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A Variant Origin of Profunda Femoris Artery and a Common Stem for the origin of Medial and Lateral Circumflex Arteries – A Case Report

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ABSTRACT

The variations of the profunda and its branches are numerous and to a considerable extent, largely associated with one another. In occlusion of the superficial femoral artery, the profunda femoris artery forms an effective collateral bed between the ileo-femoral segment and the popliteal artery and its branches. *Acharya Sushrutha* has clearly mentioned about the importance of dissection., One who is intended to acquire definite knowledge of surgery should keenly study the anatomy from the books as well as from the dissection. Femoral artery is the most important artery supplying the lower limb and in case of cadavers this artery is used for the embalmment procedure. During the routine dissection classes for the UG's, a variation was observed in the origin of profunda femoris and a common stem for the origin of medial and lateral circumflex arteries in the left lower limb.

Key words: Femoral Artery, Profunda Femoral Artery.

INTRODUCTION

Femoral artery is the continuation of the external iliac artery. It begins below the inguinal ligament and descends along the anterio-medial aspect of the thigh in the femoral triangle.

Profunda femoris artery is a large branch arising from the femoral artery at 3.5cm distal to the inguinal ligament in the proximal part the of high it gives two branches at the upper border of the adductor magnus a medial and lateral circumflex femoral artery.

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Medial circumflex femoral artery - It is usually the branch of the deep rooted Profund femoris artery which is a branch of the femoral artery, this passes through the Pectineus and Adductor longus. It originates from the posterior-medial aspect of the profunda which supplies the adductor muscles and curves medially around the femur between Pectineus, Psoas major, Obturator externus, and adductor brevis finally appearing between Quadratus femoris and the lower border of the Adductor magnus, dividing into transverse and ascending branches.

Lateral circumflex femoral artery - It is lateral branch at the root of the profunda femoris artery. It passes between the divisions of the femoral nerve, and posterior to sartorius and Rectus Femoris muscle and dividing into ascending, transverse and descending branches.

According to the Gray's anatomy,[1] the common variations of the arteria profunda femoris in the origin sometimes medial or rarely posterior on the femoral artery; if the former, it may cross anterior to the femoral vein and then passes backwards around its medial side.

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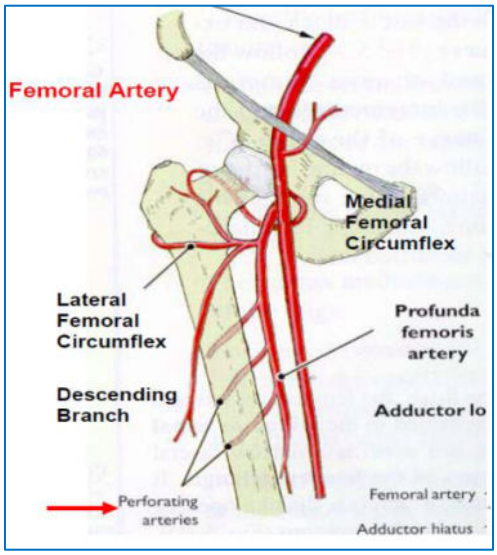
Figure 1: Normal branching pattern of femoral artery



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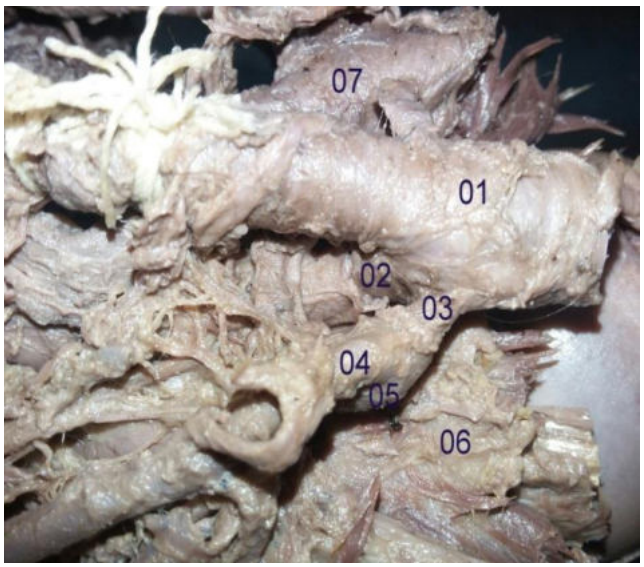
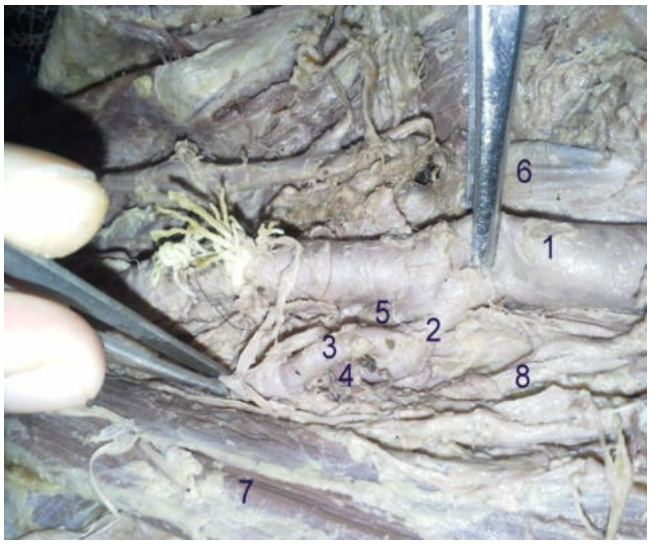
During the routine dissection for the UG's in the left lower limb of the male cadaver aged 70 yrs, a variation was observed in the origin of the profunda femoris artery in the posterior part of the femoral arterybetween the femoral vein, superior to the pectineus muscle. And also a common stem for the origin of medial and lateral circumflex arteries near the upperborder of adductor magnus muscle.The course and branches of the medial circumflex artery and lateral circumflex arteries were observed normal.

