Nepal Orthopedic Association Journal
https://doi.org/10.59173/noaj.20251101j

CASE REPORT

Management of unusually presenting open pelvic and bilateral femur fractures with crush injury of a foot in an adolescent: A case report

Nitesh Raj Pandey[1], Arjun Poudel[1], Ansul Rajbhandari[1], Ashok K. Banskota[1], Bibek Banskota[1]
[1] Hip, Pelvis-Acetabulum Unit, Department of Orthopedics, B&B Hospital, Kathmandu, Nepal.

ABSTRACT

BACKGROUND

This case outlines the management of a challenging case involving an adolescent patient presenting with open pelvic fracture, bilateral femur fractures and crush injury to the foot. The treatment approach integrates stage wise surgical interventions, wound care, and rehabilitation strategies to address each injury aspect systematically. Emphasis is placed on early stabilization, meticulous wound management, and coordinated multidisciplinary care to optimize functional recovery and minimize complications.

INTRODUCTION

Pediatric pelvic fractures are infrequently encountered, with estimates suggesting their occurrence in the range of 2% to 7.5%. These fractures typically occur as a consequence of high-energy trauma, with motor vehicle accidents.[1] Pelvic injuries with bilateral femur fractures, particularly in adolescents, pose unique challenges due to the ongoing growth and development of the skeletal system.[2] Among these, complex pelvic injuries in young individuals demand a comprehensive, multidisciplinary approach for optimal management and long-term outcomes.[3] In this case, we explore the intricacies of managing such injuries in a 15-year-old female, considering the anatomical complexity, physiological implications, and psychosocial factors. By integrating expertise from orthopedic surgeons, gynecologists and rehabilitation professionals. This case highlights the multi-disciplinary coordination and their collaborative efforts in achieving optimal patient care and recovery.

CASE REPORT

A 15-year-old girl, bicycle-rider collided with a bus, sustaining injury to her bilateral lower limbs and abdominal area was brought to the emergency room with serious physiological disturbances. The initial assessment revealed hypovolemic shock, indicated by hypotension (systolic blood pressure 80/60 mm Hg), tachycardia (pulse rate 124 bpm), thready peripheral pulses, and significant anemia (hemoglobin 6.5 g/dL). Subsequent detailed evaluation uncovered various injuries, including a perineal laceration, bilateral thigh abrasions, a substantial 2×8 cm laceration in the right popliteal fossa, and a 1×6 cm crush injury of the right foot dorsum. On examination, pelvic compression test was positive. There was tenderness present over bilateral thigh area with multiple bruises and abrasions. On radiographic finding, there was pubic symphysis diastasis with superior-inferior pubic rami fracture and bilateral transverse proximal 1/3rd shaft of femur fracture.

MANAGEMENT

In the emergency room, rapid hemodynamic stabilization was the main goal of care, involving fluid resuscitation and blood transfusion to address severe hypovolemia. Wound care guidelines were followed, which included applying compression bandages to stop bleeding and stop nosocomial infections. Pelvic binder was applied for pubic diastasis and bilateral skin-traction for femur fractures. Broad-spectrum antibiotics were administered to prevent potential infectious complications. In addition, prophylactic tetanus immunization was administered and effective pain management was done. The treatment strategy was subsequently divided into phases and thoroughly arranged.

During the first week perineal laceration repair and foot wound debridement and closure was the main priority. On eighth day, left femur fracture fixation was done with closed reduction and intramedullary interlocking nail followed by similar procedure on right femur on 11th day. On 14th day pelvic fracture was fixed where anterior pelvic was stabilized with pubic diastasis fixation with plate and screws was done. Poster pelvic stabilization done with left sacroiliac (SI) joint partially-threaded cannulated screws (PTCS).

