Chung Shan Medical Journal 2019; 30:155-157

Case Report

Pediatric blunt trauma-related vascular injury: Case report

Chin-Yi Juan[1,2], Chao-Bin Yeh[1,2*]

[1] *Department of Emergency Medicine, School of Medicine, Chung Shan Medical University, Taichung, Taiwan*

[2] *Department of Emergency Medicine, Chung Shan Medical University Hospital, Taichung, Taiwan*

An 11-year-old boy sustained blunt trauma with resultant right femur fracture. Complicated vascular injury of right lower limb was diagnosed later under suspicion, repeat physical examination and bedside sonography. Limb-threatening condition after a blunt injury is rare and early recognition is critical for emergent management. Although angiography is still the gold standard for evaluation in such situations, Doppler ultrasound might be an alternative method, as it is contrast media free and readily available.

Keywords: femur fracture; vascular injury; Doppler ultrasound

Introduction

Pediatric peripheral vessel injuries related to blunt trauma are uncommon and easily missed. Different forms of vascular injuries should be recognized, such as obstruction, pseudo-aneurysm, and partial and complete transection[1.2.3]. In this case, we present a pediatric patient with lower limb crush injury and orthopedic issues.

Case Report

An 11-year-old boy was crushed by the arm of a forklift of unknown weight over the right thigh and brought to our emergency room by family member. Primary survey was unremarkable, but deformed right leg and presumed femur fracture were noted (Figure 1). Physical examination revealed detectable right popliteal, dorsalis pedis and posterior tibia pulses but all were weaker than on the left side. During pre-operative period for

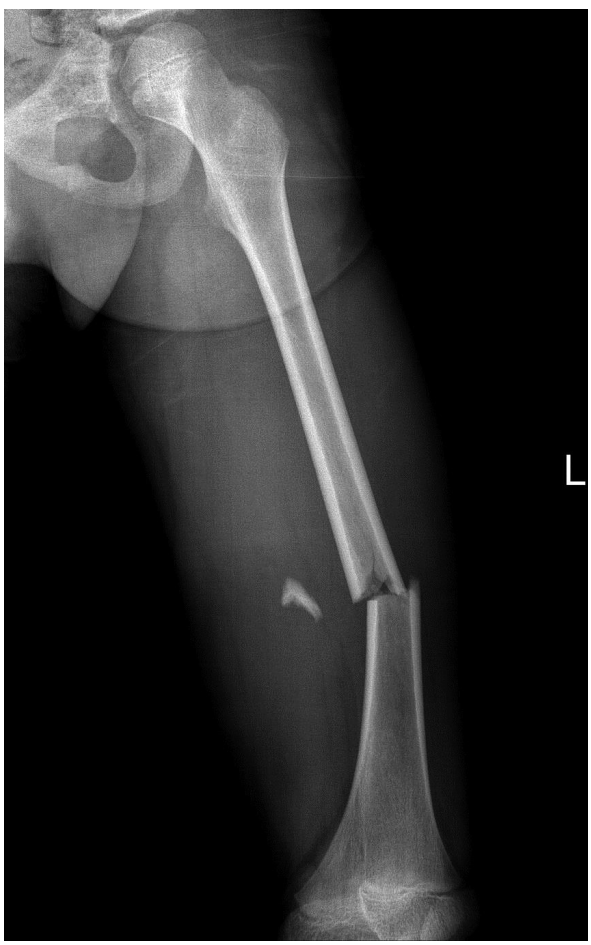

Figure 1. Left femoral shaft fracture

* Correspondence to: Chao-Bin Yeh, MD, PhD
Department of Emergency Medicine, School of Medicine, Chung Shan Medical University, 110, Section 1, Chien-Kuo N. Road, Taichung, Taiwan, ROC.
Fax: +886-4-24723229
E-mail: sky5ff@gmail.com

Figure 2. Left femoral artery dissection (Yellow Arrow)

orthopedic internal fixation, patient complained of pain over fracture side without knee or ankle discomfort. Cyanosis over distal part of right leg was noted after a few hours. Bedside Doppler ultrasound was performed and showed decreased blood flow velocity with impression of injured femoral artery. Therefore, operating method shifted to open reduction of femoral shaft with end-to-end vessel anastomosis due to complete transection of deep femoral artery (Figure 2). The postoperative course was uneventful and the patient was discharged on the 11th postoperative day.

Discussion

Pediatric traumatic peripheral vessel injuries are complex and uncommon, even in a major trauma center[1]. They make up approximately 2% of all blunt pediatric injuries.[2] Lack of witnesses at the accident scene, difficulty communicating and physical examination of a frightened child make diagnosis particularly challenging[2]. Although angiography is the gold standard for evaluating vascular injury, its invasiveness, anesthesia and sedative requirement and radiation exposure make it less than ideal for use by emergency physicians[4]. In a previous study, 31 out of 765 mid-shaft fracture patients underwent angiography during a 6-year period. Among them, 10 were found to have acute vascular injuries[3]. Doppler ultrasound is recommended as an alternative to angiography, as it is repeatable and radiation-free[4].

Delayed diagnosis can lead to chronic pain, infection, compartment syndrome, fistula, aneurysm or amputation. The success rate of limb salvage in 62 traumatic peripheral vascular injured patients was 82%. Failed cases were all preventable physician-related errors[1]. Among all causes of vascular injuries, traffic accidents are most common (50/62)[1]. This may be worse in Taiwan, where there is a high density of motor scooters and a high incidence of motor-scooter handlebar syndrome[5,6]. In conclusion, detailed and repeat physical examination and history taking are crucial for early recognition of vascular injury in patients with close mid-shaft femur fracture. Early utilization of imaging study including Doppler ultrasound could simplify the diagnostic process and lead to better outcomes. Our case was unique due to its direct diagnosis without angiography, which is controversial and should be discussed in future studies.

Conclusion

Detailed and repeat physical examination and history taking are crucial for early recognition of vascular injury in patients with close mid-shaft femur fracture. Early utilization of imaging study including Doppler sonography can simplify the diagnostic process and lead to better outcomes. Our case was unique due to its direct diagnosis without angiography, which is controversial and should be discussed in future studies.

References

1. Rozycki GS, Tremblay LN, Feliciano DV, McClelland WB: Blunt vascular trauma in the extremity. Diagnosis, management, and outcome. J Trauma. 2003;55:814–824.
2. Hoover JD, Almond PS: Isolated pediatric peripheral vascular injury caused by blunt trauma: a new occurrence. J Trauma, 2004 Jan, 56: 198–200.
3. Kluger Y, Gonze MD, Paul DB, DiChristina DG, Townsend RN, Raves JJ, Young JC, Diamond DL: Blunt vascular injury associated with closed mid-shaft femur fracture: a plea for concern. J Trauma. 1994;36:222–225.

4. Luu SC, Jacques N, Jost, D & Tourtier JP: Persistent groin pain after a bicycle fall: BMJ Case Reports, 2015 Dec 17;2015. pii: bcr2015211813.
5. Baker WE, Bilimoria MM, Victor MG: Motor-scooter handlebar syndrome: blunt traumatic injury of the femoral artery. J Trauma. 1996 Jun;40(6):1017-20.
6. Hassan I, Rasmussen TE, Cullinane DC, Panneton JM: Motor scooter handlebar syndrome. J Trauma. 2002;53:806.