

Treatment of Osteoporotic Supracondylar Femur Fractures with a Photodynamic Bone Stabilization System: A Review of Short-Term Outcomes

Shikha Sachdeva, MD; Travis Parkulo, MD; Brandi Hartley, MD; David Seligson, MD

Purpose: Distal femur fractures in elderly patients pose a challenging problem for the orthopaedic traumatologist. In osteoporotic bone, commonly used constructs fail secondary to lack of implant anchorage and poor bone stock resulting in cut-out. In our aging population, an increasing number of these fractures are periprosthetic, adding a layer of complexity as fixation methods may act as a stress riser to total knee or hip prostheses. Use of a photodynamic bone stabilization system, used in conjunction with plating, provides a solution to this problem. A light-activated polymer within an expandable catheter, this minimally invasive intramedullary implant provides augmentation to osteoporotic bone. In combination with plate fixation, we review whether it sufficiently stabilizes osteoporotic bone while minimizing blood loss and protecting local tissue biology.

Methods: 14 patients with fragility fractures of the supracondylar femur were reviewed, with minimum 3-month follow-up. All patients underwent a combination of a photodynamic intramedullary implant with supplemental plate fixation of the distal femur and were made weightbearing as tolerated immediately after surgery.

Results: The average age of the patients was 76 years. Review of CT imaging confirmed that there was poor bone density in the distal femur, as measured by Hounsfield Units (mean 93 HU). All patients have maintained stability of fixation construct at a minimum of 3 months postoperatively (Figure 1). 11 of 14 patients showed signs of radiographic healing with bridging callus present on routine radiographic imaging at 3 months. There were 0 cases with infection or requiring return to the operating room (OR) for failure of fixation/revision.

Conclusion: Initially used in treatment of pathologic fractures, the use of intramedullary photodynamic bone stabilization systems with supplemental plate fixation is a novel idea in the treatment of geriatric fragility fractures. Benefits of this method include early mobilization, less blood loss than endosteal reaming, and increased purchase for screws within the plate compared to plating alone. Patients with osteoporotic bone who are at risk for implant failure, patients with medical comorbidities that demand expeditiously shortened OR times, or patients with comorbidities that cause concern for wound healing problems may benefit from this technique. While longer term follow-up is needed, a review of short-term outcomes shows that this is a good option for treatment of geriatric fragility fractures of the supracondylar region with proper patient selection.



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