Development of a Predictive Model for the Outcome of Nonsurgical Treatment of Insertional Achilles Tendinosis

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Introduction/Purpose: Insertional Achilles tendinosis (IAT) is less responsive to nonsurgical treatment than midstubstance disease. The purpose of this study was to develop a predictive model for the treatment outcomes of patients with IAT. Objectives were to discriminate between predictive and non-predictive presenting parameters with respect to the outcome of nonsurgical treatment, to develop a predictive model using these parameters which assigns individual patients a likelihood of failing nonsurgical treatment based on their respective risk profiles, and to validate this model.

Methods: Following IRB-approval, patients with Achilles tendinosis were identified using ICD-9 code 726.71. The authors reviewed medical records and included all 664 patients with IAT who underwent at least 3 months of nonsurgical treatment. Exclusion criteria included midstubstance or bilateral disease, skeletal immaturity, or previous hindfoot surgery. Parameters collected included presenting age, gender, body mass index, presence of diabetes mellitus or rheumatoid arthritis, tobacco use, workman’s compensation status, previous corticosteroid injection, ankle range of motion, visual analogue pain score, Foot and Ankle Ability Measure score, presenting SF-12 score, presence of Haglund’s exostosis, insertional enthesisophyte or intrasubstance calcification. Univariate analysis was used to describe the study population. A multivariate logistic regression was developed and pruned using Akaike information criterion. The final model was used to predict an individual’s likelihood of undergoing surgery for IAT and the model was validated using bootstrapping analysis.
Results: The study sample was 53% female, had a mean age of 53.7 years (SD 14.7 years), and 80% were overweight or obese. Duration of symptoms at presentation averaged 10.4 months (range, 0 to 348 months, SD 28 months). 1 in 12 patients failed nonsurgical treatment. Final predictors of outcome were presenting visual analog scale >4 (OR 1.13, 95% CI 1.01-1.26, p=0.02), limited ankle range of motion (OR 0.33, 95% CI 0.19-0.58, p < 0.01), previous corticosteroid injection (OR 2.33, 95% CI 1.06-5.10, p=0.04), and Achilles insertion enthesophyte (OR 2.21, 95% CI 1.38-3.54, p < 0.01). The model assigned a risk of failure ranging from 5% for one predictor to 55% for 4 predictors. For this model, the area underneath the curve was 0.7.

Conclusion: These data indicate that patients with IAT can be risk-stratified according to presenting data. A validated model for risk stratifying patients with IAT did not exist prior to this study. Such a model has potential utility in clinical care and when planning and interpreting the outcomes of clinical trials. Strengths of this study were its breadth of included parameters and its large sample size. Weaknesses were its retrospective nature and lack of a defined nonoperative treatment protocol. While encouraging, these findings require prospective validation prior to clinical or investigational use.