

Complication Rates in Open versus Arthroscopic Ankle Arthrodesis in Patients with Avascular Necrosis of the Talus

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INTRODUCTION: Treatment strategies for talar avascular necrosis (AVN) range from nonsurgical management to surgical interventions, including joint-sparing and joint-sacrificing procedures. However, no consensus remains on the optimal treatment approach, particularly in cases requiring ankle arthrodesis. The purpose of this study is to evaluate whether open ankle arthrodesis and arthroscopic ankle arthrodesis differ in complication rates when used for the treatment of talar AVN.

METHODS:

This retrospective study utilized data from the TriNetX database to identify patients with foot and ankle AVN who underwent open or arthroscopic ankle arthrodesis between January 29, 2004, and January 29, 2024. A secondary analysis examined those undergoing concurrent ipsilateral subtalar fusion. Propensity score matching controlled for age, sex, long-term steroid use, and comorbidities (Table 1). Primary outcomes included one-year rates of nonunion and hardware removal. Risk differences were calculated, and significance was assessed with Z-tests.

RESULTS:

Prior to matching, the open ankle cohort had a significantly lower prevalence of peripheral vascular disease (3.2% vs. 8.5%, $p = 0.013$) and heart failure (2.7% vs. 8.5%, $p = 0.004$) compared to the arthroscopic ankle cohort. No significant differences in orthopaedic complications between the groups, including rates of nonunion (30.6% vs. 31.1%, $p = 0.936$) and hardware removal (19.0% vs. 12.1%, $p = 0.147$) were found. In a sub-analysis of patients undergoing combined ankle and ipsilateral subtalar fusion, nonunion rates did not differ significantly between the open ankle + subtalar and arthroscopic ankle + subtalar cohorts (14.3% vs. 20.5%, $p = 0.142$).

DISCUSSION AND CONCLUSION:

This study found no significant differences in orthopaedic complication rates between open and arthroscopic ankle arthrodesis for the treatment of talar avascular necrosis, including nonunion and hardware removal. Additionally, in patients undergoing combined ankle and subtalar fusion, nonunion rates were similar between techniques. These findings suggest that both open and arthroscopic approaches offer comparable complication profiles.

Table 1: Characteristics of patients in Open Ankle and Arthroscopic Ankle cohorts before and after matching

Characteristic	Before Matching			After Matching		
	Open Ankle n=412	Percutaneous Ankle n=120	p-value	Open Ankle n=116	Percutaneous Ankle n=116	p-value
Age, mean	49.8	48.2	0.268	48.2	48.3	0.963
Male, n (%)	174 (42.6)	48 (41.0)	0.754	45 (38.8)	48 (41.4)	0.687
Female, n (%)	218 (53.4)	69 (58.9)	0.288	71 (61.2)	68 (58.6)	0.687
Antiphospholipid Syndrome, n (%)	10 (2.5)	0 (0.0)	0.087	0 (0.0)	0 (0.0)	1
Chronic Kidney Disease, n (%)	27 (6.6)	10 (8.5)	0.472	10 (8.6)	10 (8.6)	1
Diabetes, n (%)	72 (17.6)	14 (12.0)	0.143	15 (12.9)	14 (12.1)	0.843
Heart Failure, n (%)	11 (2.7)	10 (8.5)	0.004	10 (8.6)	10 (8.6)	1
Hypertension, n (%)	119 (29.2)	26 (22.2)	0.138	26 (22.4)	25 (21.6)	0.874
Long-term Steroid Use, n (%)	18 (4.4)	10 (8.5)	0.079	10 (8.6)	10 (8.6)	1
Peripheral Vascular Diseases, n (%)	13 (3.2)	10 (8.5)	0.013	10 (8.6)	10 (8.6)	1
Obesity, n (%)	72 (17.6)	17 (14.5)	0.428	16 (13.8)	17 (14.7)	0.851
Sickle Cell Disease, n (%)	10 (2.5)	0 (0.0)	0.087	0 (0.0)	0 (0.0)	1