Learning from errors

The importance of being earnest; in haemostasis after femoral venepuncture

Gwilym Morris,¹ Katie Clarke,² Imran Satia,³ Sarfraz Khan²

¹Cardiovascular Medicine, Faculty of Medical and Human Sciences, University of Manchester, Core Technology Facility, Manchester, UK;

²Cardiology Department, Lancashire Teaching Hospitals NHS Trust, Preston, UK;

³Respiratory Department, Royal Albert Edward Infirmary, Wigan, UK

Correspondence to Dr Imran Satia, imransatia@gmail.com

Summary

Femoral vein phlebotomy is a commonly used technique to obtain venous blood in situations where peripheral venous access is not possible. It is often performed by junior medical staff members and there is little formal teaching of the technique. There are no good research articles on safe postprocedural management or of complication rates. Furthermore, few medical textbooks deal with the procedure beyond demonstration of the femoral neurovascular anatomy. Information available recommends compression times of between 3–15 min following femoral arterial blood sampling in patients with normal coagulation parameters.^{1 2} There are no guidelines available in the literature for compression times following femoral venous puncture. The authors report a case of life threatening occult haemorrhage following apparently unsuccessful femoral venepuncture. This case demonstrates the importance of post procedural care in all cases of invasive central venous access.

Figure 1 CT angiogram.

Figure 2 Femoral arterial angiogram of right leg.

BACKGROUND

It highlights the potential risks with a procedure which is performed so frequently throughout hospitals. More attention needs to be made in teaching anatomy, training for procedures and having supervision until clinically competent to perform independently. Furthermore we don't routinely consent patients in writing for arterial blood gases or femoral venepuncture and it raises the discussion whether we ought to be doing so. Finally, with some hospitals having access to ultrasound on the ward, there may be some discussion whether we should be requesting ultrasound scan guided vascular access for difficult patients.

CASE PRESENTATION

A 52-year-old woman was admitted following an episode of collapse. Clinical examination was unremarkable other than general frailty. Her admission bloods showed hypokalaemia with chronic kidney disease stage 3 (Na^+ 147 mmol/l, K^+ 2.6 mmol/l, urea 2.9 mmol/l, creatinine 111 $\mu\text{mol/l}$, epidermal growth factor receptor 45 ml/min/1.73m²), her full blood count was within normal limits with haemoglobin (Hb) 13.2g/dl. The 12-lead ECG recording showed sinus

tachycardia (124 bpm) and a prolonged QTc of 0.568 ms. While on the medical admissions unit with ECG telemetry she suffered a cardiac arrest; the initial cardiac rhythm was polymorphic ventricular tachycardia. She received 2 min of cardiopulmonary resuscitation and cardioverted to sinus rhythm with an output following amiodarone 300 mg intravenously. Subsequently she was transferred to the coronary care unit where she received further amiodarone 900 mg intravenously and KCl 80 mmol intravenously over 24 h. Repeat U+Es showed correction of K^+ to 3.2 mmol/l and a 12-lead ECG was performed showing sinus rhythm 96 bpm and QTc 424 ms. Amiodarone 200 mg p.o. o.d. was commenced as maintenance therapy.

A transthoracic echocardiogram revealed mild-moderate left ventricular systolic function impairment. After 3 weeks she was transferred to a medical ward. Due to the potential sequelae of hypokalaemia it was communicated to the receiving medical team that daily U+E monitoring was mandatory, using femoral venepuncture if required. Four days later she underwent an unsuccessful attempt at femoral venepuncture. No blood was withdrawn and therefore the procedure was abandoned and only cursory

attention was given to haemostasis. Three h later she became unwell, her blood pressure was 70/41 mm Hg and pulse 71 bpm. Clinical examination revealed a large haematoma in her right thigh. Her Hb had fallen to 7.5 g/dl, a clotting screen was normal.

A CT angiogram of the leg was organised on an urgent basis, confirming the presence of a large haematoma in the right thigh but no bleeding point was seen (figure 1). After involvement of the vascular surgery team a femoral arterial angiogram was performed via the left common femoral artery (figure 2). A bleeding point was identified in a small medial branch of the common femoral artery. The small size of the artery precluded percutaneous intervention, therefore she underwent surgical exploration and the bleeding vessel was ligated. She made an uneventful recovery from surgery and was discharged home after a successful period of rehabilitation with the aim of further cardiovascular investigation as an outpatient.

DISCUSSION

The anatomy of the femoral triangle is well known, the femoral artery lies lateral to the femoral vein and is therefore a useful landmark for venous access.³ Inadvertent arterial puncture is one of the most frequent complications of femoral venous access at around 3%, though published data are poor.⁴ Studies of femoral vein cannulation suggest that arterial haemorrhage occurs in less than 1% of patients in whom femoral venous access is gained using the landmark technique.⁵

This case demonstrates the importance of adequate haemostasis following femoral venepuncture in all cases, even if apparently unsuccessful. We would recommend

a minimum of 5 min of manual pressure in patients with normal coagulation to prevent life threatening complications.

Learning points

- ▶ The importance of knowing the anatomy of the femoral triangle
- ▶ Having teaching and supervised training is vital in gaining competence in femoral venepuncture, and where available ultrasound should be used.
- ▶ To inform patients of such risks before performing femoral venepuncture.
- ▶ To perform pressure haemostasis following femoral venepuncture in all cases.

Competing interests None.

Patient consent Obtained.

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