From Fragility to Strength: Navigating Surgical Challenges in Osteogenesis Imperfecta

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INTRODUCTION:

Osteogenesis imperfecta (OI) often involves recurrent fractures and significant bowing due to bone fragility. This poses a risk of fractures including the femur, once children begin weight bearing activities since there is significant tension exerting across the bowed area. Surgical treatment aims to fix the fracture and indeed to prevent the recurrence.

REPORT:

A two-year-old boy with OI type III came to us with a closed left midshaft femur fracture which was the second episode with a similar presentation. In previous fracture he was treated with closed reduction and hip spica casting. For this presentation, we performed the procedure in the supine position with standard lateral

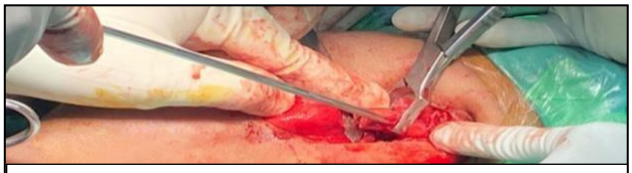

Figure 1: Retrogradely reamed via lateral canal.

approach.

We used a cannulated drill to create a canal in the lateral most part of the shaft near the fracture site (proximal fragment). The proximal segment was retrogradely reamed from the lateral canal to the greater trochanter. Similarly, the distal segment was reamed until just before the distal femoral physis. A rush rod of appropriate length and diameter was then inserted from the greater trochanter to the proximal lateral canal, passing through to the distal femoral metaphysis while maintaining neck-shaft angle. Non-elongating rush rod, featuring long shaft with proximal hook for stabilization, offers structural support to the weakened bone in a load-sharing manner, favored for their cost-effectiveness and ease of reducing diaphyseal fracture with minimal technical demands compared to elongating rod. Non-elongating rods are often preferred over elongating rods, especially in very young patients owing to its cost and lesser technicality. Elongating rods, instead, have the advantage of

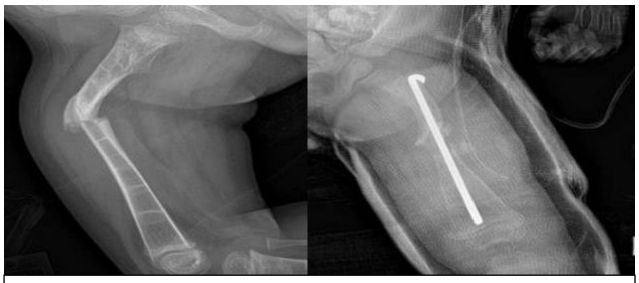

Figure 2: Pre and post rash road insertion X-RAY

longer duration time for revision. Non-elongating rods can lead to unsupported bone segments over time, increasing the risk of fracture and implant protrusion, which can be addressed using a sliding rod technique with two rush nails inserted from both bone ends, allowing for gradual nail sliding as the bone grows. To prevent complications with rush rods, adequate reduction, proper implant diameter and length, and dual rodding fixation are recommended, with central placement in the medullary cavity crucial to reduce extra cortical migration. Antegrade rodding extending to the distal femoral epiphysis, as in elongating telescoping nails, may provide superior fixation stability compared to rodding only reaching the metaphysis.

CONCLUSION:

Most experts favor rodding over plating in OI long bone fracture, though the choice of rod material and type remains debated, with centers favoring telescoping rods despite requiring specialized training and incurring higher costs; nonetheless, regardless of the chosen implant, surgeons must adhere to rodding principles in brittle bones to prevent severe complications.

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