Case Report

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PERCUTANEOUS REDUCTION WITH K-WIRES OF A BIMALLEOLAR SALTER HARRIS III: A CASE REPORT.

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SUMMARY

A Salt Harris Fracture is a fracture involving the epiphyseal plate or growth plate of a bone. It is a common injury found in children; occurring in 15% of childhood long bone fractures. Injuries of the ankle joint are common. In our case report, we describe the case of a thirteen-year-old patient under our treatment at the Orthopaedic emergency department of Val D'Elsa Hospital (in Campostaggia Poggibonsi, Siena), who presented with a bimalleolar Salter Harris III fracture after a sport trauma. We reduced the bimalleolar Salter Harris III with percutaneous K-wires instead of an open access and two screws (one on the top and another on the bottom of the epiphyseal plate of distal tibia). We performed it according to a revision of scientific literature. The result was a satisfactory reduction of the bimalleolar Salter Harris III.

Introduction

A Salt Harris Fracture is a fracture involving the epiphyseal plate or growth plate of a bone. It is a common injury found in children; occurring in 15% of childhood long bone fractures (Figure 1) (1). Injuries of the ankle joint are common. According to Peterson (2), physeal injuries of the distal tibia and fibula account for 25% of all physeal fractures. About 60% of physeal ankle fractures occur during sports activities and are more common in males than in females (2). Generally, non-displaced fractures can simply be immobilized in a cast. We describe the case of a thirteen-year-old patient with a bimalleolar Salter Harris III reduced by K-wires. In such procedures, doctors must remember to address the risk of premature physeal closure.

Presentation of the case

A thirteen-year-old patient at the Orthopaedic emergency department of Val D'Elsa Hospital (in Campostaggia Poggibonsi, Siena) presented with a shooting ache on the left ankle after a clash with another teenager while playing football. The patient was healthy and had no history of fractures. He was not obese, in good health, and without any hereditary diseases. The ankle was swollen and seemed to be medially unstable during semiological maneuvers. He underwent X-ray in AP, LL and oblique (Figure 2 A, B, C). He was not subjected to CT scans in order to avoid radiation risks. After the examinations,

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it was discovered that the medial malleolus was separated 6.09 mm, while the lateral one was not separated. The medial malleolus apex had a 21 degree outwardly turned angle, while the fibular one was 8.7 degrees outwardly rotated. The patient was operated on two days after the trauma. He was sedated with an anesthetic induction of Propofol and fentanyl citrate and maintained under a gas mask with Sevorane. It was decided not to surgically open the swollen ankle in order to avoid problems in suturing the surgical opening. Thus, the head physician used an instrument for the synthesis of small fragments composed of K-wires of 1.4mm and a K-wire drill. Before undergoing the operation, the patient underwent an intravenous antibiotic treatment with Cefazoline 2gr (5) by intravenous administration. Since he was underage, he could not be subjected to the antithromboembolic (6) treatment. After the operation, a morphine pump was administered (7). The patient was discharged four days after surgery and during his hospital stay reported a medium Vas of 3.

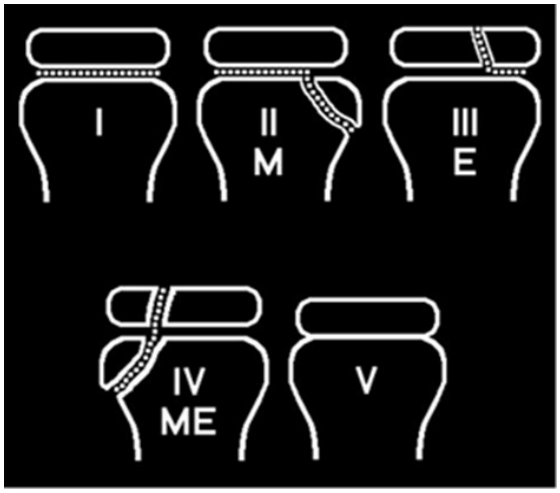

Figure 1: Figure 1: Diagram showing the Salter-Harris Fracture Classification System. M = Metaphyseal involvement, E = Epiphyseal involvement, ME = Metaphyseal and Epiphyseal involvement.

