

Painful Wrist in a 9-Year-Old Child after an Electrical Injury

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ABSTRACT

Electric shock injuries may cause dermal burns, cardiac complications, nerve deficits, and dislocations after muscle contractions. Radial torus fractures are the most common axial compression injuries, with minimal unicortical disruption at the metaphyseal region, occurring after direct low-energy trauma. We report a case of radial torus fracture after an electric shock and discuss the mechanism, diagnosis and treatment.

Key words: Electric shock, Fracture, Radius, Torus, Contraction

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ÖZET

Dokuz Yaşındaki Çocukta Elektrik Çarpması Sonucu Görülen Ağrılı El Bileği

Elektrik çarpması sonucu görülen yaralanmalar cilt yanıkları, kardiyak komplikasyonlar, sinir arazları ve kas kontraksiyonu sonucu ortaya çıkan eklem çıkıkları şeklindedir. Radius torus kırıkları metafizyel bölgede sıklıkla düşük enerjili aksiyel yüklenmeyle oluşan tek korteks kırılmasıyla ortaya çıkan kırıklardır. Biz bu olguda elektrik yaralanması sonucu gelişen radius torus kırığını sunarak oluş mekanizması, teşhis ve tedavi üzerine tartışıyoruz.

Anahtar kelimeler: Elektrik yaralanması, Kırık, Radius, Torus, Kontraksiyon

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CASE REPORT

A nine-year-old girl admitted to the emergency room with forearm pain two hours after suffering an electric shock from an electrical outlet of 230 voltage (v). The outlet was 50 centimeters (cms) above the floor, and she was sitting when she was exposed to the current. Her father turned off the electricity and carried the child to a safe area. He reported that she had not fallen or hit her head, or lost consciousness. Forty-five minutes after the accident, the child began complaining of pain on her right forearm.

The patient was evaluated by a pediatric physician and an orthopedic surgeon in the emergency room. She was conscious, oriented and cooperative. She had normal pulse beat (75/minute) with sinusoidal rhythm and normal electrocardiogram. No dermal burns or vascular problems were noted, and neurological findings were also normal. Minor swelling and tenderness with movement and palpation on her right forearm were noted. There was no deformity, open wound or bruising. All of the other system findings were in normal limits. Lateral and anteroposterior (AP) X-rays and complete peripheral blood count were obtained. The hemoglobin concentration was 13 mg/dL, and the white blood cell count was in normal limits. The X-rays demonstrated an incomplete, non-displaced distal radial metaphyseal fracture (torus fracture) (Figures 1, 2). A short circular forearm cast was applied. The child was monitored and observed for 24 hours in the hospital for neurovascular problems and cardiac arrhythmia. Everything was normal in the follow-up visit one week after discharge. The cast was removed four weeks after the trauma. The fracture was completely healed and the extremity was fully functional at the final follow-up visit.

DISCUSSION

Electrical, particularly low-voltage, injuries (110-440 volts) are one of the major causes of household accidents^[1]. Our country has a standard household electrical current of 220 volt alternating current (AC) with 50 Hertz, which can cause dermal burns, nerve deficits, fractures, and dislocations. Direct current produces single muscular contraction and pushes the patient away from the source after exposition. On the other hand, AC stimulates all the muscles and causes tetany^[2]. Since the flexor muscle groups are stronger, this tetany eventually causes uncontrollable grasping of the hand and the patient cannot separate from the electrical source by himself.

Fractures and dislocations associated with electrical injury are usually seen with high voltages and



Figure 1. Anteroposterior radiograph of the wrist.



Figure 2. Lateral radiograph of the wrist.

additional trauma mechanisms. Tetanic contractions by electrical current may produce fractures, even in low voltages^[2].

Proximal humeral fractures and shoulder dislocations have been reported occasionally in the literature^[3].

Radial torus fractures are the most common axial compression injuries, with minimal unicortical disruption at the metaphyseal region, occurring after direct low-energy trauma. The treatment of this fracture is to immobilize the extremity for two to four weeks^[4,5].

Fractures and dislocations caused by household electrical injury may easily be missed in the emergency room because of the absence of major cardiac and renal problems^[6-8].

Patients with a history of low-voltage electric shock who have minimal symptoms rarely require further evaluation and may be discharged without any interventions. Radial torus fractures have not been

reported previously in association with electrical injuries. Since the clinical appearance of this fracture may easily be missed, subjective pain complaints of children should be considered seriously and radiographic evaluation should be done in the emergency services.

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