

ANATOMICAL VARIATION OF PROFUNDA FEMORIS ARTERY IN TWO CADAVERS

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ABSTRACT

Profunda femoris artery is the branch of femoral artery which arises from postero-lateral aspect of femoral artery about 3.5-4 cm distal to inguinal ligament. This artery is useful in various procedures such as angiography, arteriography and vascular reconstructive procedures. The aim of this paper is to provide the awareness of anatomical variation in origin of Profunda femoris artery. We observed a variation of profunda femoris artery in two cases during routine dissection of first year MBBS students in our college. Variation was noticed as the bifurcation of left femoral artery (in both cases) i.e. Profunda femoris artery was arising from lateral side of femoral artery just behind the inguinal ligament. When the origin of Profunda femoris artery lies high, it can cause problems during femoral arterial or venous puncture, embalming, various interventional procedures and femoral nerve block. The precise knowledge of normal and variant anatomy of profunda femoris artery is important for surgeons, clinicians, radiologist and anatomist.

KEYWORDS: Profunda femoris artery, Femoral artery, Inguinal ligament.**INTRODUCTION**

Profunda femoris artery (PFA) is the largest deep branch of femoral artery (FA) which arises from postero-lateral aspect of femoral artery about 3.5-4 cm distal to inguinal ligament. It is the main artery which supplies all three compartments of thigh.^[1,2,3] It gives medial circumflex femoral artery (MCFA), lateral circumflex femoral artery (LCFA), four perforating arteries and muscular branches. Above the origin of PFA the FA is known as common femoral artery (CFA) and below the origin of PFA it is called as superficial femoral artery (SFA) by clinicians.^[4] This artery is useful in various procedures such as angiography, arteriography, embalming, vascular reconstructive procedures also used for USG, MRI, Doppler imaging, hemodialysis.^[5,6]

Lateral circumflex femoral artery which is the branch of the PFA is useful for aorto-politeal bypass and anterolateral thigh flap.^[7] Variations in origin of PFA and its branches require differing approach to explore these vessels. Precise knowledge of variations of PFA is essential for successful execution of various procedures carried by vascular and reconstructive surgeons, to avoid the iatrogenic femoral arterio-venous fistula formation, radiologists and anatomists.^[8] The aim of this study is to provide the awareness of anatomical variations in origin of PFA and to discuss its embryological basis and clinical insight of this variation along with relevant review of literature.

CASE REPORT

During routine dissection of first year MBBS students in our college we observed variation of PFA origin and its branches in two cases. Variation was noticed as the bifurcation of left femoral artery i.e. PFA was arising from lateral side of femoral artery just behind the inguinal ligament in both cases.

First case: In a 60 year old male cadaver we noticed an unusual origin of PFA on the left side. It took a very high origin i.e., just behind the midpoint of inguinal ligament from the lateral aspect of CFA (Fig. 1a). The external diameter of PFA (9 mm) was almost same as compared to the CFA (10 mm). PFA had routine course and branching pattern including lateral, medial circumflex femoral artery and perforating branches except medial circumflex femoral artery originated in middle of thigh (Fig.1 b). Femoral artery had a normal course on right side.

Second case: In a 63 year old female cadaver in the left lower limb we observed high origin PFA. It sprouted from the lateral side of femoral artery just behind the midpoint of inguinal ligament. It run laterally and down words parallel to femoral artery then it passed below the rectus femoris, Sartorius and vastus medialis muscle and finally pierced adductor magnus as forth perforator artery above the knee joint. Superficial circumflex iliac artery was first branch given by PFA immediately after its origin. Femoral artery had external diameter of 10 mm while for PFA it was 6 mm (Fig 2a). In lower third of thigh it divided into three branches. Upper one became

1st perforating artery, middle one became 2nd perforating artery and lower branch divided into two branches as 3rd and 4th perforating arteries (Fig. 2b). The femoral artery

had its normal course and continued as popliteal artery. Femoral artery had a normal course on right side.

LEGENDS:

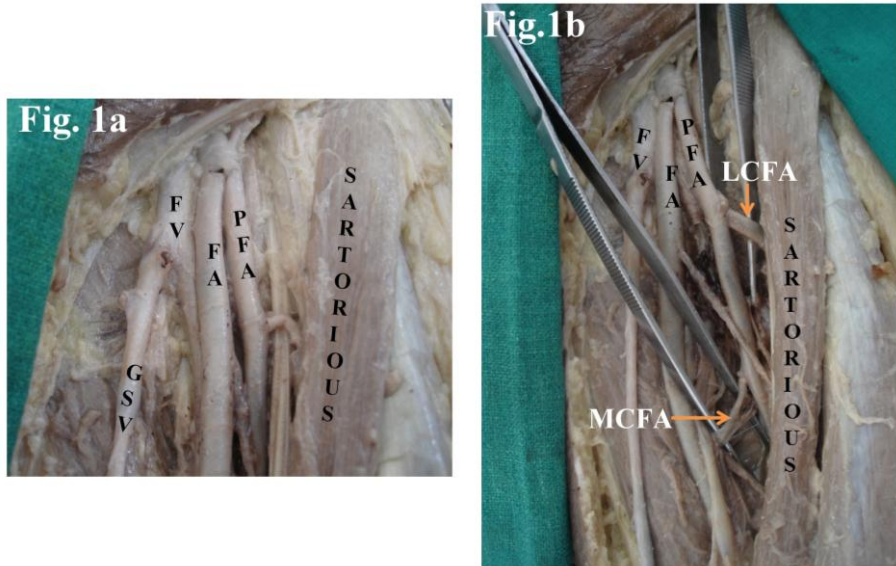


Fig 1 a and 1b: Showing high origin of profunda femoris artery (PFA).

