Clinical Outcomes following Percutaneous Ankle Fusion

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INTRODUCTION:

Percutaneous ankle fusion is an emerging technique with minimal published outcome data. It is hypothesized that this technique has the same advantages as arthroscopic-assisted ankle fusion but with even less local soft tissue injury. This study is a retrospective review of patient-reported outcomes and radiographic outcomes after percutaneous ankle fusion.

METHODS:

Adult patients treated by a single surgeon from February 2018 to June 2021 that underwent isolated percutaneous ankle fusion with at least one year follow up were included in this study. Additional patient inclusion criteria were end stage ankle arthritis in patients who were not candidates for arthroplasty or who opted for fusion, patients with foot drop ineligible for tendon transfer due to paralysis, or patients with comminuted pilon fractures that opted for primary arthrodesis. Patients with other prior foot and ankle fusions were excluded. Surgical technique consisted of fixation with three crossed headless compression screws in sizes from 5 to 7 millimeters. Achilles tenotomy was performed in all cases. Patients were non-weight-bearing for 6 weeks, then weight-bearing as tolerated in a CAM boot for 6 weeks postoperatively. Pre- and postoperative patient-reported outcomes were compared with Visual Analog Scale and Foot Function Index (FFI) and compared using paired t-tests. Fusion was assessed radiographically by the surgeon on postoperative radiographs and computed tomography (CT) at 3 months postoperatively.

RESULTS:

Twenty-seven adult patients (44% male) were included in the study. Mean follow up was 21 months (range 13 – 31 months). Mean age was 60 years (range 39 – 89 years). Medical comorbidities included diabetes (3/27), smoking (1/27), rheumatoid arthritis (3/27), lupus (1/27, and paralytic foot(3/27). Mean preoperative VAS was 7.4 compared to postoperative VAS of 0.2 ($p<0.0001$). Mean preoperative Foot Function Index (FFI) in pain domain, disability domain, activity restriction domain, and total score was 20.9, 16.7, 18.5, and 56.4 respectively. Mean postoperative FFI in pain domain, disability domain, activity restriction domain, and total score was 4.3, 4.7, 6.7, and 15.8 respectively. All pre- and postoperative differences in FFI were statistically significant ($p<0.0001$). Fusion was achieved in 26/27 patients (96.3%). Four patients had complications: a nonunion converted to a tibiotalocalcaneal nail, hardware removal for symptomatic hardware, superficial wound dehiscence, and transient superficial peroneal nerve palsy.

DISCUSSION AND CONCLUSION:

The results of this study demonstrate that percutaneous ankle fusion achieves a high rate of fusion (96.3%), has outcomes comparable to other minimally invasive techniques such as arthroscopic assisted fusion, and is associated with minimal complications. Pre- and postoperative patient-reported outcomes suggest high patient satisfaction with the procedure.