Focal Growth Plate Arrest After Percutaneous Pinning of Distal Femur

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INTRODUCTION:

Metaphyseal fracture of distal femur accounted for 8.8% of all femoral fractures in children.[1] We report a case of child with metaphyseal fracture of distal femur, who has delayed presentation of angular deformity due to iatrogenic growth plate injury after treatment with percutaneous pinning.

REPORT:

A 2 years-old girl sustained supracondylar fracture of bilateral femurs after car accident. At Day 5 of injury, percutaneous pinning was done using two cross K-wire size 2.0mm, which went through growth plate of both distal femur (Figure 1a). The fractures were fixed in an acceptable alignment, with mechanical lateral distal femoral angle (mLDFA) of 89° for the right femur and 96° for the left. The K-wires were removed 6 months later as fractures united.
3 years later, she presented with left genu varus. Radiograph showed varus deformity of left distal femur with mLDFA of 116° (Figure 1b). CT scan revealed a bone bar at medial aspect of left distal femur physeal plate (Figure 1c).
She was subjected to deformity correction surgery of left femur at age of 5. The bony bar was resected. Osteotomy was performed at metaphysis, followed by valgus correction of left distal femur and fixation with three K-wires size 1.6mm in cross construct (Figure 2a). These wires were inserted from entry points 10mm proximal to growth plate. Radiographic follow-up after 2 months showed union of osteotomy site with corrected mLDFA of 96° (Figure 2b).
9 months later, she presented with left genu valgum. Radiographs showed valgus angulation of left distal femur with mLDFA of 70°. CT scan revealed a bone bar at lateral physis, measuring 11.3mm x 8.9mm (Figure 2c).
We resected a peripheral-located bone bar from lateral side of growth plate. Open wedge varus osteotomy was performed at metaphyseal-diaphysis junction, followed by fixation using a plate. Post-operative radiograph shown successful correction of the deformity with mLDFA of 84.5° (Figure 2d).

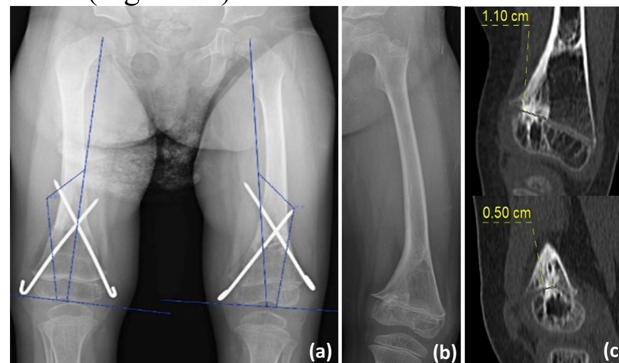

Figure 1: (a) Cross K-wires inserted through distal femoral growth plates. (b) Varus deformity of left distal femur at age of 5. (c) Physeal bar located at medial condyle left femur.

Figure 2: (a) Corrective osteotomy followed by K-wire fixation. (b) Valgus deformity of left distal femur at age of 6. (c) Physeal bar located at lateral condyle left femur. (d) Correction of the valgus deformity followed by plate fixation.

CONCLUSION:

Iatrogenic growth plate injury after percutaneous pinning of distal femur in children should not be overlooked. Patients should be monitored for growth disturbance until skeletal maturity.

REFERENCES:

Valaikaite R et al. A Retrospective Epidemiological Study of Paediatric Femoral Fractures. Swiss Med Wkly. 2020;150:w20360.