

Proximal Pole Scaphoid Nonunion with Avascular Necrosis: Treatment with Dorsal Capsular-Based Vascularized Distal Radius Graft

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INTRODUCTION: Scaphoid nonunion involving the proximal pole with the presence of avascular necrosis is difficult to reconstruct. We aimed to determine the efficacy of surgical treatment of proximal pole scaphoid nonunion with avascular necrosis using a dorsal capsular-based vascularized distal radius graft.

METHODS:

Between 2000 and 2020, 67 patients with established proximal pole scaphoid nonunion with avascular necrosis were treated using a dorsal capsular-based vascularized distal radius graft. In all patients, the vascularized bone graft was harvested from the distal aspect of the dorsal radius and was attached to a capsular flap of the dorsal wrist capsule. The graft was vascularized by the artery of the fourth extensor compartment. After fixation of the scaphoid with a small cannulated screw, the harvested bone graft with the attached dorsal capsular flap was inserted press-fit into a dorsal trough across the nonunion site. Due to the close proximity of the graft donor, only minimal rotation (10 to 30 degrees) of the flap was needed. Supplementary fixation of the graft with a micro suture anchor into the scaphoid was used in the last 50 patients. At follow up, each patient was evaluated with clinical and radiographic examination.

RESULTS: Fifty-four of the procedures were performed on the dominant arm (80.6 %). The minimal follow up of the patients was 24 months with a mean of 35 months (range, 24-59 months). Union rate was 86.6% (58 of 67 scaphoid nonunions with avascular necrosis) at a mean time of 12 weeks. Persistent nonunion was noted in eight patients and fibrous union in one patient. No patients developed donor site morbidity. No graft dislodgment was noted. There was significant improvement of the wrist functional outcomes at the final follow up. There was improvement in the mean Mayo Modified Wrist Score (MMWS) from 41 before surgery to 87 after surgery.

DISCUSSION AND CONCLUSION: The dorsal capsular-based vascularized distal radius graft is a safe and effective treatment in patients with scaphoid nonunion with avascular necrosis of the proximal pole. It is a simple harvesting technique avoiding microsurgical dissection or anastomosis. The convenient position of the dorsal capsular-based graft allows easy access to the scaphoid proximal third and its short arc of rotation reduces the risk of kinking the nutrient vessel.