Case Report / Olgu Sunumu

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A Rare Cause of Neonatal Humeral Fractures in Pediatric Emergency Department: Cesarean Delivery

Çocuk Acil Serviste Neonatal Humerus Fraktürünün Nadir Sebebi: Sezaryen Doğum

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Abstract

Birth injuries are not uncommon incidences. Especially, injury to humerus is rare in cesarean sections as compared to that in vaginal deliveries. However, in some difficult extractions, injury may be sustained by the newborn. We report a case of right humeral shaft fracture in a term female newborn who was admitted to the emergency department with limited mobility in her right arm and lack of Moro reflex on the right side. This report demonstrates a case of birth trauma-induced fracture of humerus during cesarean section. Suspicion and early diagnosis and treatment are critical to reduce complications.
Keywords: Humerus, fracture, cesarean, trauma, neonate

Öz

Doğum travmalarının insidansı az değildir. Sezaryenle doğum sonucu oluşan humerus yaralanmaları vajinal doğum ile karşılaştırıldığında daha nadirdir. Bununla birlikte, yenidoğanın sezaryen sırasında zor çıkarılması sonucu yaralanmalar olabilmektedir. Bu raporda, sağ kolda hareket kısıtlılığı olan ve moro refleksi alınamaması sebebi ile çocuk acil servise yönlendirilen term yenidoğan olgusu sunduk. Bu rapor, sezeryan sırasında humerus kırığı şeklinde doğum travması olabileceğini göstermiştir. Şüphe, erken teşhis ve tedavi, komplikasyonları azaltmak için kritik öneme sahiptir.
Anahtar Kelimeler: Kumerus, fraktür, sezaryen, travma, yenidoğan

Introduction

The rate of cesarean delivery in Turkey is higher than the rate in other countries and the upper limit of 15% estimated by the World Health Organization.[1] Fetal injuries due to cesarean delivery are less common, compared to vaginal delivery.[2] In particular, in case of shoulder dystocia, breech presentation, first-feet position, twin pregnancy, and fetal macrosomia which are also cesarean indications, the risk of fetal injury increases.[3] Humeral fractures are the second leading long-bone fractures of the neonatal period after fractures of the clavicle.[4]

Herein, we report a case who was delivered via emergency cesarean section (C-section) and referred to our emergency department (ED) with limited mobility in the right arm on the sixth hour of life and in whom a humeral fracture was detected.

Case

She was born at the 38th weeks of gestation with a weight of 3850 g from a 28-year-old mother via C-section due to the first-feet position and she had no history of hypoxia.

On the sixth hour of her life, she had limited mobility in her right arm and lack of moro reflex İn the right side, which suggested brachial plexus injury. As a result, she was referred to our ED.

On admission, her general condition was good, her vital signs were (temperature; 36.5 °C, blood pressure; 70/36 mmHg, heart rate; 124/bpm, respiratory rate; 36/minute) stable.

On physical examination, hypotonia and crepitation were detected in the right arm without Moro reflex (Figure 1). Her peripheral pulses were open, color and capillary refills were normal. There were not any other abnormalities, suggesting

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fractures of the clavicle and brachial plexus injury such as adduction and internally rotation of the arm, and waiter's tip.

The clavicle was normal and the right humeral shaft fracture was detected in the direct graphies of the right arm in the ED (Figure 2, 3). There were no vascular injuries based on Doppler ultrasonography of the right arm which was performed to find any neurovascular exposure. Based on the evaluation by pediatric orthopedics, her radial and median nerve functions were found to be normal. Motor functions of the ulnar nerve, however, were unable to be fully examined and a follow-up visit was scheduled. Loss of tone and strength in the right arm was suspected due to pain-related limited mobility.