CORRESPONDENCE

Dr Nitesh Raj Pandey
B&B Hospital, Gwarko, Lalitpur, Nepal,
Tel: +977-9840452009
Email: niteshraj3@gmail.com

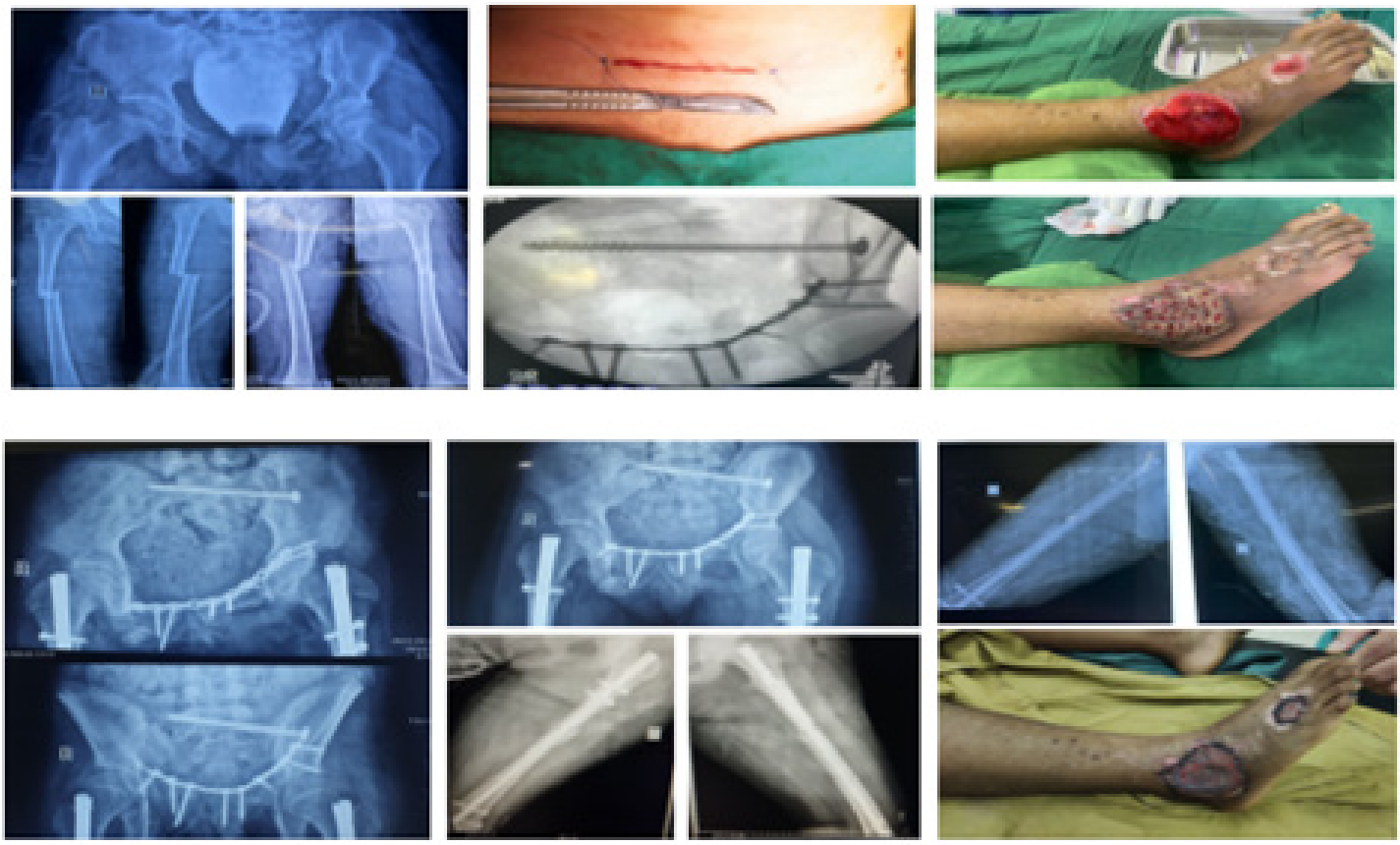

Fig. 1: Intraoperative and post-operative images of pubic symphysis diastasis with superior-inferior pubic rami fracture fixed with plate and left sacroiliac joint screw. Skin graft was used to treat the open wound, and intramedullary nails were used to fix both femur fractures.

