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Review

What is the evidence for chemical thromboprophylaxis in foot and ankle surgery? Systematic review of the English literature

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ABSTRACT

Venous thromboembolism (VTE) is a well documented complication following lower limb trauma and surgery. The incidence of VTE in hip and knee surgery has been well studied, whereas the incidence in foot and ankle surgery is less clear. There is debate as to which cases require prophylaxis and what is the most effective means by which this is achieved.

We performed a systematic review of the published English literature on VTE prophylaxis in foot and ankle surgery using MEDLINE, EMBASE, CINHAL, Cochrane Library, without date restrictions up to December 2012. From 988 citations, 25 papers fulfilled the inclusion criteria. Conclusions were drawn on the incidence (symptomatic and asymptomatic VTE), location (distal vs. proximal), associated risk factors, timing of VTE, role of mechanical and pharmacological prophylaxis and cost effectiveness of the treatment.

Our review showed that the overall incidence of symptomatic VTE in foot and ankle surgery is low (0–0.55%). There is increased incidence in foot and ankle trauma patients with the highest incidence reported in tendo-achilles surgery. The reported risk factors include previous history of VTE, immobilisation, high BMI, age, co morbidities, contraceptive pill, and air-travel. There is a cumulative effect resulting in higher risk when two or more risk factors are present.

Contents

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1. Introduction

The incidence of venous thromboembolism (VTE) in the general population is estimated to be 0.00048% [1]. Although uncommon, VTE in foot and ankle surgery can be a potentially fatal complication. There is controversy regarding efficacy of pharmacological prevention and whether it is required routinely.

NICE guidelines (published in January 2010) on the prevention of VTE recommend the use of pharmacological thromboprophylaxis in all patients with lower limb trauma and/or surgery who are immobilised in a plaster cast along with other indications. A survey of the current practice in the United Kingdom has questioned the suitability of these guidelines and their application in the NHS today [2]. Another survey showed variation in individual practices as regards VTE prophylaxis [3].

The purpose of this systematic review is to perform a qualitative synthesis of the best available evidence on VTE in foot and ankle surgery in order to address some of the controversies and identify areas for developing future research in this highly debated topic. We aimed to evaluate if there is any reported difference in the rates of VTE between elective and trauma surgery to the foot and ankle and also if there is evidence to suggest chemical thromboprophylaxis can reduce this risk.

2. Materials and methodology

We undertook a literature search utilising the following electronic bibliographic databases: MEDLINE (Medical Literature Analysis and Retrieval Online, Bethesda, MD), CINHAL (Cumulative index to Nursing and Allied Health Literature, Ipswich, MA) and EMBASE (ExerptaMedica Database, Amsterdam, Netherlands) the Cochrane library without date restriction up to 1st December 2012. To avoid missing any unpublished studies on the subject, Google Scholar search engine was also used. The key words and medical subject heading (Mesh) terms used were: foot OR feet OR ankle; DVT OR thrombo*; surgery OR surgical). Only English language papers were considered; giving a total of 988 Medline results, 1 Cochrane review and 131 CINHAL results. No papers were found in the EMBASE database.

The senior authors reviewed the titles, abstracts and full texts of relevant articles for their eligibility. Our agreed selection criteria are shown in Fig. 1. The references of inclusive studies were screened and a further three full text articles were identified.

Inclusion	Exclusion
Randomised studies	Case series <20 patients
Retrospective, observational studies	Review articles
Controlled clinical studies	Studies not on foot and ankle VTE
Meta analysis	Abstract only

Fig. 1. Inclusion and exclusion criteria.

Any doubts regarding the eligibility of data were resolved by discussion amongst the senior authors (JM, MC, DW) and each study was reviewed for the quality of its methodology. 25 journal articles were deemed to have met the inclusion criteria. Their publication dates ranged from 1979 to 2012. These articles were then rated based on their scientific methodology and robustness using a modified Colman Methodology Score system on a scale of 0–100. 23 of the 25 journal articles included in this review achieved a Colman Score of 70 or greater. The two remaining papers that scored less than 70 were included on the basis of their clinical relevance (Figs. 2 and 3).

3. Results

3.1. Incidence

The incidence of symptomatic VTE in patients undergoing foot and ankle surgery is low. There is a higher incidence of VTE events in trauma of the foot and ankle compared to elective reconstructive foot and ankle surgery.

3.1.1. Elective foot and ankle surgery

Of note the study by Jameson et al. reported rates of PE in first ray surgery, hindfoot fusion and total ankle replacements as 0.02%, 0.11% and 0.06% respectively [4]. In another large prospective multi-centre study incidence of PE was 0.15% [5].

The incidence of asymptomatic DVT ranges from 0% [10] to 3.5% [11] and 4.0% [12].

Patients undergoing total ankle arthroplasty reported a symptomatic VTE incidence of 3.9% [13] and a 0.06% risk of PE [4].

With the exception of Jameson et al., no other paper reported any case of mortality resulting from a VTE event in elective foot and ankle surgery.

3.1.2. Trauma of the foot and ankle

Fig. 4 shows a summary of VTE incidences in lower limb trauma patients and also whether the studies looked at chemical VTE prophylaxis use.

Tendo Achilles injuries are associated with higher rates of VTE [19,22]. Lapidus et al. study showed no significant difference in VTE rates between chemical thromboprophylaxis and placebo groups, however, they did feel that the relative risk of a VTE event was increased in the high risk patient with or without prophylaxis [22].

3.1.3. Metatarsal fractures

Soohoo et al. reporting a 0.2% incidence of PE, with no DVTs. [23]. However, this study only captured readmissions for a VTE event, which may explain why no DVT's were reported (as these may not require admission). No risk factors were assessed in the study.

3.2. Symptomatic vs. asymptomatic VTE

3.2.1. Elective foot and ankle surgery

There is a difference in rates between symptomatic and asymptomatic VTE in elective foot and ankle surgery. Solis et al.