New Techniques and Emerging Evidence #NT15

Hip and Femur

Minimizing Leg Length Discrepancy While Fixing Comminuted Femoral Fractures: A Prospective Quality Improvement Initiative Using an Intraoperative Grid on the Operating Room Table

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Purpose: To prevent leg length discrepancy (LLD) while treating comminuted femoral fractures, we assessed the value of an intraoperative x-ray grid to compare sides. This was a quality-improving initiative.

Methods: This prospective consecutive case series aimed at quality improvement was conducted at a Level I trauma center in the US. 23 consecutive patients with a comminuted femoral fracture underwent either open reduction and internal fixation or statically locked intramedullary nailing with a focused attempt at minimizing LLD during surgery. An intraoperative grid ($1000-$2000 online; ours was an old one found in our radiology department) was used on the radiolucent table or below the legs on a Hanna table to assess and correct LLD prior to locking in the length with a plate or an intramedullary nail. The top of the femur, the medial femoral condyle, and the distal articular surface of the tibia were lined on grid lines that could be seen with fluoroscopy. A CT scanogram of both legs was performed on postoperative day 1 to assess for residual LLD. The main outcome measure was LLD >1.5 cm, compared to our own database for comminuted fractures.

Results: There were 17 femoral shaft (32C) fractures and 6 distal femur fractures (33C). All 23 patients were found to have an LLD <1.5 cm. No difference was noted based on mechanism of injury or OTA/AO type. A prior study at our institution found an LLD in a similar cohort of 21% (in 98 patients) with comminuted femoral shaft fractures using Bovie cords and radiolucent rulers. More numbers of patients are required and more surgeons to verify our results with this technique.

Conclusion: In our hands, the use of an intraoperative radiolucent grid eliminated the incidence of LLD >1.5 cm in comminuted fractures of the femur. A postoperative CT scanogram may not be necessary when using this technique to ensure patients do not end up with an iatrogenic LLD. The grid costs between $1000 and $2000 dollars and is reusable.