DISCUSSION

Pelvic fractures are uncommon in the pediatric population and usually occur due to high-energy trauma.[1] The best way to address complex pediatric trauma is to use a staged approach that includes specific surgical interventions. This approach shows the need for quick diagnosis, quick hemodynamic stabilization, and the expertise and skills of orthopedic intervention to allow the best possible outcome. Repairing perineal lacerations is crucial for avoiding infection and encouraging proper wound healing. By removing contaminated or non-viable tissue by wound debridement process further assures the establishment of a healthier healing environment.[4] The fixation of bilateral femur fracture with iintramedullary interlocking nailing is a crucial step in restoring mobility and preventing further complications.[5] The anatomical complexity of the pelvis makes complex pelvic fractures challenging, and if they are not properly addressed, there may be long-term mobility problems. In this specific case, the decision of using plates and screws indicates the importance of absolute stability and surgical plan. The plate provides structural support to the pelvis, while the screw holds the sacroiliac joint, which plays an important role in weight-bearing and mobility.[6] Both the surgical proficiency and the patient's dedication towards rehabilitation are essential factors of the treatment.[7]

CONCLUSION

Complex polytrauma involving open wounds and pelvis fracture require aggressive resuscitation, debridement, and damage control, followed by a staged approach to definitive fracture fixation, taking into account the window of opportunity for surgery which is usually between 7 to 14 days.

ACKNOWLEDGEMENT **We would like to thank Prof. Ashok Kumar Banskota for his continuous support and guidance throughout the study and preparation of the manuscript.**

CONFLICT OF INTEREST The authors declare no conflicts of interest.

ETHICAL CONSIDERATIONS This case study adheres to rigorous ethical standards and maintains the highest level of patient confidentiality.

FUNDING No external funding was sought or received for the creation of this case study.

REFERENCES

1. Lu V, Gowrishankar S, Arshad Z, Thahir A, Lenihan J, Mcdonald S, et al. The clinical characteristics and management of paediatric pelvic fractures: a changing landscape based on skeletal maturity. Eur J Trauma Emerg Surg [Internet]. 2023 Feb 3;49(1):559-70. Available from: https://link.springer.com/10.1007/s00068-022-02108-5 https://doi.org/10.1007/s00068-022-02108-5

2. Wharton RMH, Trowbridge S, Simpson A, Sarraf KM, Jabbar Y. Anatomic, diagnostic and management challenges in paediatric pelvic injuries: a review. J Pediatr Orthop B [Internet]. 2019Sep;28(5):476-86.Available from:https://journals.lww.com/10.1097/BPB.0000000000000591 https://doi.org/10.1097/BPB.0000000000000591

3. Abdelrahman H, El-Menyar A, Keil H, Alhammoud A, Ghouri SI, Babikir E, et al. Patterns, management, and outcomes of traumatic pelvic fracture: insights from a multicenter study. J Orthop Surg Res [Internet]. 2020 Dec 9;15(1):249. Available from: https://josr-online.biomedcentral.com/articles/10.1186/s13018-020-01772-w https://doi.org/10.1186/s13018-020-01772-w

4. Parashar A, Sharma RK. The management of perineal wounds. Indian J Plast Surg [Internet]. 2012 May 27;45(02):352-63. Available from: http://www.thieme-connect.de/DOI/DOI?10.4103/0970-0358.101318 https://doi.org/10.4103/0970-0358.101318

5. Hunter TB. Fracture fixation. Radiologic Guide to Orthopedic Devices. 2017 May 11:19. https://doi.org/10.1017/9781316084304

6. Rommens PM, Wagner D, Hofmann A. Surgical management of osteoporotic pelvic fractures: a new challenge. Eur J Trauma Emerg Surg [Internet]. 2012 Oct 23;38(5):499-509. Available from: http://link.springer.com/10.1007/s00068-012-0224-8 https://doi.org/10.1007/s00068-012-0224-8

7. Piccione F, Maccarone MC, Cortese AM, Rocca G, Sansubrino U, Piran G, et al. Rehabilitative management of pelvic fractures: a literature-based update. Eur J Transl Myol [Internet]. 2021 Sep 17;31(3). Available from: https://www.pagepressjournals.org/index.php/bam/article/view/9933 https://doi.org/10.4081/ejtm.2021.9933