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Case Report

Floating Hip with Vascular Injury and Concomitant Contralateral Femur Fracture Treated with Prompt Individualized Safe Management: A Case Report

Dheeraj Attarde*, Atul Patil, Parag Sancheti and Ashok Shyam

Sancheti Institute of Orthopaedics and Rehabilitation, Pune, India

***Corresponding Author:** Dheeraj Attarde, Sancheti Institute of Orthopaedics and Rehabilitation, Pune, India.

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Abstract

Floating joint injury is an unusual injury pattern associated with high-velocity trauma. In this report, a patient had a homolateral floating hip with vascular injury, contralateral grade 2 compound femur fracture and head injury. A 36-year-old female who encountered a traffic accident was presented after 5 days to emergency department. On doppler, right side popliteal artery was thrombosed with collateral formation. Bilateral retrograde femoral nailing was done, and acetabulum fracture was conserved. In view of good collaterals no intervention was done for vascular injury. We conclude that high degree of suspicion for vascular injury is must in floating hip injuries and Prompt Individualized Safe Management (PRISM) is effective in polytrauma patient. Retrograde femoral nailing gives good functional outcome. Vascular injury should be included in classification of floating hip injuries.

Keywords: *Floating Hip; Vascular Injury; Retrograde Femur Nail; PRISM*

Introduction

The floating hip involves a pelvis or an acetabular fracture together with an ipsilateral femur bone fracture. Concurrent injuries are not uncommon in these cases, with outcome worse than expected when these fractures exist in isolation [1]. Although vascular injuries in a floating hip have been rarely described in the literature, limb viability remains of paramount importance in such condition. Such complex injury is a rare case and its treatment is known to be technically challenging. Moreover, it is known to be accompanied often by contralateral femur fracture owing to high-energy trauma [2,3]. Nathan classified type A as femur fracture occurring together with pelvic ring fracture and type B as occurring together with acetabulum fracture, Müller., *et al*. added type C classification as femoral, pelvic ring and acetabular fractures occurring simultaneously [4,5]. Although our case would correspond to type C classification by Müller according to existing classification methods, we believe that there is no appropriate classification since fracture was associated with contralateral femur fracture and ipsilateral vascular injury. For floating hip, literature suggests to fix floating hip injury first and then tackle long bone fracture, but in vascular injury scenario individualized treatment should be planned. PRISM - Prompt Individualized Safe Management opens a new dimension for management of polytrauma. We report here our treatment experience in case with floating hip, vascular injury and bilateral femur fracture altogether and propose that the contralateral femoral fracture pattern and vascular injury to be included in the classification of the floating hip injury type and management should focus on associated injuries also.

Case Report

We present a case report of 36 years old lady who suffered high velocity trauma and sustained right floating hip injury with vascular injury and contralateral grade 2 compound femur fracture (Figure 1a-1d). She was primarily treated at primary health care center with multiple blood transfusion for hypovolemic shock and immobilization with splints for bilateral femur and after stabilization patient presented late (5 days post-injury) to us. On arrival Injury severity score was 24 and right dorsalis pedis and posterior tibial artery pulse was feeble so CT angiography was done which showed vascular injury at level of right distal femur fracture and popliteal artery thrombosis with good collaterals formation. Oxygen saturation was 94% on right toes. Toes, ankle movements and sensation were preserved without any clinical sign of ischemic changes in right leg. Surgical planning was challenge in view of vascular injury, floating hip, and left femur shaft fracture. Surgical treatment planning was challenging as it is described to fix floating hip first then definitive fixation for long bone fractures on later date. As described by Pape., *et al*. [6] old concept of damage control orthopaedics is changing with availability of new diagnostic, treatment modalities are available. As Serum lactate and total creatinine kinase were found normal, therefore decision of Prompt Individualized Safe Management (PRISM) was taken. Retrograde femoral nailing was done for bilateral femur fracture, vascular injury along with acetabulum and pelvic ring fracture was treated nonoperatively (Figure 2a and 2b). Patient was followed up regularly till 1 year. Low- molecular weight heparin 0.6 ml subcutaneously twice a day and tablet ecosprin 75 mg once a day was started after evaluation by vascular surgeon and continued till 6 months, after that LMWH was tapered gradually and stopped. Post-operative doppler done at 3 months showed good collateral formation in right leg with palpable pulse without any neurodeficit. All fractures united at end of one year and patient resumed her activities at one-year end (Figure 3a-3d). Informed consent was taken regarding usage of patient's data for publication.

