Gravitational Stress Views Overestimate Ankle Instability and May Commit Patients To Unnecessary Surgery: A Case Series with 10 Year Follow Up

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INTRODUCTION:

Distinguishing stable from unstable ankle fractures is key to successful ankle fracture management. Stress tests are commonly used, and gravitational stress views (GSV) may be a convenient and less painful alternative to manual stress testing. The aim of this study was to assess the long-term outcomes of patients who had been treated conservatively following positive gravitational stress views as defined by current literature.

METHODS:

Patients presenting to a single large academic trauma centre between 2011 and 2013 at a with an isolated fibula fracture and an anatomically aligned mortise on initial plain film radiograph were retrospectively reviewed. After initial x-ray, patients underwent a gravity stress view according to hospital protocol at the time. Measurements of the medial clear space (MCS) taken from presentation plain film radiographs and GSV radiographs were recorded. Electronic case notes and National Imaging Archives were reviewed retrospectively at a minimum of 10 years post-injury and complications and reinterventions were recorded. Patients were also contacted by postal questionnaire. Validated outcome scores such as the Olerud Molander Ankle Score (OMAS), Manchester Oxford Foot Questionnaire (MOXFQ), Euroqol-5D-3L Index (EQ5D) and EQ5D Visual Analogue Scores (VAS) were used to assess long-term outcomes.

RESULTS:

One-hundred and forty-two (142) patients met the inclusion criteria and were included in the study. The mean age was 47.7 years (16.3 to 89.1). Gender distribution revealed that 44% were male (n=63) and 56% female (n=79). Classification of injuries using the AO/OTA Classification revealed most injury patterns were 44B1/2 type injuries (135, 95.1%). Ankle stability was confirmed according to our unit protocol after one week of weight bearing. Median initial film MCS measurement was 3.6mm (interquartile range 2.7 – 4.2) compared with median GSV MCS of 4.8mm (IQR 4.0 – 5.6). This was noted to be significantly different ($p < 0.001$). No patient underwent surgery and all patients had successful conservative management with anatomical union seen at their 6-week radiograph. No patient returned with a complication related to their ankle fracture during the follow-up period. With an MCS acquired from GSV of >4mm, 107 patients would have undergone unnecessary surgical intervention and with >5mm MCS, 65 patients would have undergone unnecessary surgical intervention. At MCS of >6mm, 26 patients would have undergone surgery unnecessarily and at a MCS of >7mm 10 patients would have had unnecessary surgery. Fifty-six (48%) out of 116 patients (26 deceased) returned PROMs questionnaires. Median initial film MCS for patients who returned PROMS was 3.7 (IQR 3.0 – 4.2) and median GSV MCS was 4.8 (IQR 3.9 – 5.4) which was comparable to the total cohort and therefore representative. Median OMAS at a minimum of 10 years was 100 (IQR 75 - 100), median MOXFQ was 1.56 (IQR 0 – 31.3), median EQ5D Index was 1 (IQR 0.8 – 1) and median EQ5D VAS was 80 (IQR 67.5 – 93.5).

DISCUSSION AND CONCLUSION:

Gravitational stress views are judiciously used for assessment of ankle fractures in the emergency room, however, they may over diagnose ankle instability. In this case series, the satisfactory long-term outcomes of conservatively managed ankle fractures with positive gravitational stress views confirm that these views should be used with caution when diagnosing ankle stability in isolated fibular fractures and in-tact mortise on initial plain film radiograph.