Figure 1. Hypotonicity in the right arm

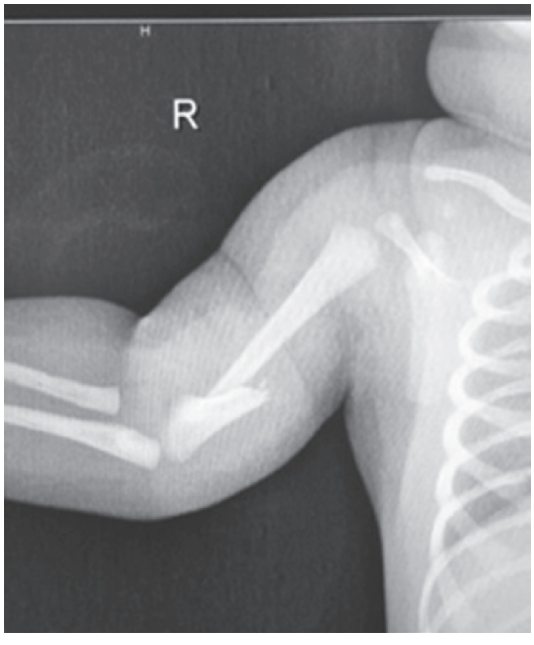

Figure 2. Right humeral shaft fracture

In the ED, the right arm was casted, a long arm splint was placed on the right upper extremity (Figure 4), and the patient was discharged with a scheduled follow-up visit three weeks later. At three weeks, the patient did not have any motor and sensory disorders. At the final visit at six weeks, the fracture line completely healed without any limited mobility (Figure 5).

The verbal consent was taken from the patient's parents.

Figure 3. Right humeral shaft fracture and normal clavicle

Figure 4. Casting of the right arm and placement of the long arm splint to the upper right extremity

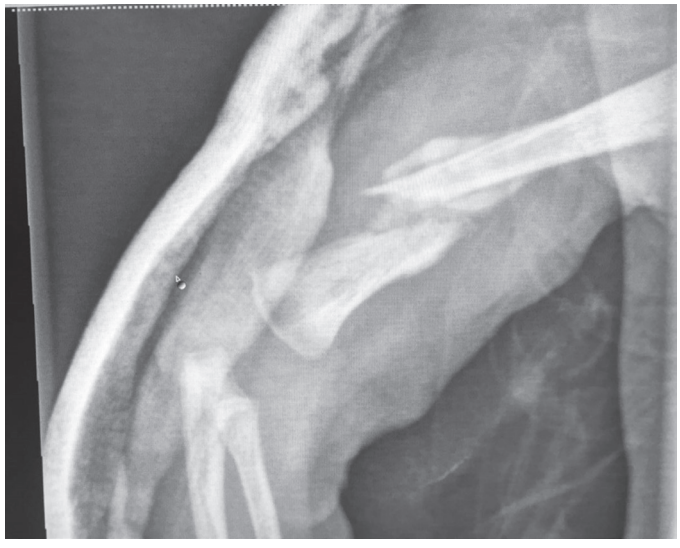

Figure 5. Healing of the fracture line

Discussion

Three-fourths of the delivery-related long-bone fractures occur during vaginal breech deliveries.[5] There may be also fractures in the presence of certain risk factors during Cesarean delivery including various maneuvers performed during the operation (particularly during traction), extended operation duration, inadequate incision line/uterine relaxation, macrosomia, breech presentation, and shoulder dystocia.[2]

Although the most frequently affected bone during cesarean delivery is clavicula, other long-bone fractures, such as humerus and femur, have been reported in the literature.[6] Pathological fractures in infants usually occur due to rickets, osteogenesis imperfecta, or abuse.[2]

In patients with fractures within the first week of life without any related factors which may cause pathological fractures or history of trauma, delivery complications should be considered.[7]

The rate of the fetal injuries following cesarean delivery varies depending on the surgical indications and type of uterine incision.[6] In our case, there was no history of trauma and cesarean delivery was performed due to first-feet position. In the light of the literature data, we considered that the fracture was caused by the maneuvers performed during cesarean delivery due to the position of the baby.

