Abstract

Post Traumatic Fat Embolism in Common Femoral Vein on CT

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Fat embolism syndrome usually occurs following trauma where fat globules from long bone fractures produce pulmonary, cerebral or cutaneous effects. This case illustrates the presence of macroscopic fat in the right common femoral vein secondary to a long bone fracture. This finding is rare but should be looked for on cross-sectional imaging to allow early, aggressive treatment of fat embolism syndrome.

Introduction

Fat embolism is the presence of fat globules in the circulation, which can affect trauma victims who sustain long bone fractures. In a minority of cases it causes fat embolism syndrome (FES), where the fat globules may produce pulmonary, cerebral or cutaneous effects. The treatment of FES is generally supportive but the mortality is high and therefore its presence should be recognised early and effective treatment instituted.

Case Report

A 20 year-old male was involved in a high-impact single vehicle road traffic accident. He sustained multiple injuries and was intubated on arrival at hospital. Initial chest radiograph revealed bilateral pneumothoraces and chest drains were inserted into both pleural cavities. Clinical and radiographic examination revealed open fractures of the right femur, left tibia and fibula, fractures of the right superior and inferior pubic rami and multiple rib fractures. A computed tomography (CT) of the thorax, abdomen and pelvis was performed with intravenous contrast enhancement to allow a detailed search for solid organ damage. CT of the pelvis demonstrated an unsuspected area of low attenuation in the right common femoral vein (Figure 1 and 2). This was in contrast to the right common femoral vein which revealed a uniform enhancement pattern. Based on the negative Hounsfield units of the low attenuation material, CT findings indicated a macroscopic venous fat embolism in the right common femoral vein. The presumed source was from the ipsilateral right femoral bone fracture. Over the course of the admission the patient developed dense bilateral airspace opacification on chest radiograph, and clinically an acute respiratory distress syndrome (ARDS) picture. The x-ray findings and the patient's clinical condition improved with supportive therapy.

Discussion

Fat embolism is due to blood vessel blockage by fat globules released from a long bone fracture following trauma. Up to 90% of individuals with fractures of the lower limbs can get embolisation of microglobules of fat, however most patients remain asymptomatic. The effects of fat embolisation are most apparent in the skin, brain and the lung parenchyma. 3-4% of individuals proceed to develop fat embolism syndrome, which is a triad of petechial haemorrhages, cerebral abnormalities and respiratory distress. Severe cases of fat embolism occur in 0.5% of patients in whom the diagnosis is made and of these, mortality can reach as high as 20%. Fat embolism syndrome (FES) is clinically challenging based on the diverse aspects of its pathophysiology and management. It is postulated that FES is due to mechanical obstruction of pulmonary blood vessels or that hormonal changes cause toxic endothelial damage to pulmonary capillary beds. Young age, closed and multiple fractures increase the risk of FES, with higher mortality rates seen in bilateral lower limb fractures. Chest radiograph may be normal or display diffuse alveolar infiltrates. Groundglass opacities with interlobular septal thickening or centrilobular nodular opacities can be seen on CT thorax. The treatment of FES is generally supportive, with maintenance of adequate oxygenation, hydration and provision of sufficient nutrition, in addition to prevention of deep vein thrombosis and gastrointestinal bleeding. High-dose corticosteroids have been effective in preventing the development of FES in several studies but their use still remains controversial. Albumin may have a role in therapy as it restores blood albumin levels and combines fatty acids which may limit lung injury.

To our knowledge only two papers to date have illustrated the presence of macroscopic fat emboli within the common femoral vein and inferior vena cava. Given the gravity of the sequelae of fat embolism, the syndrome should always be considered in individuals following significant trauma with associated lower limb fractures. It is essential that radiologists monitor for the presence of fat in the lower limb veins or inferior vena cava on CT to warn clinicians of the impending syndrome and allow for early diagnosis and aggressive supportive treatment.

References


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