Figure 1a-1d: *preoperative radiograph and angiogram [1].*

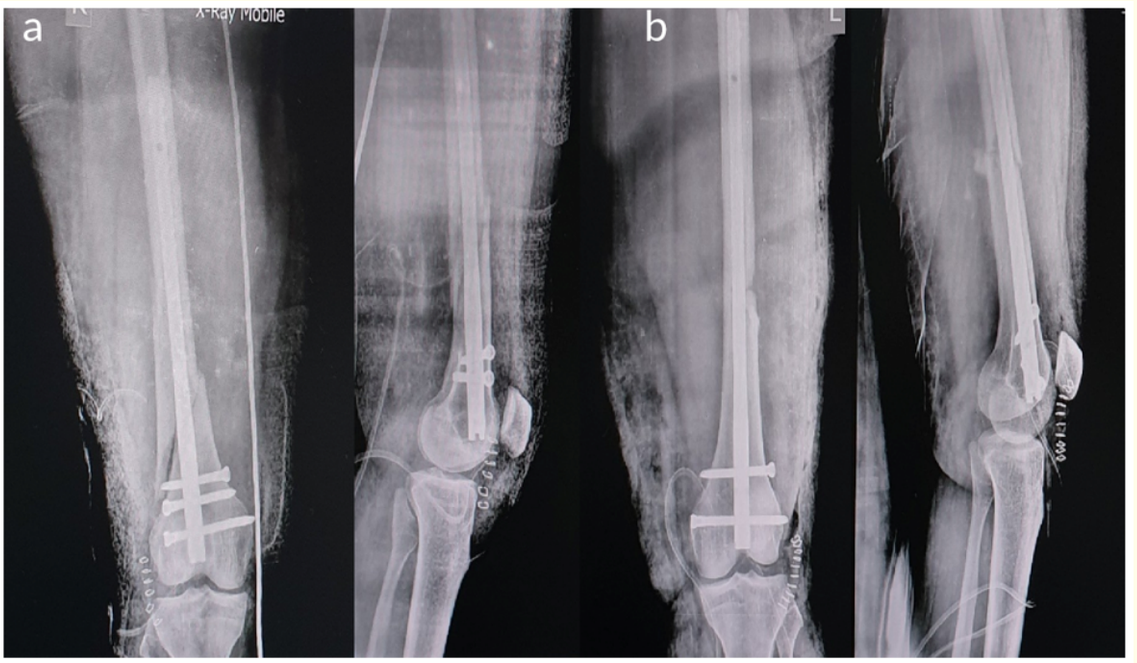

Figure 2a-2b: *Immediate post-operative radiograph.*

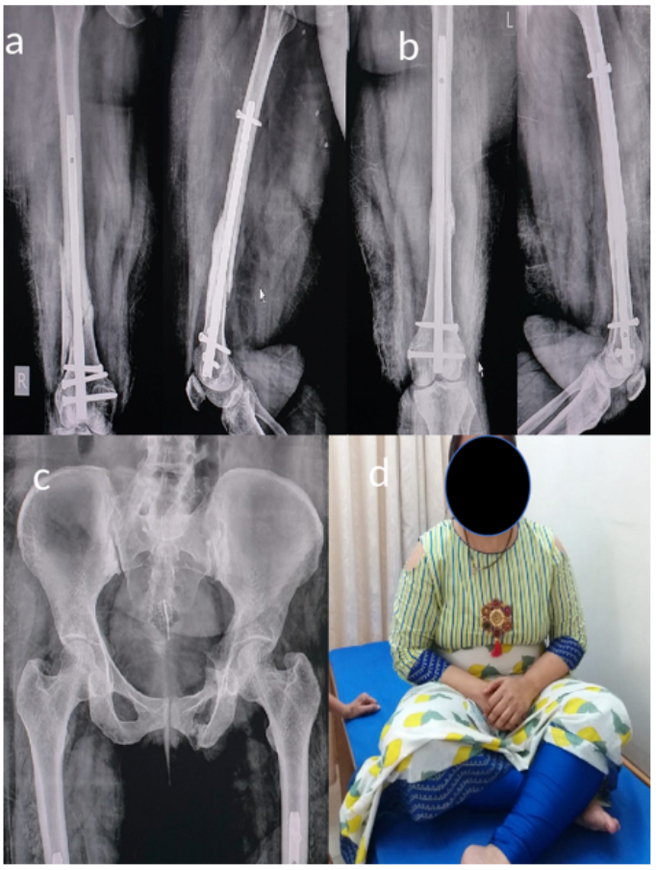

Figure 3a-3d: *1 year follow up radiograph and functional.*

Discussion

Pelvic or acetabular, fracture associated with a femur fracture is defined as "floating hip" and it is very uncommon [2] vascular injuries are more common in these fractures. Treatment of floating hip is controversial and not yet well defined. Treatment should be individualized based upon pattern of injuries, tackling of life-threatening injuries first [3]. Isolated femoral shaft fractures have up to 9% mortality. Bilateral femoral shaft fractures are reported to increase the risk of systemic complications and mortality [5]. Recently surgical treatment strategies have become more individualized, especially in life-threatening injuries in major fractures. Prompt individualized safe management (PRISM) is a concept that encompasses injury mechanism, ATLS protocols, physiological state, early diagnostics and the patient response. The individualized approach includes patient age, gender, co-morbidities and special aspects that may cause management changes [6]. Though, our patient had vascular injury, we decided not to do any intervention because of well-developed collaterals but major fractures needed stabilization to prevent further arterial damage on right side as well as avoiding systematic response to long bone fractures. Challenge was to fix femur shaft fracture without risking acetabulum and pelvic congruency. Retrograde femoral nailing proves as a rescue solution in such scenarios. For retrograde nailing fracture table is not needed, this avoids excessive traction on already compromised limb due to vascular injury as well as provide rapid and minimally invasive surgical option without opening fracture site and preserves soft tissue in limb.

Conclusion

High degree of suspicion for vascular injury is must in floating hip injuries and Prompt Individualized Safe Management (PRISM) is effective in polytrauma patient. Hip component of floating hip can be managed conservatively in such case and good functional outcome can be obtained. We feel that the retrograde nailing is a useful technique for the orthopaedic surgeon to have in armamentarium and saves morbidity associated with conventional femur nailing and gives good functional outcome in vascular injury scenario.

Conflict of Interest

The authors declare no conflict of interest.

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