

PULMONARY THROMBOEMBOLISM AFTER SUB-ARACHNOID ANESTHESIA IN A PATIENT WITH A RIGHT INTERTROCHANTERIC COMPOUND FRACTURE: CLINICAL CASE

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ABSTRACT

Background: The authors describe a clinical case of pulmonary thromboembolism that arose after sub-arachnoid anesthesia in a patient undergoing osteosynthesis with screw due to an intertrochanteric fracture. This condition is a cardiovascular emergency since it causes obstruction of the pulmonary vascular bed, which may lead to severe acute failure of the right ventricle with increased risk of death.

Methods: On arrival in our hospital emergency room the patient was diagnosed with right compound intertrochanteric fracture. On the basis of the patient's history, clinical exam, hemodynamic parameters, and total-body CT, treatment by surgery was decided by osteosynthesis with screw on the right femora utilizing sub-arachnoid anesthesia.

Results: During the operation the patient experienced dyspnea and chest pain, progressive desaturation, tachynea, marked tachycardia, and arterial hypotension. At that point general anesthesia was induced immediately by endotracheal intubation. A chest x-ray during the operation revealed a massive right pulmonary embolism, confirmed after a few minutes by a D-dimer value >3500ng/ml. For that reason an intravenous administration of sodium enoxaparin 8000 I.U. was performed immediately.

Conclusions: The authors believe that in a patient with traumatic fracture of the femora undergoing an orthopedic operation the appearance of symptoms of severe hypoxia, tachypnea, dyspnea, marked desaturation, chest pain, tachycardia, and arterial hypotension, justify a suspicion of acute pulmonary thromboembolism.

Key words: Pulmonary thromboembolism, sub-arachnoid anesthesia, hemo-gas analysis, intertrochanteric fracture, sodium heparin.

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Introduction

Pulmonary thromboembolism (PTE) is a relatively common cardio-vascular emergency that causes obstruction of the pulmonary vascular bed, and can cause severe acute failure of the right ventricle (RV) which is potentially and rapidly lethal⁽¹⁾. The diagnosis is difficult to reach and may be complicated by an atypical clinical presentation. Nonetheless, prompt diagnosis is essential since immediate therapy is very effective. Depending on the clinical presentation, initial therapy is primarily directed to restore circulation to the obstructed pulmonary arteries or prevent precocious and fatal relapse⁽²⁾.

Pulmonary thromboembolism that arises during or after local/regional anesthesia is a rare complication⁽³⁾. Cases have been reported in the literature of patients undergoing orthopedic surgery on the lower limbs. Patients with fractures of the hip, pelvis, and femora (especially chronic smokers), are at high risk of developing deep venous thrombosis and PTE^(4,7).

Materials and methods

In August of the current year the patient, G.U., age 66, weight 82kg, height 165cm, came to the emergency room of our hospital with a diagnosis of right intertrochanteric compound fracture, due to a

motor vehicle crash. The patient history revealed no significant pathology nor negative prior surgery. The patient is a heavy smoker (40 cigarettes/day for 30 years). The patient appeared conscious and lucid, and well-oriented in time and space. There was no sign of vomiting or loss of consciousness. Hemodynamic and respiratory parameters were stable: arterial pressure 125/70mmHg, cardiac frequency (CF) 85bpm, SpO₂ in air 99%, respiratory frequency 14/min. A total-body CT performed immediately after arrival excluded chest or abdominal trauma, and there was no sign of encephalic or spinal wounds. The ECG revealed a sinus rhythm with deviations within the normal range. Hemodynamic and lab exams were negative. The blood-gas analysis on arterial blood drawn from the right radial artery provided the following values: pH 7.34, pO₂ 99, pCO₂ 37, HCO₃ 22, BE -1.5, SaO₂ 97%.

