

Case Report

Management of a case of thromboembolism post spine surgery - a case report

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ABSTRACT

Postoperative deep vein thrombosis (DVT) of lower limbs is often asymptomatic. In many patients, fatal pulmonary embolism (PE) is the first clinical manifestation of postoperative venous thromboembolism (VTE). Routine screening for asymptomatic DVT of the lower limbs has a low sensitivity and is quite impractical. For these reasons, routine and systematic prophylaxis in patients at risk, is the strategy of choice to reduce the burden of VTE after surgery. If used appropriately such prophylaxis is cost effective since it reduces the incidence of symptomatic thromboembolic events, which require costly diagnostic procedures and prolonged anticoagulation therapy. Here we report the post-operative course of a spine surgery patient, presenting with DVT in calf veins, which lodged into pulmonary artery and was managed successfully with low molecular weight heparin (LMWH), embolectomy, inferior vena cava (IVC) filter, and dabigatran.

Keywords: Pulmonary embolism, Deep vein thrombosis, IVC filter, Dabigatran, Spine surgery, Hyperhomocysteinemia

INTRODUCTION

Deep venous thrombosis (DVT) is most frequent systemic complication in patients undergoing neurosurgeries.¹ There is a large variation in the reported incidence of pulmonary embolism (PE) in the medical literature. Results from the only study found in the literature specifically monitoring PE suggest an incidence as high as 2.5%.² A thrombus develops in the soleal veins of the calf, initially as a platelet aggregate. This is likely to extend upto the next large venous branch and is more likely to breakoff and embolise to lungs as pulmonary embolism.³ The most common presentation of DVT is pain and swelling especially in the calf muscle of one of the lower limbs. Many patients have no symptoms of thrombosis and may first present with signs of pulmonary embolism for example, pleuritic chest pain, haemoptysis and shortness of breath. Major risk factors for developing DVT and PE

according to American college of chest physicians consensus conference on antithrombotic and thrombolytic therapy are obesity, older age (>40 years), confinement to bed, major surgery (duration >45 minutes), malignancy within five years, history of DVT, spinal injury with paraplegia.⁴ Various modalities used to diagnose DVT and pulmonary thromboembolisms are X-ray chest, electrocardiography (ECG), D-dimer study, duplex ultrasonography, ventilation-perfusion scan and pulmonary computed tomography (CT) angiography.

CASE REPORT

A 54-year-old male patient (height-169 cm, weight-102 kg), was scheduled for lumbar decompression with instrumentation. Patient was diabetic, hypertensive with past history of bariatric surgery. Pre anaesthetic evaluation was normal with haematological and biochemical

parameters within normal limits. His elder brother had died due to sudden cardiovascular incident, which the patient had not revealed in his history.

Patient was advised breathing exercises with incentive spirometer. Anti-hypertensive medications were continued till morning of surgery, oral hypoglycemic were omitted on the day of surgery. In the operating room initial monitoring consisted of electrocardiogram, pulse oximetry, non-invasive blood pressure and capnography. Anesthesia was induced with propofol, fentanyl and atracurium and was maintained with sevoflurane, oxygen and N₂O, atracurium, and fentanyl infusion. Nitroglycerine infusion was used to maintain mean arterial blood pressure (MAP) between 70-80 mm Hg. Urinary output was monitored during the surgery. Warming blanket was used to maintain normothermia. L₄-L₅ laminectomy with medial facetectomy and right discectomy, L₄-L₅ pedicle screw fixation with fusion done in prone position. Surgery proceeded uneventfully. Patient was haemodynamically stable throughout the procedure. Total duration of the procedure was 2 hours 30 minutes. Estimated blood loss was about 200 ml and urine output was 170 ml. At the end of the procedure reversal and extubation was uneventful and patient was fully awake, with no neurological deficit in the operation room and was shifted to intensive care unit (ICU) for recovery and observation, with physiotherapy advice to avoid DVT. After 24 hours, patient was shifted toward wherein next day, that is approximately 48 hours after surgery he complained of uneasiness and sweating. Blood pressure (BP) and blood sugar were measured, blood sugar was normal and BP was low. Electrocardiography (ECG) showed right-sided bundle branch block (RBBB), 2D echo revealed dilated right atrium and ventricle (Figure 1), severe right ventricle free wall hypokinesia with preserved apical contractility.