Figure 2 B: X-ray of Ankle at admission in Emergency. It shows bimallolar Salter Harris III; X-ray in LL

Discussion and Conclusions

Our discussion begins with what happened during the operation. After sedating the patient, reductive maneuvers revealed an instability of the lateral compartment.

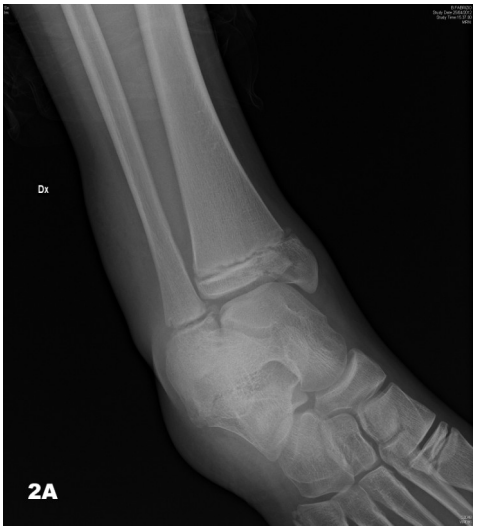

Figure 2 A: X-ray of Ankle at admission in Emergency. It shows bimallolar Salter Harris III; X-ray in AP

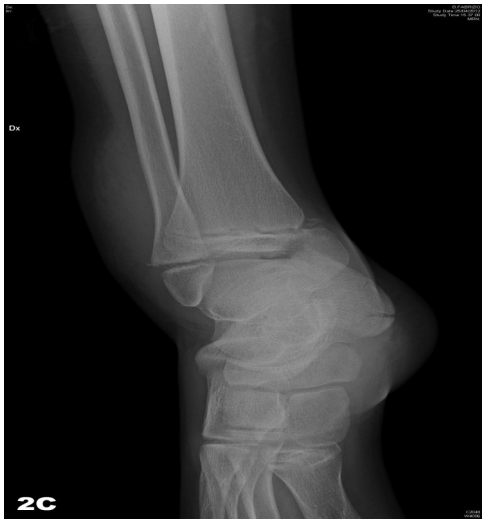

Figure 2 C: X-ray of Ankle at admission in Emergency. It shows bimallolar Salter Harris III; X-ray in oblique

Deepening with an oblique brightness intensifier, "portable C-arm", (in AP, LL and oblique) a SH III was identified on the growth cartilage of the lateral compartment (8). As a result of this new clinical picture it was decided to stabilize both fractures with percutaneous k wire. In literature, percutaneous K-wires are recommended for separations of the fibular cartilage (2,3). The stabilization of K wires of 1.4 mm in diameter appeared to be effective and provided good stability by reducing the angle of the fragment to a 4.2 degree angle, then dropping to below 5 degrees, which is the cut-off for the joint instability (3). With regard to the medial malleolus, it was decided not to open and provide a percutaneous synthesis because the skin was edematous. When the fibular malleolus was synthesized there was slight blood loss from the hematoma (2). Scientific literature describes the gold standard synthesis as over and under the growth plate with screws 3.5 mm in diameter. During the operation, however, we noticed a valgus angulation of the fragment of more than 21.5 degrees; magnification of the fracture underlined that the postoperative degrees corresponded to 4.6 degrees. The distance of the segments was 6.09 mm, postoperative equal to 0, since the two fragments were in contact with each other. Considering all of these impediments during the fixation, it was decided to proceed with the synthesis of the fragment with K-wires 1.4 mm in diameter. The percutaneous reduction was stable under the stress maneuvers subjected to the ankle. The stability and the ease of reduction were also due to the lack of interposition between the two stumps of the fracture of the posterior tibial tendon (9). At the end of the operation, the patient was fitted with a short leg semi-cast to be worn for a minimum of 3 weeks (2,3) and he was allowed to walk with the crutches but not allowed to put his left foot on the ground. Since the reduction was good and resistant to the stress test, the patient was subjected to CT and MRI after reduction only (3,4); avoiding the CT scan pre-operation was advantageous in not subjecting the patient to ionizing radiation twice and cost-saving for the National Health Service. Two days after surgery was performed, an X-ray of the cast was performed to verify the reduction of the fracture (Figure 3). The patient will be subjected to subsequent radiographic controls, which are necessary to determine his immobilization time and to monitor the development of consolidation of the growth plate. Unfortunately, the patient lives at a prohibitive distance to perform other controls at our department of Orthopaedics Hospital Val d'Elsa (in Campostaggia Poggibonsi, Siena). We provided all of the clinical materials and diagnosis to the patient to communicate to his medical center of reference. One month after discharge, the patient contacted us to inform us that the evolution of the SH III fracture

