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ANAESTHESTIC CHALLENGE IN A PATIENT WITH PRE-EXISTING PULMONARY THROMBO EMBOLISM UNDERGONE SPINAL ANAESTHESIA: CASE REPORT

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ABSTRACT Perioperative patients, including trauma victims undergoing orthopedic surgery, are at increased risk of venous thromboembolism, with immobility being the highest risk factor. The presence of shock and right ventricular failure are associated with adverse outcomes. Helical computed tomography scanning is the definitive diagnostic study. The choice of anaesthesia depends on hemodynamic stability, and surgery should be performed as early as possible to avoid complications associated with pulmonary thromboembolism. Here, a 70-year-old female with a history of a fall was diagnosed with an intracapsular neck femur fracture and successfully underwent proximal femoral nailing under spinal anaesthesia.

KEYWORDS :

INTRODUCTION

- Trauma to long bones causing fractures often leads to complications like deep vein thrombosis (DVT) and pulmonary embolism (PE), with an incidence of 2.3% to 22%.
- Acute PE is commonly encountered by pulmonologists, cardiologists, and critical care physicians.
- Surgical patients face unique perioperative risks, including tissue trauma, activation of the clotting cascade, and immobilization. Despite advances in DVT prophylaxis and diagnosis, the mortality and recurrence rates of PE remain high.
- PE can be asymptomatic and diagnosed via imaging, with clinical presentations ranging from shock to mild dyspnea.
- Common symptoms include dyspnea, anxiety, and tachypnea in awake patients, and hypotension, tachycardia, hypoxemia, and decreased end-tidal CO2 under general anaesthesia.
- Early diagnosis allows for supportive and anticoagulation therapy before surgery.
- We report a case of preexisting pulmonary thromboembolism in a patient with an intracapsular neck femur fracture scheduled for proximal femoral nailing.

Case report

A 70-year-old female experienced a fall at home two weeks ago, resulting in trauma to her right hip. She was admitted and conservatively managed for 6 days. She has a known history of hypertension, managed with 5 mg of amlodipine daily for 10 years. There was no history of head injury, loss of consciousness, vomiting, ear or nose bleed, or difficulty breathing or chest pain. An X-ray revealed an intracapsular neck femur fracture, and she was advised to undergo proximal femoral nailing. She was referred to our tertiary care hospital for further management.

On arrival, she complained of breathlessness with room air saturation at 85% and a blood pressure of 105/70 mmHg. The electrocardiogram showed left ventricular hypertrophy without any dynamic changes. In the respiratory department, cardiac evaluation with 2D echo revealed moderate tricuspid regurgitation, moderate pulmonary artery hypertension (50 mmHg), a sclerotic aortic valve, a dilated right ventricle, good left ventricular systolic function, and a left ventricular ejection fraction of 50-55%. D-dimer levels were highly elevated. CT angiography confirmed pulmonary thromboembolism in the bilateral lower lobe segmental and sub-segmental pulmonary arteries, with near-complete lumen occlusion (70-80%).

Arterial blood gas analysis showed respiratory alkalosis with compensated metabolic acidosis, PaO2 at 70 mmHg on room air, and SpO2 at 86%. She was started on low molecular weight heparin (LMWH) 0.6 cc s.c twice daily for seven days, which improved her condition. Her room air saturation improved to 98%, and her blood pressure stabilized at 120/76 mmHg on nasal prongs at 2 litres per minute.

The patient also had a thyroid swelling (3.6x4x6 cm) despite a normal thyroid profile. A CT scan showed the swelling compressing and displacing the trachea and oesophagus to the right, extending inferiorly along the left paratracheal region to the upper border of D2. She was scheduled for elective proximal femoral nailing.

Preoperative

Vitals: Pulse 80 bpm, BP 130/80 mmHg, SpO2 94% on room air, and 98% on nasal prongs at 2 litres per minute.

Airway: Edentulous with adequate mouth opening (3 finger breadths).Auscultation: Clear air entry, reduced equally at the bases.

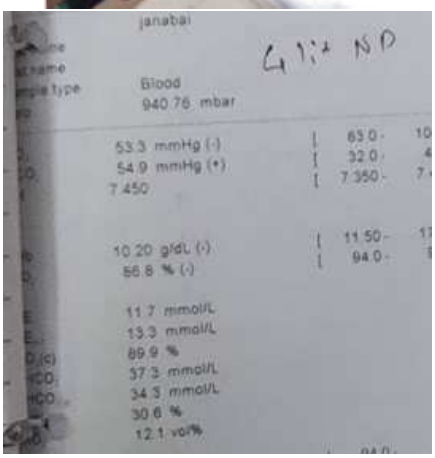
Investigations: 2D echo, ECG, CTPA, and chest X-ray showed cardiomegaly with bilateral increased bronchovascular markings and hilar opacity. All labs were within normal limits except for persistently high D-dimer levels.

As per plan, the patient was advised to stop LMWH 24 hours before surgery and required a fresh coagulation profile on the day of surgery. Regional anaesthesia (spinal anaesthesia) was planned.

