical area exiting proximal to the lesser trochanter [6]. There are very few reports on neglected basicervical fractures in the literature. Since these fractures are extracapsular, classical complications like osteonecrosis of the femoral head and fracture non-union are less expected with these fractures with <8% failure rate [7]. There are no specific guidelines for managing these fractures in case of delayed treatment. The question, would internal fixation alone

without any additional procedures like a valgus osteotomy or bone grafting be sufficient to treat such injuries, is unanswered.


CASE REPORT

A 42-year-old male presented to our outpatient department with a 10-month-old history of motor vehicle accident sustaining fracture neck of the left femur. Initially, the patient was managed by a local bonesetter with immobilization for 2 months, followed by mobilization with the help of a stick. The patient had a limp and was unable to bear full weight on the left side and was unable to squat or sit cross-legged.

On examination, the patient had a Trendelenburg gait, the left hip was externally rotated, the joint line was non-tender, and the greater trochanter was proximally migrated. There was a true shortening of one centimeter compared to the right side, and the Harris hip score was 48.

Plain radiograph revealed fractured non-union neck of the left femur in basicervical region with sclerosed fracture margins and varus malalignment (Fig. 1). There was minimal bone resorption at the fracture site, and there were no signs of osteoarthritis of the hip joint. Magnetic resonance imaging was performed, which ruled out AVN of the femoral head.

Considering young age, basal fracture, minimal bone resorption, and viable femoral head, we planned for osteosynthesis without any additional procedure. After obtaining closed reduction, the fracture was fixed using a proximal femoral

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nail anti-rotation (PFNA II), under image guidance (Fig. 2a). A gradual range-of-motion followed by strengthening exercise was done for the left hip. The patient was mobilized with a walker allowing weight bearing as tolerated on the left lower limb for 6 weeks, after which full weight-bearing was allowed supported with an elbow crutch.

At 3 months follow-up, the patient was still using an elbow crutch, which he continued to use for another 2 months (Fig. 2b). After 6 months of surgery, he was mobilizing freely without any pain, and the radiographs revealed fracture union with implants well in place. At 1 year follow-up, the patient was asymptomatic and was walking with full weight-bearing without any support or limp. The patient was able to perform squatting and cross-leg sitting, which was not achievable preoperatively (Fig. 3). Harris hip score at the final follow-up was 95. The radiograph revealed a united fracture (Fig. 2c).

DISCUSSION

Many authors consider basicervical fracture as a separate entity from the fracture neck of the femur [5]. It also behaves differently



Figure 1: Plain radiograph of the left hip AP view in abduction and adduction showing non-union neck femur fracture

from intertrochanteric fractures and more commonly has fixation failure and AVN [8]. It is an extracapsular fracture, and vascularity of the proximal fragment is less jeopardized than sub-capital and transcervical fracture [7]. Therefore, the consequence of negligence must also be less grave in basicervical fractures than proximal fractures of the neck of the femur. This fact might explain the finding in the current case that despite being neglected for 10 months, the only changes appreciable in the pre-operative radiograph were sclerosis and smoothening of the fracture margins. However, according to Jain *et al.*, the neglected fracture neck of the femur in 6 months developed changes of Sandhu stage three [4].

In our case, the post-operative neck-shaft angle was 120°. Compared to the contralateral side, the left hip had a 10° varus deformity. Therefore, our reduction can be classified as a poor category [9]. Furthermore, since the overlap was <80%, and the shortening was 1 cm in our case, it also dissatisfies the standards suggested by the modified Baumgartner classification [9]. The latter accepts minimal displacement with more than 80% overlapping in both planes and <5 mm shortening. However, these criteria were proposed for intertrochanteric fracture in a non-neglected scenario. We had accepted this reduction because we believed even open reduction would not have improved the deformity. The current literature also suggests no significant difference in the rate of AVN and non-union between open and closed reduction [10]. Upadhyay *et al.* had compared open versus close reduction in delayed treatment of fracture neck of femur and found that even open reduction can't achieve better reduction status in these patients [11].

