

Fatal pulmonary embolism following tourniquet inflation

A case report

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A 69-year-old woman was admitted to the emergency room for a closed fracture of the proximal end of her right tibia, which she had incurred in a bicycle accident. She was hospitalized with a loose plaster of Paris cast extending from the thigh to the foot. She had no past history of serious illnesses. All the tests, including bleeding time and coagulation time, were normal. Two days after the injury, a plate osteosynthesis was planned. During these 2 days, she experienced no pain.

In the operating room, the plaster of Paris cast was removed. Although the knee region was somewhat swollen, the skin color was good, the motion of the ankle and the toes was good, and the dorsal pedis artery was readily palpable. Lumbar spinal anesthesia was performed without any complications. The operative site was prepared and draped, and the Esmarch bandage was applied in the usual fashion.

Suddenly, 1 or 2 seconds after the tourniquet was inflated to 400 mmHg, the patient lost consciousness, her breathing stopped, her blood pressure could not be measured, and her pulse rate was seen on the monitor to drop to 20 beats per minute. She was immediately intubated. Although cardiac arrest had occurred for several minutes, the blood pressure rose to 70 mmHg and the pulse rate increased to 80 beats per minute after 40 minutes. But she remained unconscious.

The ultrasound cardiogram showed a large dilatation of the right cardiac ventricle. Right ventricular failure due to pulmonary embolism was suspected. On the next day, the electroencephalogram recorded a flat pattern and an auditory brain-stem response could not be elicited. She died 1 day later. The autopsy revealed necrosis of the inferior lobe of her left lung and extensive small emboli were found in the small and medium-sized pulmonary arteries. The cause of death was recorded as pulmonary emboli from her right lower extremity.

Discussion

Six patients have been reported with pulmonary embolism after use of an Esmarch bandage or a tourniquet (Austin 1963, Samann 1970, Estrera et al. 1982, Pollard et al. 1983, Hofmann and Wyatt 1985). In these, pulmonary embolism occurred 7 to 54 days after the injury. In all the cases, the pulmonary embolism occurred during operations on the lower extremities.

Samann (1970) recommended that an Esmarch bandage should not be used for an operation on the lower extremity after the seventh day of injury, whereas Hofmann and Wyatt (1985) recommended that an Esmarch bandage or a tourniquet should be avoided in patients who were undergoing a secondary or delayed procedures after immobilization.

Salzman and Harris (1976) recommended in knee surgery and in femoral or tibial fractures that warfarin be prescribed for patients with a history of earlier thromboembolic disease and aspirin for patients without a thromboembolic history.

References

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