

Anatomical variations of Femoral vessels.**Romini Niranjan¹ and Sivananthini Udhayakumar¹**¹ *Department of Anatomy, Faculty of Medicine, University of Jaffna, Sri Lanka***Abstract**

Femoral triangle is an important site for various clinical procedures. Knowledge about anatomical variations of femoral vessels is important to prevent inadvertent damage during surgical procedures and for successful arterial and venous cannulation.

It is an incidental finding in which profunda femoris artery originated just 1 cm below inguinal ligament from lateral aspect of femoral artery (FA) in left femoral region of a middle aged Sri Lankan man which was observed during routine dissection.

It was observed that FA crossed superficially over femoral vein (FV) in upper part of femoral triangle and FV was lying deep to FA in most part of femoral triangle. FV catheterization is necessary when there is no visible peripheral vein for cannulation or when rapid access to a large vein is needed. Complications may arise from accidental puncture of neighbouring structures. Ultrasonography should be used particularly for more difficult femoral vascular access.

Even though variations are mostly incidental findings and being of general anatomical interest, knowledge of these variations appears to be mandatory for planning surgery and vascular interventions.

Key Words

Femoral triangle, Femoral artery, Femoral vein, Profunda femoris artery

Introduction

Knowledge of normal anatomy and its variants is vital for safe surgical practice. Femoral artery and vein in the femoral triangle are utilized for various clinical procedures. Anatomical text books state femoral artery (FA) lies between femoral vein (FV) and femoral nerve in base of the femoral triangle.

FV usually crosses FA near apex of femoral triangle and lies posterior to it at its apex, 10 cm below inguinal ligament (1). Profunda femoris artery (PFA) which supplies deep structures of thigh and femur arises from lateral side of FA about 3-4 cm distal to inguinal ligament (1). Aim of this study is to discuss normal anatomy and possible variation of femoral vessels and highlight its clinical significance with relevant review of literature

Case report

Present report describes an abnormal relationship between FA and FV within the femoral triangle and high origin of PFA from FA in the left lower limb of a middle-aged Sri Lankan man in a routine Anatomy dissection.

In left femoral triangle, FV was medial to FA near the base of femoral triangle. The PFA was arising from lateral aspect of FA just 1 cm distal to inguinal ligament (Fig1). After providing the PFA, FA passed superficially and medially over FV, such that FA was lying superficial and medial to FV in rest of triangle (Fig 2). Profunda femoral vein drained into FV nearly 3 cm below inguinal ligament (Fig 2). Medial circumflex, lateral circumflex arteries and femoral nerve maintained the normal relationship.

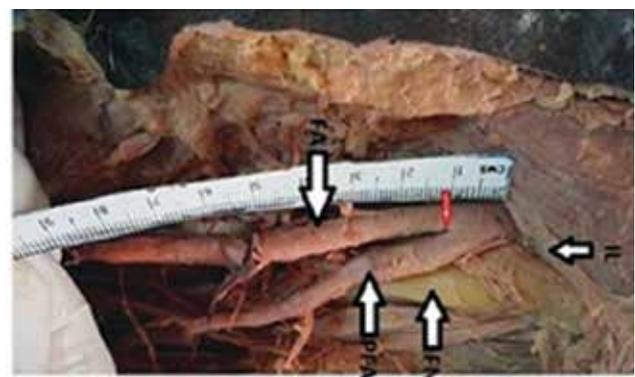
Discussion

Fig 1.

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Fig 2

FV catheterization is necessary when there is no visible peripheral vein for cannulation or when rapid access to a large vein is needed (2).

In an ultrasonographic study of 50 patients by Hughes et al (2000) pointed out that FA was seen frequently overlapping FV and degree of overlap increases as the vessel descend distally towards the knee. They also observed that at the level of inguinal ligament in 72 % of the patients on the right side and 59 % of the patients on the left side, FA and FV were side by side with FV medial to FA. In the remaining cases there was partial overlap between FA and FV at 4 cm below inguinal ligament (3). Bandyopadhyay et al (2010) reported a case of FA crossing the FV just deep to the inguinal ligament and FV was lying superficial to FA at the base of the femoral triangle (2).

The distance between midinguinal point and origin of PFA is clinically important. It enables to identify the correct site of making incision for surgical exposure of the junction of FA and PFA (4).

In the Sri Lankan study by Samarawickram et al (2009) found that PFA origin vary from 3 - 7cm from midinguinal point with a mean value of 5cm, which is higher than that reported in standard text books. They observed that PFA on left side tend to originate from a point proximal to that of origin on the right side (5).

Samarawickrama et al (2009) stated that PFA commonly originate (46 %) from the posterior aspect of FA, posterolateral in 30 % and lateral in 23 % in Sri Lankan population.

The direction of origin of PFA is important in catheter application, in making flaps with pedicles in reconstructive surgery and bypass procedures made to supply the lower extremity (5).

The FA is usually the site of choice for arterial puncture. Judkins technique for left heart catheterization is undertaken where FA is

approached by puncturing the vessel 1 to 3 cm below inguinal ligament (4). Knowledge of the site of origin of PFA helps in avoiding iatrogenic injuries like venous puncture, femoral nerve blocks, severe secondary haemorrhage while performing FA puncture.

Therefore cannulation of FA also should be done close to the inguinal ligament as possible to prevent inadvertent cannulation of PFA.

It was documented that diameter of PFA decreases as the site of its origin becomes more distal from inguinal ligament. Anatomical knowledge of the relationship of femoral vessels in femoral triangle, site of origin of PFA and the diameter of PFA is needed for the safe medical and surgical practices.

Conclusion

Even though the variations are mostly incidental findings, knowledge of these variations appears to be mandatory for planning the surgery and ultrasound guidance of surgical intervention reduces the incidence of complications.

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References

1. Sinnatamby, C.S. Last's anatomy: regional and applied. 12th edn, Edinburg: Elsevier Health Sciences. 2011. 116-119
2. Bandyopadhyay M, Biswas M, and Roy R. Vessels in femoral triangle in a rare relationship. Singapore Medical Journal. 2010. 51 (1) : e 3- 5
3. Hughes P, Scott C and Bodenham A Ultrasonography of the femoral vessels in the groin: Implications for vascular access. Anaesthesia. 2000. 55 (12): 1198- 1202.
4. Teli C, Vanitha, Kadlimatti HS and Kate N. Unilateral high origin of profunda femoris and variation of its branching. International Journal of Health Sciences & Research. 2015. 5 (3): 394 - 397
5. Samarawickrama MB, Nanayakkara BG, Wimalagunaratna KW, Nishantha DG, Walawage UB. Branching pattern of the femoral artery at femoral triangle: cadaver study. Galle Med J. 2009. 14 (1):31-34.