



Anatomical Variations of Profunda Femoris Artery in Indian Population

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Abstract

Background: Aim: To assess anatomical variations of profunda femoris artery in Indian population. **Methods:** 45 embalmed lower extremities adult human cadavers age range of 30–65 years were recruited for the study. The femoral triangles were dissected with proper care to identify the profunda femoris and circumflex femoral arteries. Their source of origin, position, and distance were noted with the mid-inguinal point (MIP) as a reference point. **Results:** Side of profunda femoris artery (PFA) was postero- lateral in 60%, posterior in 30%, lateral in 5% and absent in 5%. Medial circumflex femoral artery (MCFA) had 65%, 15%, 12% and 8% and lateral circumflex femoral artery (LCFA) had 80%, 15%, 5% and 0% respectively. Origin of profunda femoris artery (PFA) was FA in 90% and common trunk with medial circumflex femoral artery in 10%. Origin of Medial circumflex femoral artery (MCFA) was FA in 55%, PFA in 40% and FA with common trunk with MCFA in 5%. Origin of lateral circumflex femoral artery (LCFA) was femoral artery in 70%, PFA in 20% and FA with common trunk with PFA in 10%. A significant difference was observed ($P < 0.05$). **Conclusions:** A thorough knowledge of variation of profunda femoral artery is of great importance and to avoid complications.

Keywords:- Profunda Femoral Artery, Medial Circumflex Femoral Artery, Lateral Circumflex Femoral Artery.

INTRODUCTION

The profunda femoral artery has an important compensatory role for the collateral blood flow in the atherosclerotic occlusive disease through collateral pathways in the lower pelvis, starting from the internal iliac arteries (or the mesenteric arteries if the internal iliac arteries are also affected).^[1,2] This collateral pathway is more important if aorto - iliac lesions are associated with femoro - popliteal lesions.^[3,4]

The common femoral artery (CFA) which is frequently accessed by radiologist and surgeons, is easily accessible to catheterization.^[5] Knowledge of the anatomy and possible

variations of the PFA, LCFA and MCFA are important for clinicians. The PFA is used for arteriography, ultrasound and Doppler imaging, digital subtraction angiography and magnetic resonance imaging.^[6] Some of the current uses of the PFA include the use for haemodialysis where it supplants the use of the SFA. The branches of PFA are also used as long vascular pedicle during breast reconstruction after mastectomy in cases of carcinoma of breast.^[7,8,9]

Bergman et al. describe that various vessel of the profunda complex may more or less dissociate, one or another of them having an independent origin from the femoral artery;



this may occur to such an extent that a profunda femoris as a definite vessel may not exist. Differing patterns of the origin of the PFA and its branches have been described on a racial basis as well as variations being noted between the two legs of the same individual.^[10,11] Points of origin are helpful to avoid high or low punctures. High punctures, above the inguinal ligament, may result in a retroperitoneal hematoma, as the artery is difficult to compress without the support of the femoral head. Low punctures may result in pseudo - aneurysms formation. The present study was conducted to assess anatomical variations of profunda femoris artery in Indian population.

MATERIAL AND METHODS

A total of 45 embalmed lower extremities adult human cadavers age range of 50 - 85 years, were recruited for the study. The study was started with the approval of institutional ethical review committee.

The skin overlying the anterior compartment of the thigh was incised, dissected and reflected medially. The subcutaneous fat, translucent fascia and superficial vessels were fully dissected and the sartorius muscle and quadriceps muscle identified. The sartorius muscle and the rectus femoris muscle were

transacted, to further expose the CFA, SFA, PFA and the LCFA. Femoral triangles were dissected with proper care to identify the profunda femoris and circumflex femoral arteries. Their source of origin and position were recorded. After recording all the parameters, statistical analysis was carried out using Mann Whitney U test. Level of significance was set below 0.05.

RESULTS

Side of profunda femoris artery (PFA) was postero- lateral in 60%, posterior in 30%, lateral in 5% and absent in 5%. Medial circumflex femoral artery (MCFA) had 65%, 15%, 12% and 8% and lateral circumflex femoral artery (LCFA) had 80%, 15%, 5% and 0% respectively. A significant difference was observed ($P < 0.05$) [Table 1, Figure 1].

Origin of profunda femoris artery (PFA) was FA in 90% and common trunk with medial circumflex femoral artery in 10%. Origin of Medial circumflex femoral artery (MCFA) was FA in 55%, PFA in 40% and FA with common trunk with MCFA in 5%. Origin of lateral circumflex femoral artery (LCFA) was femoral artery in 70%, PFA in 20% and FA with common trunk with PFA in 10%. A significant difference was observed ($P < 0.05$) [Table 2].

Table 1: Variations of profunda femoris artery and its branches.

Side	Profunda femoris artery (PFA)	Medial circumflex femoral artery (MCFA)	Lateral circumflex femoral artery (LCFA)	P value
Postero- lateral	60%	65%	80%	0.05
Posterior	30%	15%	15%	0.01
Lateral	5%	12%	5%	0.04
Absent	5%	8%	0%	0.09

