Managing A Distal Femoral Physeal Nonunion secondary to Knee joint sepsis in an Eight year old Child

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Introduction: Neonatal bone and joint infections can cause physical damage resulting in either growth disturbance or complete growth arrest. (1) Femur lengthening is a technically difficult procedure, used in leg length discrepancies of 5-10 cm. The Ilizarov fixator method lengthening knee spanning fixation is commonly used. (2) Removal of the Ilizarov frame can result in loss of flexion secondary to a "rebound phenomenon." (3) Extension contracture of the knee is a common complication of femoral lengthening (4); Quadricepsplasty is a technique devised to release extra-articular adhesions or contractures which prevents unification of the knee(s).

Objectives:
- To achieve union at distal femur
- To correct limb length discrepancy
- To allow knee flexion and achieve acceptable knee range of motion

History: A 4-year-old child presented to us with short right lower limb and shortening secondary to neonatal sepsis.

- An examination showed right lower limb shortening of 10 cm. Knee range of motion could not be assessed as movements were occurring at the phalangeal joints. A short limb was noted. No distal neurovascular deficits were present.

Treatment plan:

Stage 1: Acute docking and limb lengthening with Ilizarov ring fixator

- Due to severe shortening, tibia was also lengthened
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Stage 2: Operative procedure: Judet’s quadricepsplasty:

3 years post initial lengthening, knee was stiff, due to soft tissue contractures. To achieve knee ROM, Judet’s Quadricepsplasty was done.

- Initially limb was kept in maximum flexion immobilized in a flexion slab.
- Post-op day 5, flexion slab was removed, and intensive physiotherapy was initiated.
- A CPM machine was used and after 4 weeks of hospital stay the child achieved 85 degrees of active knee flexion.

Discussion

- Long standing infected nonunion at distal femur can lead to knee stiffness. Femoral lengthening can also add to knee stiffness and an extension contracture. Short femur segment limits our choices of fixator use, Ilizarov ring fixator being the most feasible.
- At 112 weeks, three Stage 2 limb lengthening was not possible, hence staged treatment was planned. Antekamp et al have shown that 70 degrees of flexion during swing portion of gait is required for normal ambulation (6).
- The Judet Quadricepsplasty is performed in phases with increments of flexion achieved by passive manipulation after each phase of the release. This technique of distraction and muscle sliding is associated with rapid recuperation, little extension lag and almost complete maintenance of the range of passive movement found at operation.

Conclusion

- Treating distal femoral nonunion due to destruction of physeal bone is difficult as it leads to a lot of limb length discrepancy. The short femur segment limits the choice of implants to Ilizarov fixator.
- Initially, Ilizarov ring fixator was used choices of lengths very short limb segments and also have unions.
- Judet quadricepsplasty improves knee ROM in complicated cases like long docking infection associated with knee stiffness even after aggressive physiotherapy.

References
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