GSV: Great saphenous vein, FV: Femoral vein, FA: Femoral artery, MCFA: Middle circumflex femoral artery, LCFA: Lateral circumflex femoral artery.

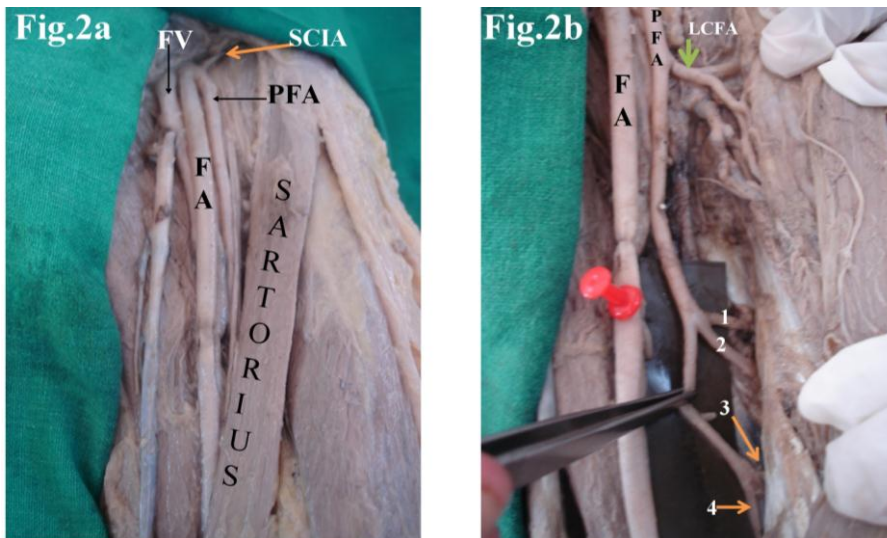


Figure 2a and 2b: Showing high origin of profunda femoris artery and its branches.

FV: Femoral vein, FA: Femoral artery, SCIA: Superficial circumflex iliac artery, MCFA: Middle circumflex femoral artery, LCFA: Lateral circumflex femoral artery.

DISCUSSION

Vascular variations are usually subclinical but may put the life of the patients at risk while performing various clinical procedures.^[8] They are usually incidental findings and found during dissection, operation or during an angiographic or radiologic procedures. Interventional radiology opened a new boulevard for the study of variations of the courses of the arteries but femoral angiography is used as an important investigation in the diagnosis of peripheral occlusive arterial disease and it is

also used to rule out the diagnosis of suspected congenital anomalies.^[9,10]

PFA shows variations in its origin. Researchers reported that it may take origin from postero-lateral, medial or lateral aspect of femoral artery.^[3,8,9] Dimri and Deshwal noted the bilateral high origin of the PFA.^[11] According to Samarawickrama *et al.* if the PFA originated close to midpoint of inguinal ligament then the site of its origin was from lateral aspect of FA^[12] and present study reported the same observation. Siddharth *et al.* observed

origin of PFA at the level of the inguinal ligament in 1% cases.^[13]

The knowledge of the site of origin of PFA is important while performing clinical procedures in the femoral region and in hip joint replacement and also for avoiding iatrogenic arterio-venous fistula or severe secondary hemorrhage while performing femoral artery puncture.^[11] The anatomical variations changes the relationships between the various structures and lack of knowledge of variations of these vessels make the hemostasis difficult to manage.^[7,9]

Embryological basis

Exact cause of vessel variation is not known. Variations of the lower limb vessels can be explained on the basis of an abnormal development of the arterial network of the lower limb. The femoral artery developed from the capillary plexus (rete femorale) which is connected with external iliac artery proximally through rete pelvum and axis (sciatic) artery distally. Dorsal root of the umbilical artery gives the axis artery of the lower limb. The PFA develops in the rete femorale, appears as a branch of the femoral artery after regression of the rete femorale. Anatomical variations in the origin of the PFA occur due to variability in the pattern of regression of the rete femorale and it is accepted that increase of blood flow in these capillaries determines the final mature arterial pattern. Thus, the most appropriate channels enlarge while others contract and disappear.^[14,15] PFA is a branch of internal iliac artery in lower animals but during the course of evolution its origin shifted distally as a branch of FA. So, ontogeny repeats phylogeny. Hence the arrest at various developmental stages may lead to anatomical variations related to the division of femoral artery.^[8]

CONCLUSION

Profunda femoris artery shows the variation in its origin, course and branching pattern. It acts as a collateral vessel in the occlusion of the femoral artery. When the origin of it lies high, it can cause problems during femoral arterial or venous puncture, embalming, various interventional procedures and femoral nerve block. Before any procedure of the femoral artery high-resolution ultrasonic imaging should be done which can provide anatomical and functional information about it which would be helpful in planning various procedures.^[16] Therefore precise knowledge of normal and variant anatomy of PFA is important for surgeons, clinicians, radiologist and anatomist.

CONFLICT OF INTEREST: None.

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