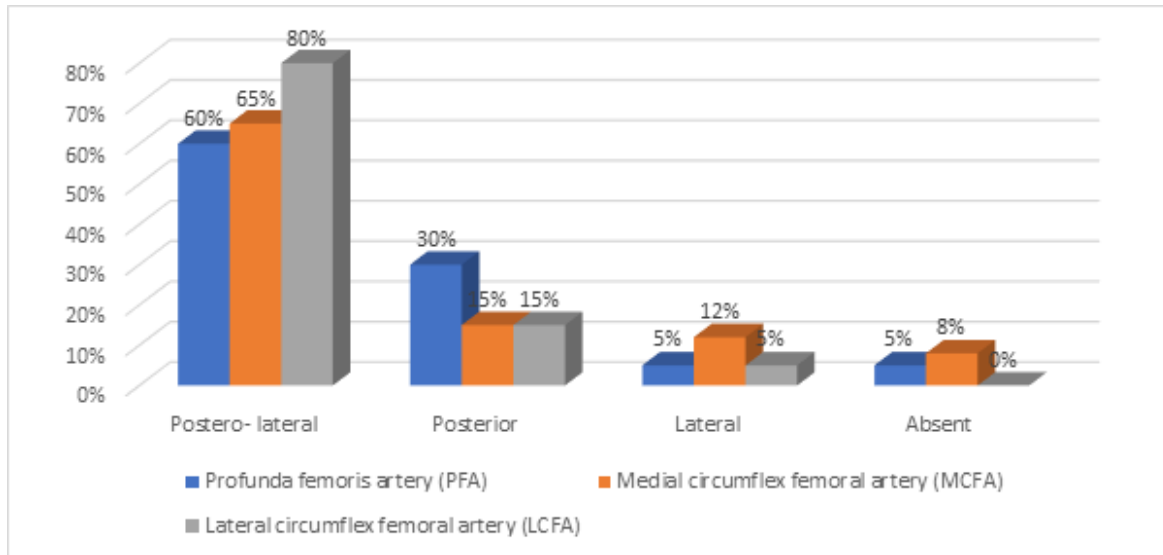


Figure 1:

Table 2: Origin of various arteries.

Origin	Profunda femoris artery (PFA)		Medial circumflex femoral artery (MCFA)		Lateral circumflex femoral artery (LCFA)	P value
Femoris artery	90%	FA	55%	FA	70%	0.02
Common Trunk with MCFA	10%	PFA	40%	PFA	20%	0.05
-	0%	FA with common trunk with MCFA	5%	FA with common trunk with PFA	10%	0.15

DISCUSSION

The lateral circumflex femoral artery (LCFA) is an artery that branches from the profunda femoris artery (PFA) and at times directly from the superficial femoral artery (SFA).^[12,13] The LCFA is known for contributing to the blood supply of the muscles in the lateral aspect/compartments of the thigh, and to a lesser degree contributes to the blood supply of

the neck of the femur and femoral head.^[14] Around the shaft of the femur, the LCFA encircles the superior part of the femoral shaft and anastomoses with the medial circumflex femoral artery of the thigh (MCFA). In its course, the LCFA passes laterally deep to the sartorius and rectus femoris muscles, dividing into the ascending, transverse and descending arteries.^[15] The ascending branch supplies the anterior part of the gluteal region, transverse



branch winds around the femur, while the descending branch joins genicular peri-articular anastomosis. Therefore, the LCFA gives blood supply to the head and neck of the femur, greater trochanter, the vastus lateralis and the knee.^[16,17] The present study was conducted to assess anatomical variations of profunda femoris artery in Indian population.

In our study, side of profunda femoris artery (PFA) was postero-lateral in 60%, posterior in 30%, lateral in 5% and absent in 5%. Medial circumflex femoral artery (MCFA) had 65%, 15%, 12% and 8% and lateral circumflex femoral artery (LCFA) had 80%, 15%, 5% and 0% respectively. Mogale et al,^[18] consisted of 55 cadavers of different ages, ancestry groups and varying body mass index. A total of 90 legs were dissected. The anterior thigh compartment was dissected and the common femoral artery (CFA), superficial femoral artery (SFA), PFA and LCFA further exposed. The course and variations were noted and results documented for further analysis. The LCFA was present in all the legs dissected. The origin of the LCFA was found to be the PFA in 75.6% of the left legs and 82.2% of the right legs dissected. In two cases, a male and female limb, the branching of the PFA from the CFA was observed directly from the external iliac artery, deep to the inguinal ligament. A variation was noted in a female cadaver, where the branches of the LCFA on the left limb had different points of origin. Another variation was noted on a male cadaver, the left limb had two different points of branching for the ascending and descending branches of the LCFA, a common trunk was absent.

We observed that origin of profunda femoris artery (PFA) was FA in 90% and common

trunk with medial circumflex femoral artery in 10%. Origin of Medial circumflex femoral artery (MCFA) was FA in 55%, PFA in 40% and FA with common trunk with MCFA in 5%. Origin of lateral circumflex femoral artery (LCFA) was femoral artery in 70%, PFA in 20% and FA with common trunk with PFA in 10%. Tzouma et al,^[19] concluded that the DFA arises from the CFA with a varying site of origin, the posterolateral being the prevalent one found in 51.32% of cases. Of all cases studied, the MCFA and the LCFA most often originated from the DFA in 63.125% and 74.92%, respectively, but the CFA constitutes another frequent source of origin in 27% and 12.12% of cases, respectively. The descending branch of the lateral circumflex femoral artery (dLCFA) is the prominent pedicle in the ALT flap, originating from the LCFA in 83.55% of cases. However, the presence of an oblique lateral circumflex femoral artery (oLCFA) branch with changeable origination was observed. Knowledge of the anatomical variants in the deep femoral artery is imperative both for interventional radiologists and surgeons. Especially in reconstructive surgery, the possibility for different sources supplying the skin and the pedicle compel surgeons to acquire an awareness of this subject. Also it is important to bear in mind the proximity of the femoral nerve, which lies just lateral to the artery.

CONCLUSIONS

A thorough knowledge of variation of profunda femoral artery is of great importance in diagnosing, therapeutic purposes. Points of origins are helpful to avoid high or low punctures.



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