We have opted for a cephalomedullary nail to fix the fracture. Sharma *et al.* compared the results of fixation of the basicervical fractures either with cannulated cancellous screws, dynamic hip screws (DHS), or proximal femoral nail (PFN) [12]. They found that the rate of union was highest with PFN. Furthermore, the duration of surgery and the fall in hemoglobin levels were lesser in patients treated with a PFN. They found multiple cancellous screws not to be an ideal technique for fixation for these fractures. Basicervical fractures are extracapsular and are comparatively more unstable than transcervical and subcapital fractures. Therefore, multiple

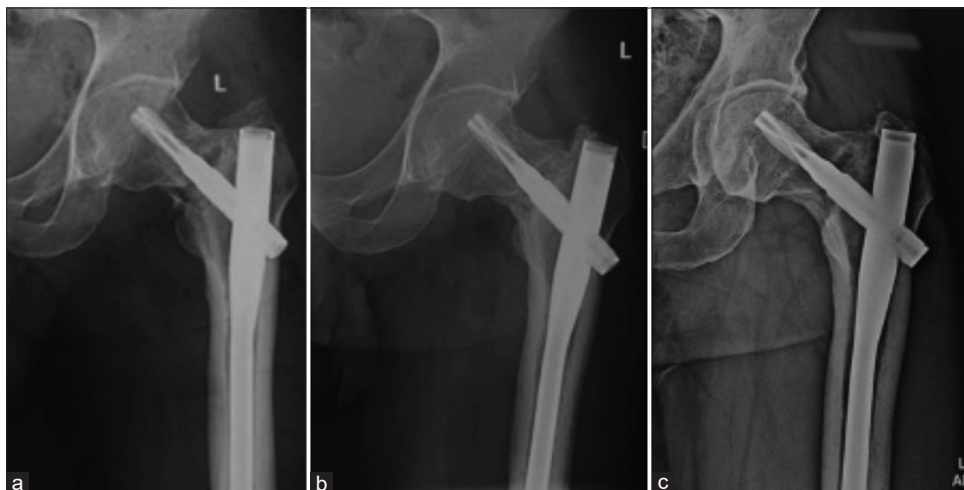


Figure 2: Plain radiograph (a) immediately after surgery showing the left neck femur fixation with PFNA II, (b) At 3 months showing fracture in process of union, (c) At 12 months showing united fracture



Figure 3: Patient demonstrating squatting and sitting cross-legged at 12 months follow-up

authors have suggested treating it in lines of intertrochanteric fractures using a cephalomedullary nail. Lee *et al.* performed a retrospective study in which they have compared the outcome of basicervical fracture treated either with DHS or PFN and have found higher failure rates with DHS than the intramedullary device [13]. They cited the reasons for favorable outcomes with intramedullary devices to be lesser bending moment, prevention of collapse of fracture site, and less bone loss while insertion. Yoo *et al.* have conducted a systematic review and found that treatment outcomes differed among different studies. Some of them favor DHS, while others favor cephalomedullary devices [6].

Since neglected fractures are associated with non-union and AVN, one may ask us why we didn't perform additional procedures such as vascularized or non-vascularized fibula grafting, Meyer's procedure, and Valgus osteotomy. However, we did not perform any of these surgeries because the fracture was basal, and all these procedures are extensive in nature and complicate future replacement surgery. Furthermore, even these surgeries cannot guarantee prevention of AVN and non-union in fracture neck of femur [4].

Baumgaertner *et al.* had recommended tip-apex distance should be <25 mm in case of intertrochanteric fracture treated with DHS to minimize the chances of lag screw cut out [14]. However, the ideal apex distance in the case of basicervical fractures treated with a helical blade in a cephalomedullary device is not yet determined. Kweon *et al.* have published a series of 15 patients with basicervical fractures treated with intramedullary nails and have suggested keeping the tip apex distance <25 mm to achieve satisfactory results [15]. In our case, the tip apex distance was 40 mm. Despite the higher tip apex distance, the functional outcome was good, and at 1 year, there was no cut-out. However, it would be inappropriate to give an opinion regarding an ideal tip-apex distance based on the finding of our case report. Therefore, future studies should be conducted to find out tip apex distance in the case of basicervical fractures treated with a helical blade.

CONCLUSION

The authors report a neglected basicervical fracture that successfully united with good functional outcome after isolated

closed reduction and internal fixation, despite a delayed treatment of 10 months. This case indicates that neglected basicervical fractures can be managed by closed reduction and internal fixation using cephalomedullary nails. Furthermore, extensive surgeries such as valgus osteotomy and bone grafting, which may complicate future replacement surgery, can be avoided in neglected basicervical fracture.

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