

Picture Quiz:

Know your anatomy—the femoral triangle



Case history

A 25 year old man was brought into the emergency department by ambulance. He was involved in a road traffic incident and had an obvious site of blood loss from a fracture of an upper limb. On his arrival at the emergency department, you are told that the ambulance paramedic was unable to gain intravenous access and are asked by the person in charge of resuscitation to try to gain access. You are unable to find any peripheral veins because he is hypovolemic. You attempt to put in a central line via the femoral vein (fig 1).

Questions

- (1) Describe how you would locate the femoral vein.
- (2) Is the femoral vein within the femoral sheath?
- (3) If the femoral nerve is damaged accidentally what could be the consequences for your patient?
- (4) What is the femoral canal?

Answers

- (1) Palpate the femoral pulse at the midinguinal point. The femoral vein lies medial to the femoral artery and lies medial to the pulsation.
- (2) Yes. Both femoral vessels lie within the femoral sheath.
- (3) Damage to the femoral nerve can lead to loss of sensation on the anterior part of thigh and unopposed flexion of the knee.
- (4) The femoral canal is a space within the femoral sheath medial to the femoral vein.



Fig 2 Anterior view of an articulated male pelvis. A=anterior superior iliac spine; B=pubic tubercle; C=pubic symphysis; D=body of pubis

Discussion

To put in a central line in the femoral vein it is essential that you know the basic anatomy and how to apply this information.

The femoral triangle

The femoral triangle is the name given to an area of the anterior aspect of the thigh formed as different muscles and ligaments cross each other producing an inverted triangular shape (fig 2). Contained within this area, placed medially to laterally, are the femoral vein, artery, and nerve (remember “van”).

Looking at the triangle from above, the medial border of the sartorius forms the lateral border of the triangle, the inguinal ligament forms the superior border, and the medial border of the adductor longus forms its medial border. The apex is produced when the medial border of the sartorius crosses the medial border of the adductor longus (fig 3). Forming the roof of the triangle are the superficial structures, namely the fascia lata, cribiform fascia, subcutaneous tissue, and the skin.

The floor of the femoral triangle is muscular and roughly concave or gutter shaped, formed, from medial to lateral, by the adductor longus, part of the adductor brevis, the pectineus, and the iliopsoas. Running in the deepest part of the gutter are the neurovascular structures—the femoral vessels and nerve (fig 3).

The femoral vessels and nerve

Enclosing the femoral vessels is the femoral sheath, but the femoral nerve lies outside this sheath. The femoral nerve supplies

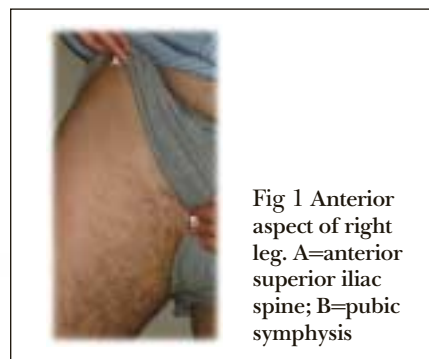


Fig 1 Anterior aspect of right leg. A=anterior superior iliac spine; B=pubic symphysis



Fig 3 Anterior view of the right thigh. V=femoral vein; A=femoral artery; N=femoral nerve; 1=adductor longus; 2=adductor brevis; 3=pectineus; 4=iliopsoas; 5=sartorius

skin, the sartorius, which flexes the knee joint and laterally rotates the leg, and the quadriceps femoris, which extends the knee

joint. Medial to the femoral vein within the sheath is the femoral canal, an area of dead space into which the vein can expand during increased venous return.

The femoral artery provides the major blood supply to the lower limb and is a continuation of the external iliac artery. It exits the triangle by running to the apex of the femoral triangle (fig 2) and entering the subsartorial or Hunter's canal.

The femoral artery lies at the midinguinal point, which is midway between the pubic symphysis and anterior superior iliac spine and is the inferior extremity of the mid-clavicular line.

The inguinal ligament

The inguinal ligament is the upturning of the aponeurosis of the external oblique and attaches from the anterior superior iliac spine to the pubic tubercle. The pubic symphysis is a secondary cartilaginous joint between the bodies of the pubic bones, and the pubic tubercle is a small bony projection on the upper surface of the body of the pubis (fig 2).

Medial to the femoral artery is the femoral vein and laterally is the femoral nerve. So, in effect, medial to the femoral pulse is the femoral vein and lateral to it is the femoral nerve.



Fig 4 Femoral neurovascular bundle superimposed on the anterior aspect of the right thigh. A=anterior superior iliac spine; B=pubic tubercle; inguinal ligament attaches from A to B; C=femoral vein; D=femoral artery; E=femoral nerve

Putting it all together

From the anatomy described in the discussion, to find the femoral vein you feel for the femoral pulse at the midinguinal point. Then you move medially from the femoral pulse to find the femoral vein (fig 4).

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Editorials

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Argues that tuberculin skin testing is not required before BCG vaccination in young children.

BMJ 2003;327:243-4. (2 August.)

Primary care

Acute low back pain: systematic review of its prognosis

Almost every doctor will come across this at some stage. The paper describes the course of acute low back pain and sciatica and

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BMJ 2003;327:323. (9 August.)

Clinical review

New approaches to preventing restenosis

Interesting review of this common problem after coronary interventions, discussing predicting and in particular preventing restenosis. As ever, there are also useful additional educational resources.

BMJ 2003;327:274-9. (2 August.)

Tennis elbow

Taken from the bible of evidence based medicine, *Clinical Evidence*, this one page summary outlines the benefits and harms of treatments for tennis elbow. The full content of *Clinical Evidence* is available online at www.clinicalevidence.com

BMJ 2003;327:329. (9 August.)

Bulimia nervosa

Taken from Best Treatments—the patient friendly version of *Clinical Evidence*. This short review goes through treatments for bulimia clearly, separating ones that are likely to work from ones that need further

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BMJ 2003;327:380-3. (16 August.)

10 minute consultation

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Part of a series on common problems in primary care. This wonderfully straightforward article goes through what issues you should cover and what you should do if a patient with a family history of prostate cancer with a high concentration of prostate specific antigen comes to see you.

BMJ 2003;327:379. (16 August.)

ABC of interventional cardiology

Percutaneous interventional electrophysiology

BMJ 2003;327:280-3. (2 August.)

ABC of interventional cardiology: implantable devices for treating tachyarrhythmias

BMJ 2003;327:333-6. (9 August.)

Interventional paediatric cardiology

BMJ 2003;327:385-8. (16 August.)