While clavicle fracture is the primary long-bone fracture which occurs during delivery, femoral and humeral fractures are mostly observed secondarily with an incidence of 1 to 2/10.000 deliveries.[4,8] The diagnosis can be delayed, as it is rare in the neonatal period and it is not primarily conceivable. About 50% of patients with congenital fracture are diagnosed between postnatal days 3 and 7.[9]

Clinical findings and X-ray images support the diagnosis. However, it can be confused with dislocation or congenital brachial plexus injury, if the practitioner is not experienced. Although congenital brachial plexus injury is considered primarily in differential diagnosis, there were not any other abnormalities such as adduction and internal rotation of the arm and waiter's tip. Our case was suspected of having a humeral fracture, as she had lack of mobility in her arm and crepitation in the sixth hour after birth, and unequal arm diameter due to hematoma-related edema, no paralysis signs, history of first-feet position and cesarean delivery. An accompanying clavicle or femoral fracture was not detected in the X-ray examination. Despite the current literature data, early diagnosis was made owing to the referral of the patient by the gynecologist and examination by the pediatrician in the emergency department. Due to close adjacency to the neurovascular structures, humeral fractures can be accompanied by brachial artery and radial, median and ulnar nerve injuries, or combined arterial nerve injuries. The two most frequent complications are radial nerve paralysis and non-union. Complete nerve paralysis is rare in closed fractures in children and nerve functions heal spontaneously.[10] In postnatal fractures, re-modeling is very rapid and effective; humeral fracture rarely fails to heal and there are only a small number of cases in the literature.[6,11] Although several techniques have been reported for the treatment of pediatric humeral fractures in the literature, the established treatment method is closed reduction followed by cast immobilization.[11,12] In our case, immobilization was done using a long arm splint following a mild manipulation.

In conclusion, although cesarean delivery reduces the rate of trauma-related morbidity, it does not fully eliminate it. It

should be, therefore, kept in mind that mode of delivery, fetal malpresentation, and birth trauma in multiple pregnancies increase the risk. It should be also noted that, although rare, humeral fractures can occur due to the maneuvers performed during cesarean delivery. Suspicion and early diagnosis and treatment are critical to reduce complications.

Ethics

Informed Consent: The verbal consent was taken from the patient's parents.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: C.T., H.G., E.U.S., Concept: E.U.S., Design: C.T., E.U.S., Data Collection or Processing: C.T., G.K., Analysis or Interpretation: C.T., A.Y., Literature Search: C.T., H.G., E.U.S., Writing: C.T., G.K., E.U.S.

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References

1. Turkey Demographic and Health Survey (TDHS). Hacettepe University Institute of Population Studies, Ministry of Health General Directorate of Mother and Child Health and Family Planning, T.R. Prime Ministry Undersecretary of State Planning Organisation and TUBITAK, Ankara, Turkey, 2008.
2. Cebesoy FB, Cebesoy O, Incebiyik A. Bilateral femur fracture in a newborn: an extreme complication of cesarean delivery. Arch Gynecol Obstet. 2009;279:73-4.
3. Awwad JT, Nahhas DE, Karam KS. Femur fracture during cesarean breech delivery. Int J Gynecol Obstet. 1993;43:324-6.
4. Sherr-Lurie N, Bialik GM, Ganel A, Schindler A, Givon U. Fractures of the humerus in the neonatal period. Isr Med Assoc J. 2011;13:363-5.
5. Rutgers RA, Bilo RA, Nijs HG, Bosschaart AN, van Rijn RR. [Fractures in full-term neonates]. Ned Tijdschr Geneeskd. 2007;151:1043.
6. Canpolat FE, Köse A, Yurdakök M. Bilateral humerus fracture in a neonate after cesarean delivery. Arch Gynecol Obstet. 2010;281:967-9.
7. Caviglia H, Garrido CP, Palazzi FF, Meana NV. Pediatric fractures of the humerus. Clin Orthop Relat Res. 2005;432:49-56
8. Cheng JC, Ng BK, Ying SY, Lam PK. A 10-year study of the changes in the pattern and treatment of 6,493 fractures. J Pediatr Orthop. 1999;19:344-50.
9. Al-Habdan I. Birth-related fractures of long bones. Indian J Pediatr 2003;70:959-60.
10. Shah JJ, Bhatti NA. Radial nerve paralysis associated with fractures of the humerus. A review of 62 cases. Clin Orthop Relat Res. 1983;172:171-6
11. Husain SN, King EC, Young JL, Sarwark JF. Remodeling of birth fractures of the humeral diaphysis. J Pediatr Orthop. 2008;28:10-3.
12. Jacobsen S, Hansson G, Nathorst-Westfelt J. Traumatic separation of the distal epiphysis of the humerus sustained at birth. J Bone Joint Surg Br. 2009;91:797-802.