Case Report

Deep venous thrombosis revealed during ultrasound-guided femoral nerve block

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Ultrasound imaging used to facilitate performance of a femoral nerve block also affords imaging of adjacent anatomical structures. Following a fracture of the femur, an ultrasound guided femoral nerve block (UGFNB) was performed to provide analgesia; this led to the incidental finding of a previously undiagnosed femoral vein thrombosis (DVT), resulting in a change in patient management before surgery. An inferior vena cava (IVC) filter was placed before intramedullary nailing of the fracture.


Keywords: anaesthetic techniques, regional; complications, cancer; embolism, thromboembolism

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Case report

A 24-yr-old woman with a 1-yr history of a stage IV alveolar soft part sarcoma of the right mid-femur and multiple large pulmonary metastases bilaterally had severe right leg pain while walking, heard a loud crack, and fell to the ground. At Bellevue Hospital Center, a pathological fracture of the femur was suspected. Her medical history was significant for chronic shortness of breath and dyspnoea on exertion, and her symptoms had been stable over the preceding 2 months. Despite chemotherapy, however, there was progression of the primary and metastatic disease.

Because of severe leg pain that prevented transport to the radiology suite for diagnostic studies, we performed UGFNB. With the patient supine, a 4- to 7-MHz ultrasound transducer (Sonosite180® C 11; Bothell, WA, USA) was used to visualize the femoral nerve, artery and vein. The femoral nerve was visualized 1 cm lateral to the artery and deep to the iliacus fascia. After sterile preparation and local infiltration of the skin, a 17 G Tuohy needle was inserted 2 cm distal to the inguinal ligament at a 30° angle in a cephalad direction. The needle was continuously visualized by ultrasound until it perforated the fascia and its tip was immediately superficial to the femoral nerve. Lidocaine 1.5%, 10 ml with epinephrine 1:200 000 was injected and a 20 G catheter was threaded through the Tuohy needle to permit rebolusing. The right common femoral vein was non-compressible, echolucent and more pulsatile than the femoral artery. Extending distally from the common femoral into the femoral vein, there was an echogenic mass 8 cm long by 2 cm wide, consistent with a proximally evolving, free-floating, femoral DVT (Fig. 1). A formal venous duplex study performed by the hospital’s vascular technologist confirmed these findings and the Doppler study revealed bidirectional flow in the right and left common femoral veins. Arterial blood gas analysis while breathing room air revealed \( pH=7.46, P_{CO_2}=30 \text{ mm Hg}, P_{O_2}=49 \text{ mm Hg}, HCO_3=21.7 \text{ mEq/litre} \).

Because of the risk of pulmonary embolism (PE) during surgery, and given the extent of pre-existing pulmonary compromise, a second bolus of local anaesthetic was given through the femoral nerve catheter. Instead of going directly to surgery, she was taken to the angiography suite, where a nitinol inferior vena cava (IVC) filter was placed under fluoroscopy via the left femoral vein.

The following day she underwent an uncomplicated general anaesthetic and repair of the fractured femur with an intramedullary nail. Her postoperative course was uneventful. She was transferred to the rehabilitation service 7 days after surgery and was discharged home on postoperative day 14. Eleven months after discharge, she died at home while under hospice care.
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Discussion
Our patient had an alveolar soft part sarcoma; this is a rare
tumour (0.5–1% of all soft tissue sarcomas) that carries a
poor prognosis and often metastasizes to the lung. In one
series, the 5-yr survival rate of patients with metastatic
disease was 20%.1
Femoral nerve block is an accepted regional anaesthetic
technique for providing pain relief after femur fracture,
especially to assist with patient transport or fracture
reduction.2 The block affords excellent analgesia, circum-
venting the need for opioids, which cause sedation and may
impair the physical examination. Ultrasound has been used
to reduce onset time3 and dose of local anaesthetic 4 for
femoral nerve block. In our patient, ultrasound visualization
of the venous anatomy revealed a previously undiagnosed
DVT. This was not an unexpected finding as long bone
fractures of the lower extremity and malignancy are risk
factors for DVT. In a patient with cancer, pulmonary
metastases and pulmonary compromise, the mortality of
perioperative PE probably exceeds 25%.5 For this reason,
insertion of the IVC filter was justified as a prophylactic
measure to reduce the likelihood of fatal thromboembolism
during intraoperative femur manipulation.6 although the
filter would not prevent embolization of small particulate
matter, air or fat during surgery.
The non-compressible proximal common femoral vein
was echolucent, suggesting a clot several hours to several
days in age, whereas the lumen of the more distal common
femoral and femoral veins contained a well-formed echo-
genic mass, suggesting a clot of at least 7–10 days in age.
Direct tumour extension into a vein can occur in some
sarcomas; however, echolucency of the proximal femoral
vein clot is most suggestive of newly formed thrombus.
Pulsations of the femoral vein associated with retrograde
flow in synchrony with the cardiac cycle is not a common
finding; however, they are associated with right heart failure,
defined as a central venous pressure greater than 8 mm Hg
(sensitivity 46%, positive predictive value 94%).7 In our
patient, venous pulsations were probably caused by:
(i) right heart failure probably secondary to pulmonary
hypertension; (ii) tricuspid insufficiency; (iii) partial femoral
vein occlusion (by clot); and/or (iv) high tumour blood flow
(which can mimic an arteriovenous fistula). Pulmonary
hypertension in our patient may have resulted from hypoxic
pulmonary vasoconstriction, massive pulmonary tumour
invasion and vascular compression, pulmonary venous
hypertension, pulmonary thromboembolism, and/or
pulmonary tumour micro- or macroembolism.
The UGFNB allowed incidental detection of a femoral
vein thrombus and afforded excellent analgesia. If the nerve
block had been performed with a nerve stimulator technique,
the DVT would have gone undetected. Perioperative pul-
monary thromboembolism in this patient with baseline dys-
pnoea and probable right heart failure carries a substantial
mortality, and insertion of the IVC filter before surgery
probably reduced this risk.

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