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Case Report

Deaths Due to Pulmonary Embolism: 2 Case Reports

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ABSTRACT

Pulmonary embolism (PE) is a major cause for morbidity and mortality. Following trauma to lower extremities, thrombus formation is a well-know entity, and one needs to foresee the possibility of embolism and eventual death. It is imperative and the onus solely rests on the treating doctor to weigh the risk factors for thrombus formation like age, sex, obesity, fracture, and immobilization and take necessary precautions to prevent pulmonary embolization. Two such cases with fractures of lower limb bones, where the deceased were middle aged, obese and immobilized for a period of time, died following muscular activity and autopsy revealed PE.

Keywords: Trauma, Pulmonary embolism, Muscular activity, Preventable death, Autopsy

INTRODUCTION

Venous thromboembolic disease, manifesting primarily as deep vein thrombosis and pulmonary embolism (PE), is recognized as a substantial health problem.[1,2] Due to non-specific symptoms and imaging features, a timely and accurate diagnosis of pulmonary thromboembolism is often difficult[3].

Venous thromboembolism (VTE) is a major cause of morbidity and mortality,[4] and PE is responsible for up to 10% of hospitalized patient deaths[5]. The estimates of PE prevalence in patients at risk for VTE have been derived from the results of randomized clinical trials, and prospective population-based analyses have provided additional insight into the risk of the population as a whole[6,7].

PE is a well-known complication following injuries of lower extremities and abdomen. It is one of the leading causes for death even after successful surgical procedures. At times, there is an allegation of negligence on the operating surgeon or on the anaesthesiologist.

However, there is a possibility of the detachment and propagation of the thrombus from a peripheral vein following muscular movement. Here we discuss two such cases.

Case No. 1

A 49-year-old male had met with a road traffic accident and was taken to a hospital. He had sustained left tibial condylar fracture with posterior displacement of fractured fragment. Posterior above knee slab was applied. Open reduction and internal fixation was planned after 2 days. After 2 days of total bed rest, he got admitted to the hospital. Pre-surgical and pre-anaesthetic evaluations were done; all parameters were normal and fitness for surgery was given. He was taken up for surgery on 5th day (post trauma); open reduction and internal fixation were done with buttress plating under

spinal anaesthesia. Duration of surgery was one and half hours and was uneventful. After completion of surgery, when the pneumatic tourniquet was released and the thigh was massaged, patient went into asystole and was taken to ICU, could not be revived and was declared dead. Body was subjected for autopsy.

Salient Autopsy Findings

A well-built and obese male, weighed 122 kg, left leg wrapped in hospital bandage (Figure 1). Left thigh showed tourniquet pressure marks all around (Figure 2). Sutured wound measuring 18 cm in length over inner aspect of the left leg was observed. On removal of sutures, the margins and wound were clean, Buttress plates and screws were *in situ*.

Figure 1: Left leg wrapped in hospital bandage post operatively

A long, coiled, smooth embolus measuring 23 cm was lodged in the right atrium extending into left pulmonary artery and its branches (Figure 3). Dissection of Posterior tibial, Popliteal and Femoral veins did not show any thrombus or remnants of thrombus. Lungs were oedematous and congested. On cut, section exuded froth mixed with blood.

Upon histopathological examination, lungs showed acute venous congestion and pulmonary oedema. Right atrium, right ventricle, pulmonary trunk, left pulmonary artery and its branches in left lung showed a large thromboembolus (PE).

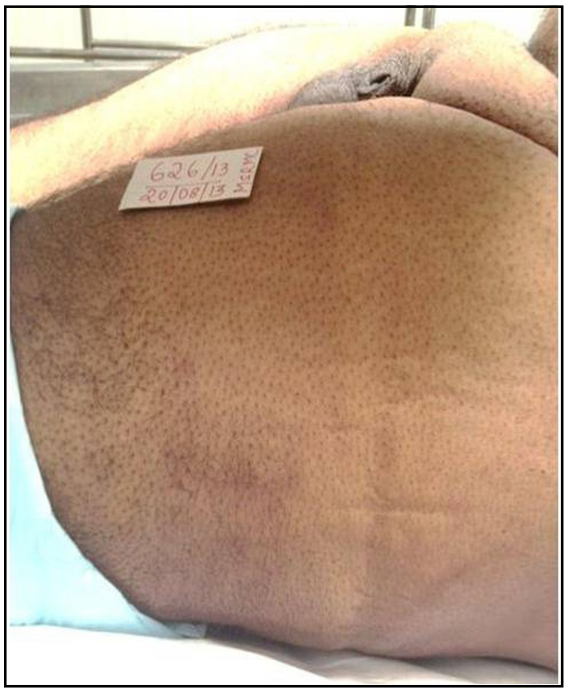

Figure 2: Tourniquet pressure marks over left thigh

Figure 3: Embolus lodged in the right atrium extending into left pulmonary artery

Case No. 2

A 49-year-old male had sustained fracture of left 2nd to 4th metatarsal bones in a road traffic accident. He was treated as an outpatient at a Tertiary care hospital; and limb immobilized with a cast. He was reviewed after a month and the cast was removed and a posterior slab was applied and sent home. After returning home, while

Figure 4: Below knee plaster of Paris slab over left leg

kick-starting his scooter using left lower limb he had shortness of breath, later collapsed and was brought dead to hospital. Body was subjected for autopsy.

