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Pulmonary embolism following ankle fractures treated without an operation – An analysis using National Health Service data

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ABSTRACT

The majority of ankle fractures are stable and can be treated without an operation, most commonly with cast immobilisation. Based on concerns regarding the risk of a venous thromboembolic event (VTE) while immobilised, there is currently debate as to whether these patients should receive VTE prophylaxis for the duration of treatment. Rates of pulmonary embolism (PE) in this patient group are unknown. This retrospective cohort study was designed to identify patients treated without an operation for ankle fracture and determine the occurrence of PE and inpatient mortality within 90 days of injury using the English National Health Service administrative databases. Logistic regression models were used to assess the influence of age, gender and Charlson co-morbidity score on these outcomes.

We identified 14 777 adult patients over a 54-month period (April 2007–September 2011) that met our linkage and inclusion criteria (isolated, unilateral closed ankle fracture that did not require hospitalisation). Mean age was 46.4 years (range 18–99) and the majority had a Charlson 0 score (97.7%). There were 32 (0.22%) PEs within 90 days of the fracture (including in one patient who subsequently died). After adjustment, Charlson score of $\geq$1 was associated with a greater risk of PE (Odds ratio = 11.97, $p < 0.001$) compared to Charlson 0. Risk for these patients was 2.08%. In total, fifteen patients (0.11%) died in hospital within 90 days.

Pulmonary embolism is rare following ankle fractures treated without an operation. Patients with multiple co-morbidities are at a higher risk. Based on this evidence, an ankle fracture treated without an operation does not appear to be an indication for routine VTE prophylaxis.

Introduction

Ankles fractures are common, surpassed only by hip, wrist and hand fractures in numbers dealt with by the orthopaedic community [1]. The majority of ankle fractures are stable and are therefore immobilised and treated non-operatively [2]. There are reports of deep venous thrombosis [3] and even fatal pulmonary embolus [4] suspected to result from plaster immobilisation of stable ankle fractures. Consequently, current debate centres on whether patients with ankle fractures who do not undergo surgical treatment should receive routine venous thromboembolic (VTE) prophylaxis.

The National Institute for Health and Clinical Excellence (NICE) produces evidence-based guidance on the appropriate treatment of patients in the NHS in England and Wales. Current guidance states that there is insufficient evidence to make a recommendation regarding thromboprophylaxis for this group of patients [5]. With the incidence of stable ankle fractures in a typical United Kingdom (UK) population estimated to be 5 per 10 000 head of population each year [6], the potential cost of routine prophylaxis for these fractures would be considerable,

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amounting to a minimum of £2.5 million annually of drug costs alone, without taking into account the organisational costs.

We therefore aimed to determine rates of pulmonary embolism (PE) within 90 days of ankle fracture following non-operative treatment.

Materials and methods

Design

A retrospective cohort study was used to access the English administrative hospital episodes database (Hospital Episode

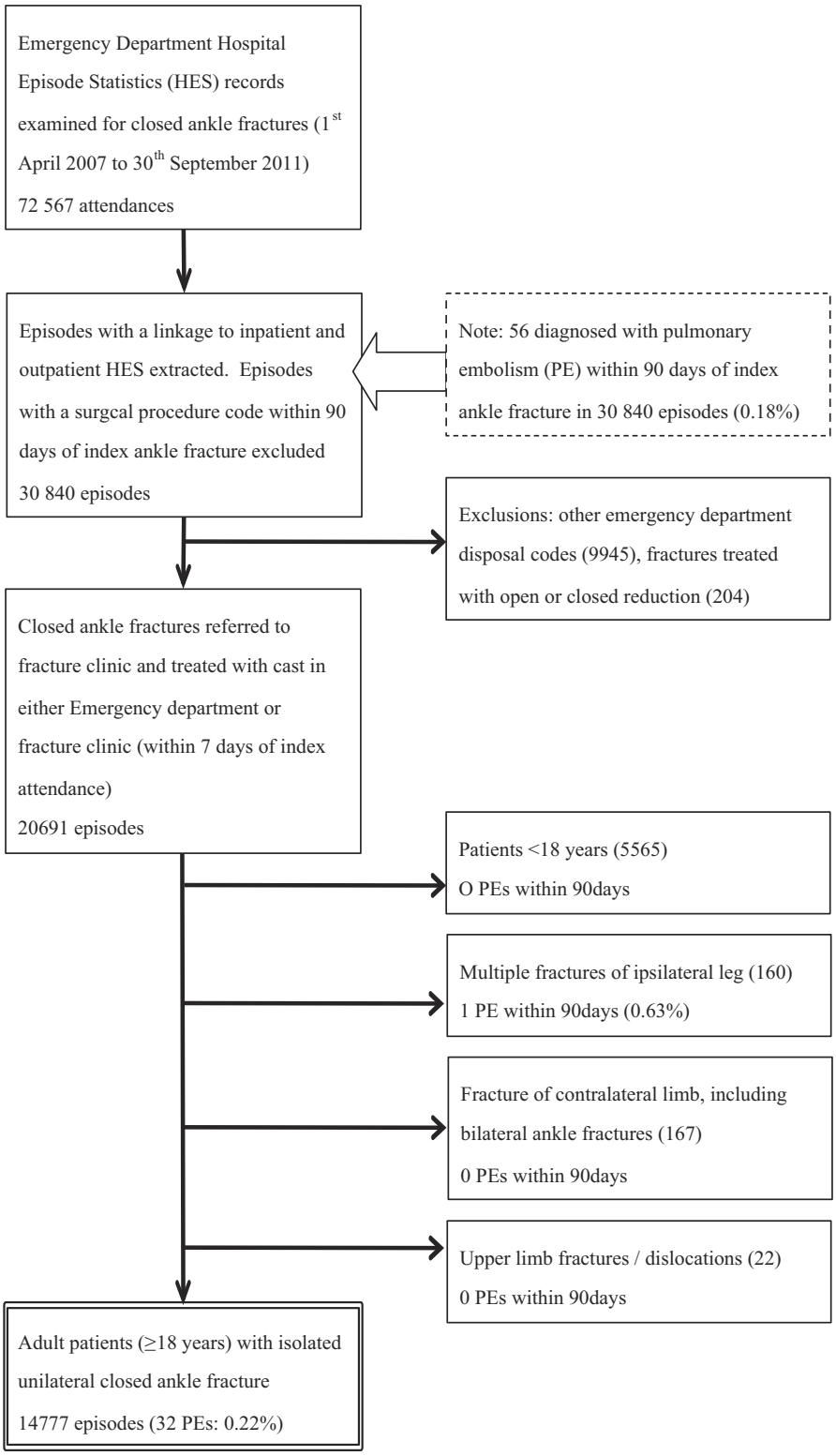

Fig. 1. Flowchart describing the inclusion of patients within in the study.