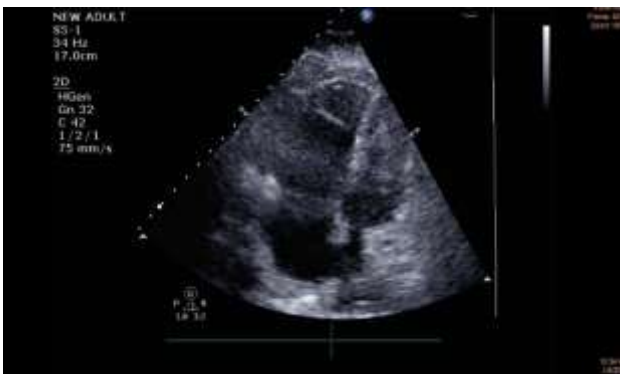


Figure 1: 2D echo revealing dilated right atrium and ventricle.

Patient was diagnosed as a case of massive PE and immediately shifted to ICU. Unfractionated heparin (UFH) 1000/hour, was started to keep partial thromboplastin time (PTT) twice the control. Patient was further investigated to confirm the diagnosis. Brain natriuretic peptide (BNP) and cardiac enzymes are within normal limits. D-dimer level was increased (4240 ng/ml).

Venous Doppler both lower extremities and pelvic veins showed non-compressible thrombus in right calf veins. Patient was not thrombolysed as there was serious risk of bleeding in view of spine surgery and planned for IVC filters and embolectomy. Patient was shifted to cath lab on noradrenaline support and heparin infusion. Intravenous access through right femoral vein was taken. Inferior vena cava (IVC) filter was placed at the level of renal vein. Multiple catheters were used to macerate the clot in pulmonary artery branches and clots sucked out immediately (Figure 2).



Figure 2: Macerated clot from pulmonary artery branches.

Following which the pulmonary artery pressure dropped significantly and ECG reverted back within normal limits. Patient was shifted to ICU on noradrenaline support and heparin infusion wherein after 12 hours noradrenaline was tapered off and stopped as patient was haemodynamically stable. Heparin was continued with international normalized ratio (INR) monitoring, patient was further investigated to know about the cause of DVT and PE and was found to have increased homocysteine levels (18 micro moles/liter) and decreased high density lipoprotein (HDL) cholesterol levels which are independent risk factors for pulmonary embolism.^{5,6} Patient was discharged after 2 weeks on dabigatran 150 mg. After six weeks, the IVC filter was successfully removed and patient was discharged on the same day.

DISCUSSION

Venous thromboembolism (VTE) is the most feared postoperative complication in spinal surgery patients. Pulmonary thromboembolism in such patient's presents with clinical features of chest pain, sweating, breathlessness, decreased SpO₂ levels and is confirmed further by hypotension. Appearance of new RBBB on ECG, elevated D-dimer levels with thrombus in calf vessels on colour Doppler confirms the diagnosis. In medical management of such patients, proper personal and family history play an important role as age, obesity and other risk factors like family history of hyperhomocysteinemia have to be ruled out and one needs to take important preoperative measures in such patients. Oda et al reported that the incidence of DVT post spinal

surgery is higher than appreciated and that increased age and posterior lumbar surgery are independent risk factors.⁷ A variety of factors like older age, prolonged immobilization postoperative incision pain, malignant tumors, postoperative paralysis, and duration of surgery puts the spinal surgery patient at increased risk of DVT. Caprini and others attempted to quantify these factors in a reproducible manner to assist the clinician in performing preoperative risk assessment.⁸ The risk factors for the patient can be calculated to produce an overall risk factor score, which can be from low to very high potential for DVT development (Table 1).

Table 1: Thromboembolism risk factor points.

S. no.	Risk factor	Points
1	Overweight and obese (BMI>25)	1
2	Age 41-60 years	1
3	Age 61-75 years	2
4	Confined to bed >72 hours	2
5	Malignancy within 5 years	2
6	Major surgery >45 min	2
7	Age >75 years	3
8	History of DVT	3
9	Spinal injury/paraplegia	5

BMI: Body mass index.

According to this system our patient was in high-risk group and prophylaxis with mechanical, pharmacological and supportive methods has been shown to be effective and safe in most types of surgery and should have been implemented. A number of issues related to prophylaxis of VTE after surgery deserves further clarification, including the role of screening for asymptomatic DVT, the best timing for initiation of pharmacological prophylaxis and surgeon has to weigh the risk of postoperative hematoma formation against the benefit of protecting against DVT.

As it seems possible that the extensive bone removal involved in spinal fusion and/or decompression leaves a wider potential bone surface area for rebleeding, this could predispose patients to a delayed postoperative hematoma. Incidence of postoperative spinal epidural hematoma is 0.1% to 3%.⁹⁻¹¹

CONCLUSION

Hence, we conclude that in spinal surgeries routine prophylaxis for DVT should be taken and whether pharmacological prophylaxis is to be started with mechanical prophylaxis should be decided on the basis of risk of DVT and type of surgery. Also in obese patients with abnormal lipid profile and homocystiene levels preoperative colour Doppler screening for DVT can be considered. In above case early diagnosis and timely intervention helped in successful management.

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