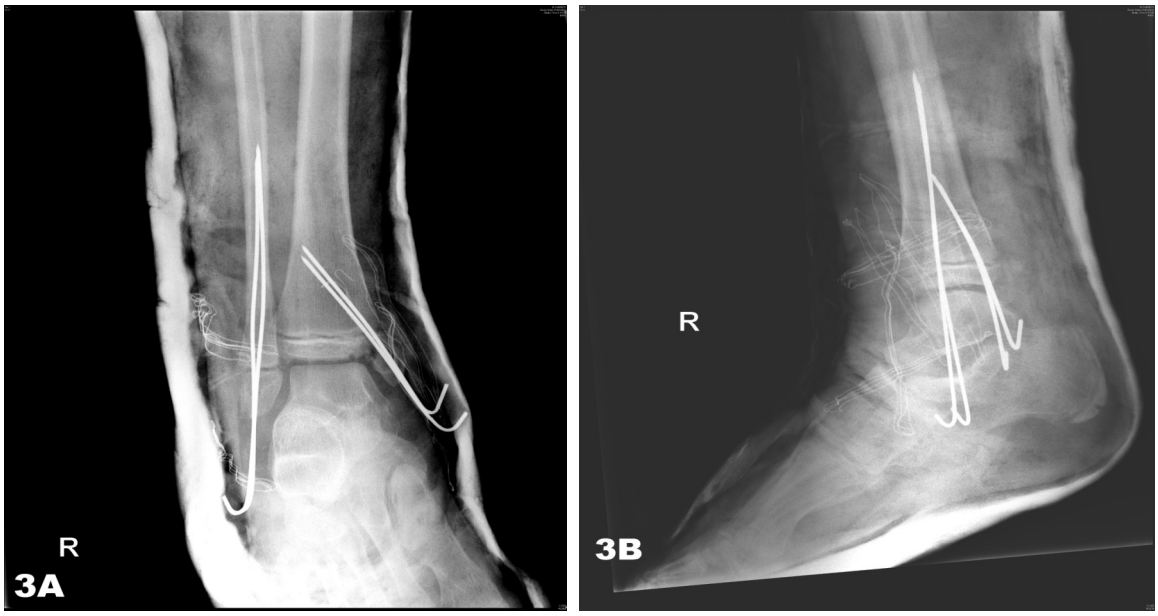

Figure 3: X-ray with short leg semi cast after two days from treatment. 3A: in AP; 3B: in LL

has bimalleolar prognosis quoad valitudem positive. Unfortunately, the patient has not been able to send us diagnostic images to understand his prognosis. In conclusion, the percutaneous osteosynthesis with K-wire proved the ideal and appropriate choice for maintaining the integrity of the skin, decreasing the surgery time and anesthesia, and better respecting the growth cartilage by avoiding further trauma through open access.

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