Informed verbal and written consent was obtained. Nil per oral was confirmed, and injection ceftriaxone was given 30 minutes prior as surgical prophylaxis.In the operation room, monitors were attached, and baseline vitals were noted (Pulse: 86 bpm, BP: 136/86 mmHg, SpO2: 98% on room air). She was kept on nasal prongs at 3 litres per minute. An 18G

and a 20G IV cannula were secured in the right and left upper extremities, and IV ringer lactate was preloaded with 500 ml. A central line for resuscitative purposes and an invasive arterial line were kept ready. Noradrenaline was prepared in an infusion pump for anticipated hypotension. A difficult airway cart, including laryngoscopy blades and a bougie, was kept ready. USG-guided pericapsular nerve group block with 20 ml of 0.25% bupivacaine was given.

Under aseptic precautions, the patient was placed in a sitting position. A 25G Quincke spinal needle was introduced at the L3-L4 interspace until clear CSF was obtained. Spinal anaesthesia was administered with 2.5 cc of 0.5% bupivacaine. Sensory blockade was confirmed by loss of sensation to pinprick below the T8 dermatome.



Twenty minutes after spinal anaesthesia, the patient experienced two episodes of hypotension, treated with IV phenylephrine 40 microgram bolus. Her heart rate increased to 120 bpm. Noradrenaline (4 mg in 50 cc normal saline) was infused at 60 cc per hour due to persistent hypotension. The proximal femoral nailing lasted 45 minutes with a total blood loss of 200 ml and a urine output of 100 ml. The patient was shifted to the ICU for postoperative observation with noradrenaline support for 24 hours and once the spinal anaesthesia level regressed , the sensory action of PENG block was checked. Inotropic support was stopped after 8 hours her vitals stabilized. IV fluids at 80 cc per hour were continued, and LMWH was resumed after 12 hours. The patient was monitored for two days with injection tramadol 50 mg twice daily for postoperative analgesia and then transferred to the ward.

DISCUSSION

- Pulmonary thromboembolism (PE) involves obstruction of the pulmonary arteries. Rudolf Virchow identified three risk factors for venous thromboembolism: venous stasis, endothelial damage, and a hypercoagulable state.
- According to Naess et al., the incidence of PE is three times higher in patients over 70 years than in those aged 45-69 year.
- Risk factors include Corticosteroids,Diabetes mellitus,Disseminated Intravascular Coagulation (DIC),Hyperthyroidism,Trauma,Immobilisation,Oral contraceptives,Hereditary factors,Sepsis
- our case, the patient was immobilized for 6 days due to traumatic fractures.
- Obstruction of the pulmonary artery by more than 50% is considered a PE. The primary cause of pulmonary arterial hypertension (PAH) is the remodeling of small pulmonary arteries (<500 micrometers) due to smooth muscle and endothelial cell proliferation. This increases pulmonary vascular resistance (PVR), elevates alveolar dead space, and impairs gas exchange. Increased right ventricular pressure leads to ventricular dilatation, dysfunction, and reduced perfusion.
- Patients with PE often exhibit acidosis and hypoxia on arterial blood gas analysis. Elevated PVR and right ventricular dysfunction result in a fixed cardiac output state, making these patients vulnerable to reductions in systemic vascular resistance (SVR) and myocardial depression from anaesthetic agents.
- CT Pulmonary Angiography (CTPA), which is the gold standard. CTPA assesses clot size and obstruction and aids in the early diagnosis of patients with enlarged right ventricles at risk of early death
- Management include: Anticoagulant therapy,Early thrombolysis,Inferior Vena Cava (IVC) filters, Surgical embolectomy, Vasodilators to reduce afterload and improve myocardial function
- our case, treatment was started with Low Molecular Weight Heparin (LMWH).
- Anaesthetic goals ; Careful titration of anaesthetic agents to maintain myocardial function,maintaining normovolemia,avoiding drug overdose during induction due to slow circulation time,avoiding increased ventricular afterload,Preventing sudden hypotension; regional anaesthesia is preferred, avoiding tachycardia,Judicious fluid therapy,avoiding increases in peripheral vascular resistance by preventing hypoxia, hypercarbia, hypothermia, acidosis, and avoiding nitrous oxide
- Inotropes may be needed perioperatively due to right ventricular dysfunction, with norepinephrine being the inotropic agent of choice.
- For our patient, spinal anesthesia was preferred due to hemodynamic stability, a normal coagulation profile, and the short duration of the procedure.
- It does not depress the respiratory system as general anesthesia does.
- Patients with PE often have compromised respiratory function due to impaired gas exchange and increased alveolar dead space.

Preserving spontaneous breathing and avoiding the need for mechanical ventilation reduces the risk of worsening hypoxia and hypercarbia. It's an excellent pain relief during surgery

and reduce the need of systemic opioids.

- General anesthesia, with its associated risks of laryngoscopy and intubation, can affect hemodynamic stability. General anesthesia can affect coagulation by increasing levels of tissue factor, von Willebrand factor (vWF), plasminogen activator inhibitor-1 (PAI-1), and tissue plasminogen activator, leading to a hypercoagulable and hypofibrinolytic state. This increases the risk of further thrombotic events postoperatively.
- Case of intra operative of acute pulmonary thromboembolism have been reported.[7]
- only one case has been reported of preoperative existing pulmonary thromboembolism being operated on for long bone surgery under general anaesthesia. [1]

CONCLUSION

The choice of anaesthesia technique may have a profound impact on the patient's risk for VTE and managing stable haemodynamic parameters perioperatively. In hemodynamically stable patients it is better to operate the underlying fracture as soon as possible to avoid further aggravation and complication of the condition. Spinal anaesthesia was a challenging risk and has managed with successful outcome.

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