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Case Report
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Pulmonary Emboli Secondary to Temporary Limb Immobilization Due to Metatarsal Fracture: A Case Report

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Abstract

This is the case of 41-year-old male who had bilateral pulmonary emboli secondary to temporary limb immobilization due to metatarsal fracture. We discuss the use of thromboprophylaxis in this group of patients and the present lack of consensus worldwide and in the Caribbean on this matter. We think that it is integral to discuss thromboprophylaxis with this group of patients so that an informed decision can be made by patients with the possibility of preventing a potentially fatal condition.

Keywords: Thromboprophylaxis; Pulmonary emboli; Limb immobilization

Introduction

The use of thromboprophylaxis in ambulatory patients who have sustained trauma and who require temporary lower limb immobilization is still uncertain [1]. It has been known since 1944 that temporary lower limb immobilization and venous thromboembolism (VTE) have been linked [2] and this relationship still exists in present times with lower limb immobilization being the causative factor in 1.5-3% of all VTE events [3,4]. Limb immobilization has also been shown to be associated with the highest risk of VTE among all the causes of immobilization [5].

Case Report

Mr. AW is a 41-year-old man from Trinidad, West Indies. He is of Afro-Caribbean descent and has no significant past medical history other than a left 5th metatarsal fracture secondary to trauma 2 weeks ago of which he had a plaster of Paris short leg cast. He presented to the emergency department with bilateral chest pain and moderate shortness of breath (SOB) for the last two days. Patient was ambulant with the use of crutches prior to his presentation to the emergency department. There was no prior period of immobilization. Patient was prescribed NSAIDs as needed. Surgical and family history was non-contributory. He had no known drug allergies, no history of smoking, drugs or alcohol abuse. On arrival his vitals were; Temp-36 °C HR-105bpm. RR- 22/min Spo2-97% on room air BP-134/84mmHg. On systemic examination, his BMI was 25.41kg/mm and he had slight tenderness at the mid to lower posterior chest wall on both sides with equal air entry bilaterally. There was no calf swelling or tenderness and the rest of his physical exam was unremarkable. His 12-lead electrocardiogram was normal except for sinus tachycardia. His D-dimmers was markedly elevated at >5000.

Patient's pre-test probability for Pulmonary Embolism (PE) was moderate with a Wells score of 4.5. He was treated with analgesics (Tramdol+Gravol) and low molecular weight heparin (enoxaparin) 80mg subcutaneous stat and then every 12 hours. CT pulmonary angiography (CTPA) was requested but unavailable at time of admission. Patient's SOB worsened on second day of admission and emergency CTPA requested, which demonstrated bilateral peripheral pulmonary emboli. Patient had a negative screen for Protein C and Protein S deficiency and Factor V Leiden.

His management continued with enoxaparin for five days and then dabigatran 150mg PO q 12 hours was added. His clinical condition improved with the resolution of SOB and chest pain. He was discharged on the tenth day and advised to follow up in the medical outpatient's clinic where he currently has no complaints.

Discussion

The use of thromboprophylaxis in ambulatory patients who have sustained trauma and who require temporary lower limb immobilization is still uncertain [1]. It has been known since 1944 that temporary lower limb immobilization and venous thromboembolism (VTE) have been linked [2] and this relationship still exists in present times with lower limb immobilization being the causative factor in 1.5-3% of all VTE events [3,4]. Limb immobilization has also been shown to be associated with the highest risk of VTE among all the causes of immobilization [5]. It has also been shown that plaster cast immobilization causes a moderate risk for thrombosis [6]. Although there is a strong link between immobilization and VTEs, there is still a lack of consensus on whether thromboprophylaxis should be used. We focus specifically at thromboprophylaxis in ambulatory trauma patients with temporary lower limb immobilization.

The French and German guidelines both support the use of thromboprophylaxis [1], with the German guidelines suggesting use of thromboprophylaxis in patients with joint-immobilizing plaster casts while the French guidelines suggest use in lower limb fractures [1]. However, the UK and USA currently do not support thromboprophylaxis. The NICE guidelines from the UK suggest use of prophylaxis in hospital patients with lower limb immobilization but do not specifically recommend for non-hospitalized ambulatory trauma patients with lower limb fractures [7]. While, in the USA, the American College of Chest Physicians (ACCP) advice against prophylaxis [8].

To our knowledge there are currently no Caribbean guidelines on this matter. A number of factors contribute to the lack of consensus among major guidelines. One of the issues is that distal calf thrombi is a common complication of lower limb immobilization [9] and that treatment of distal DVT is still somewhat uncertain [10]. It has been shown that 39% of distal DVTs propagate with conservative treatment [11] and pulmonary embolization can occur very rapidly (less than a week) [12]. There is also no validated scoring system in this group of patients.

Our patient developed pulmonary embolism within 2 weeks of his limb being immobilized. There are currently no local guidelines regarding thromboprophylaxis in this situation and we have seen that international guidelines lack consensus Soohoo [13] found a low incidence (0.27%) of pulmonary embolism in post-surgical treatment for metatarsal fractures while Jameson [14] also found a low risk of VTEs (<1%) in patients undergoing foot and ankle surgery but not specifically metatarsal fractures.

Selby et al. [15] however looked at 1200 leg fracture patients of which 30% patients had metatarsal fractures and also found less than 1% incidence of venous thromboembolism. However, we do not think that his metatarsal fracture on its own caused the pulmonary embolism. Rather, it was caused more likely by his temporary limb immobilization. The literature suggests that the risk of pulmonary embolism from a metatarsal fracture to be low. However as in our case, this young male patient developed bilateral pulmonary emboli within 2 weeks of fracture and immobilization of his limb. Therefore, we think that it is integral to discuss these issues with this group of patients so that an informed decision can be made by the patients with the possibility of preventing a potentially fatal condition.

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