Salient Autopsy Findings

Below knee plaster of Paris slab was present over left leg (Figure 4). Left foot was swollen, with a wound of 2 cm over the dorsum of the foot. 2nd to 4th metatarsal bones on the left foot are fractured with callous formation seen at the fracture sites. A saddle embolus was observed measuring 20.5 cm in length in the pulmonary artery (Figure 5). Lungs were oedematous and cut section exuded froth mixed with blood.

DISCUSSION

Many risk factors related to PE have been discovered that could cause vascular endothelial damage, stasis of blood flow, and hypercoagulability of blood (Virchow's triad). They are increasing age, overweight, male gender, trauma, prolonged surgery–type and duration, prolonged immobility. Predisposing factors are prior superficial vein thrombosis and varicose veins. Currently, trauma has been regarded as one high-risk factor of PE due to direct vascular injuries, blood clotting caused by post traumatic stress, and the subsequent application of tourniquets and fixed measures [8,9].

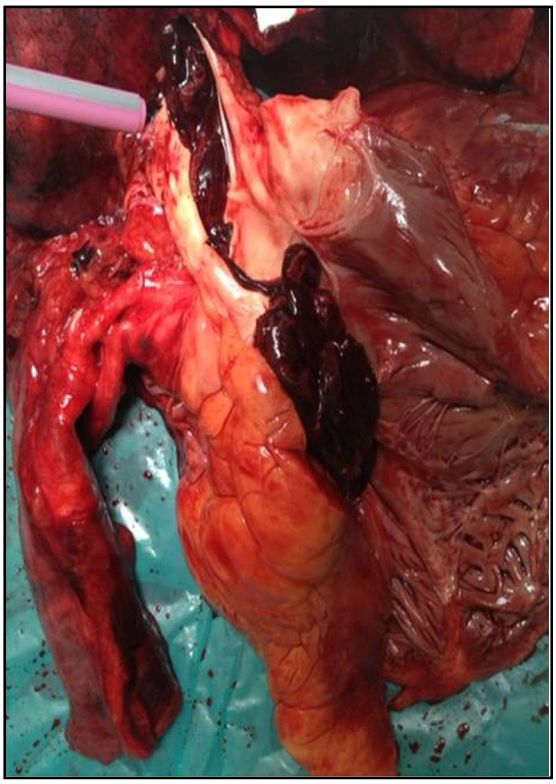

Figure 5: Saddle embolus in pulmonary artery

It is usually considered that pulmonary emboli occurred most commonly between 5 and 7 days after injury,[10] while one recent report showed that 37% of PE cases could occur in the first four days after trauma 19. In another study, death by PE occurred between 3 and 24 days after injury, and 56.7% of cases occurred in the first week after trauma. Therefore, it is reasonable to infer that non-fatal PTE may have already formed in the early stages after trauma has occurred. Physicians should increase the awareness of the early diagnosis of PE and pay more attention to the thrombosis. Numerous studies have reported that the incidence of PTE is associated with increasing age. Patients over 40 years of age had a higher incidence of PTE than did younger patients and, for each 10-year increase in age, the incidence of PTE doubled [11]. Deep venous thrombosis and PE are a single clinico-pathological entity–VTE. PE is major health problem and is a preventable cause of hospital death. In more than 95% cases, pulmonary emboli arise from thrombi in deep venous system of the lower extremities.

Autopsy studies have shown the incidence of VTE in hospitalized patients to be as high as 34.7% with fatal PE in 9.4%.

The first case had all of the components of Virchow's triad present in the peri-operative period.

Venous stasis is caused due to immobilization and surgical positioning, direct venous injury and remote release of mediators of coagulation due to tissue trauma. Factors which favoured the formation of thromboembolism in both these cases were: both being males, aged more than 40 years, fracture of lower limb bones, immobility of >/= 5 days, morbid obesity in the first case.

In both cases, DVT was a foreseeable complication as the risk factors were present. Possible trigger factor for embolization in our cases are:- In the first case, it was due to post operative release of tourniquet and massage to the thighs and calves following which the patient went into asystole and died. In the second case, kick-starting the scooter from the injured leg after returning from the hospital lead to embolization following which he collapsed and died.

CONCLUSION

In both the cases, death was attributed to acute cardiopulmonary arrest consequent upon PE as demonstrated in the proximal pulmonary arteries at autopsy. The clinical and pathological data indicated that the patient would not have died of any other underlying disease at that time if PE had not occurred which emphasizes that the treating doctor should be aware of the factors predisposing PE, which were evident in these cases and not just rely on clinical symptoms but to foresee this complication and take up necessary preventive steps.

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