Results

On the basis of the patient history and clinical findings and in consultation with the orthopedic surgeon, the patient was transferred to the operating room for osteosynthesis with screw on the right medial femora utilizing sub-arachnoid anesthesia. The anesthesia was performed at the inter-vertebral space L3-L4, with the patient lying on the side of the fracture. Hyperbaric bupivacaine 12mg at 1% was administered using a 25-G Quincke spinal needle. Approximately 10 minutes after administration of the anesthesia we observed a perceptual and motor deficit up to T10, and the patient was then positioned supine and the surgery began. ECG was monitored throughout the perioperative period, as was P.A., F.C., SpO₂.

Approximately 45 minutes after the sub-arachnoid block the patient complained of dyspnea and chest pain, and there was a rapid and progressive reduction of SpO₂ below 70%, as well as tachypnea (respiratory frequency over 25/min). On auscultation of the chest there was a marked reduction of vascular murmur at the right pulmonary level. Cardiac frequency reached 140bpm, and arterial pressure (AP) decreased rapidly to 70/50mmHg. At this point general anesthesia was administered using sodium thiopental 300mg, fentanest 150γ, and cisatracurim 16mg, along with placement of an 8Ø endotracheal tube. Anesthesia was maintained using sevoflurane 1%. Once protection of the airways was ensured, arterial blood-gas analysis was per-

formed and revealed the following values: pH 7.30, pO₂ 55, pCO₂ 52, HCO₃ 17, BE -6.9, and SaO₂ 75. An x-ray performed during the operation revealed a massive right pulmonary embolism, confirmed after a few minutes by D-dimer >3500ng/mm. For that reason we immediately administered sodium enoxaparin 8000 I.U. (100 I.U./kg) intravenously, as well as a continuous I.V. infusion of dopamine 10γ/kg/min.

At the same time a catheter was placed in the right radial artery to monitor arterial pressure, and a CVC trilume was positioned in the right internal jugular vein to measure central venous pressure. After 15 minutes of administering low molecular weight Heparin the clinical picture improved, with CF 95bpm, AP 110/70mmHg, and SpO₂ 97%. The operation lasted 80 minutes, at the end of which CF was 115bpm, AP 120/60mmHg, and SpO₂ 97%. The patient was then transferred to the I.C.U. where mechanical respiration was maintained as well as continuous invasive monitoring of AP, central venous pressure, oxygen saturation, and ECG.

The D-dimer value remained very high at >3000ng/ml. Echo-Doppler of the lower limbs revealed a severe degree of deep vein thrombosis of the lower right limb, so thromboembolism therapy was administered as I.V. infusion of sodium enoxaparin at a dose of 20 I.U./kg/hour. The ECG performed in the I.C.U. revealed mild tricuspid regurgitation, moderate degree of pulmonary hypertension, and a hypo-kinetic right ventricular wall. After three days the patient was taken off respiratory support, and spontaneous respiration was maintained with a Venturi mask (FiO₂ 0.5%) for another 2 days. The inotrope support was removed on the fourth day, and the patient was transferred to the orthopedics ward after 6 days.

Discussion

The clinical case we reported describes acute pulmonary thromboembolism that arose after performing sub-arachnoid anesthesia in a patient undergoing osteosynthesis with screw on the right femora due to a compound fracture of that long bone. A systematic review of the literature^(5,6) revealed that chronic smokers⁽⁷⁾ are at higher risk of developing deep venous thrombosis, with a rapid evolution to acute pulmonary thromboembolism due to venous dilation caused by a sympathetic block following spinal anesthesia⁽⁸⁾. For this reason constant vigilance is needed in patients undergoing

orthopedic surgery of the lower limbs with sub-arachnoid anesthesia to avoid the appearance of that clinical picture, whose incidence reported in the literature is rare.

Conclusions

The clinical symptoms of severe hypoxia, dyspnea, chest pain, marked desaturation, tachycardia, and arterial hypotension after spinal anesthesia in patients with traumatic fractures of the femora undergoing orthopedic surgery should immediately raise the suspicion of acute pulmonary thromboembolism. Hence, careful surveillance of such patients is necessary to prevent the appearance of critical events.

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