**HYDROXYAPATITE-COATED SCREWS PREVENT LAG SCREW CUT-OUT IN OSTEOPOROTIC TROCHANTERIC FRACTURES FIXED WITH DHS PLATE. A PROSPECTIVE RANDOMIZED STUDY**

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**INTRODUCTION:** The incidence of trochanteric fractures is increasing dramatically, proportionate with the growing elderly population. Dynamic Hip Screw (DHS) fixation is widely used in osteoporotic trochanteric fracture patients. However, significant failure rates have been reported due to lag screw cut-out resulting from inadequate fixation. The incidence of lag screw cut-out ranges from 5-25%1 with a reoperation rate of 10%.2 To improve screw fixation, hydroxyapatite (HA)-coated AO/ASIF screws have been developed, and results in unloaded and loaded animal models have been encouraging.3,4 Additionally, optimal bone purchase was achieved in osteoporotic wrist fracture patients treated with external fixation with HA-coated pins.5 This background, the present study was designed to determine if osteoporotic trochanteric fracture patients could benefit from treatment with DHS plates fixed with HA-coated screws.

**METHODS:** 70 patients with trochanteric fractures were selected. Patients were divided into two paired groups and randomized to receive 135° 4-hole DHS plates with either standard lag and cortical screws (Group A), or HA-coated lag and cortical screws (Group B). Inclusion criteria were: female; age 65 years; AO type A2; and BMD as measured at the contralateral hip lower than -2.5 T score. Exclusion criteria included history of previous hip fracture or current multiple fractures, inability to communicate, malignancy, infection, and lag screw extension into the proximal quadrant of the femoral head in the AP view, or into the anterior quadrant in the lateral view.

**RESULTS:** Average patient age was 81±9 in Group A and 82±7 in Group B (ns). Average BMD was 499±76 in Group A, and 569±107 in Group B (ns). Lag screw cut-out occurred in 4 Group A cases and in none of Group B (p<0.05, β=0.8). Three cut-out cases underwent revision with bi-polar prostheses. At 6 months, Harris Hip Score was 60±25 (Group A) and 79±11 (Group B) (p=0.0001). SF36 score was 53±27 (Group A) and 67±21 (Group B) (p=0.01). In Group A, the femoral neck shaft angle was 134±5° postoperatively and 126±12° at 6 months (p=0.003). In Group B, the femoral neck shaft angle was 134±7° postoperatively and 133±7° at 6 months (ns).

**DISCUSSION AND CONCLUSIONS:** It is widely accepted that obtaining adequate fixation in osteoporotic bone is a challenge. The incidence of lag screw cut-out observed in Group A corresponds to results reported in previous studies.1,2 In Group B, no lag screw cut-out occurred, and the resultant superior functional outcome can be considered a major improvement in trochanteric fracture treatment. Due to the enhanced bone anchorage of the HA-coated screws, there was no deterioration of the femoral neck shaft angle over time. This result shows that fixation with HA-coated screws was strong enough to maintain the reduction achieved during surgery. Conversely, fixation with standard screws was inferior. Four cases of lag screw cut-out occurred. The functional outcome was fair and the femoral neck shaft angle reduced over time. The results of this study confirm a previous external fixation study of osteoporotic wrist fracture patients and suggest that the use of screws coated with hydroxyapatite heralds a new era in fracture fixation.

3. Moroni A, Faldini C, Rocca M, Stea S, Giannini S. Improvement of the bone screw interface strength in hydroxyapatite-coated and titanium-coated AO/ASIF cortical screws. *Accepted for publication in J. Orthop. Trauma*

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