Figure 2: Variant femoral artery



1 - Femoral artery,
2 - Profunda Femoris Artery
3 - Common stem of origin
4 - Medial circumflex femoral artery
5 - Lateral circumflex femoral artery
6 - Iliacus muscle
7 - Femoral vein

Figure 3: Variant femoral artery



1 - Femoral artery
2 - Common stem of origin
3 - Lateral circumflex femoral artery
4 - Medial circumflex femoral artery
5 - Profunda femoris
6 - Femoral vein
7 - Saratorius muscle
8 - Femoral nerve

DISCUSSION

The knowledge of the site of origin of profunda femoris artery is important while performing clinical procedures in the femoral region and hip joint replacement and also for avoiding iatrogenic arteriovenous fistula or severe secondary hemorrhage while performing femoral artery puncture.

Anatomical variations at the level of the femoral artery is explained in many ways as the ontogeny repeats phylogeny[2] hence, the developmental arrest at different stages of the life may lead to the anatomical variations related to the divisions of the femoral artery. The major study of the variation in the arterial system of the lower limb is mentioned by the

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various authors in the International journals. Variations in the vascular patterns are generally due to the developmental anomaly of the blood vessels, According to Gray's Anatomy,[3] the adult pattern of the medial circumflex femoral artery usually arises from the profunda femoris, which is the chief source of blood supply to head and neck of the femur, this continues below and at the lower border of the adductor magus and divides into ascending and the transverse branches.

Various authors documented such variations in the origin of profunda femoris artery and medial circumflex and lateral circumflex femoral arteries.

1. Apurva Darji and T.C. Singel[4] - mentions that out of 130 cases of study the medial circumflex femoral artery are originated from profunda femoris artery in 116 cases (89.23%) and from femoral artery in 14 cases (10.77%), hence the origin of the medial circumflex from common stem in femoral artery in rare case.

Figure 4: Distance of origin of medial circumflex femoral artery from the origin of profounda femoris artery.

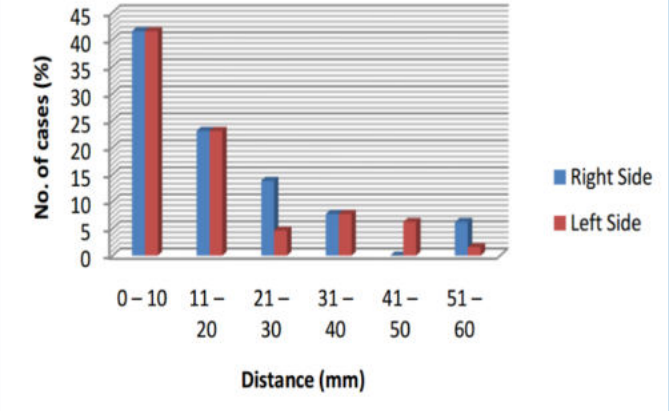

Table 1: Distance of origin of Medial Circumflex Femoral Artery from the origin of Profunda Femoris.

Distance (mm)	Right Side		Left Side	
	No.of cases	Percentage (%)	No. of cases	Percentage (%)
0-10	27	41.54	27	41.54
11-20	15	23.08	15	23.08
21-30	9	13.85	3	4.62
31-40	5	7.69	5	7.69
41-50	0	0	4	6.15
51-60	4	6.15	2	3.08
Total	60	92.31	56	86.16

2. Cifcioglu E, et.al. [5] - Mentions that variation in the medial circumflex femoral artery (MCFA) was observed in a male cadaver. In that case mentioned the MCFA origin from the postero-lateral aspect of the femoral artery, 32mm distal to the Inguinal ligament which is not a frequent case.

3. Sangeeta Jitendra Rajani[6]- In their study mentions that the profunda femoris artery takes origin from posterolateral and lateral aspect was common (71.21%) than posterior and posterio medial which is rare in origin(24.24%).

4. Daksha Dixit et.al.[7] - Mention a various variations of the medial circumflex femoral artery that in 64 cases (56.1%) this origin from the profunda femoris artery and in 19 cases (16.6%) origin from femoral artery as a common stem with the profunda femoris artery.

5. Waseem-al-Talawah[8]- In his study mentions that the medial circumflex femoral artery arises from the common femoral artery in 39.3% and dependently with the profunda femoris artery in 14.6%.

6. Prakash et.al.[9] - In his case study mentions that the medial circumflex femoral artery origin from profunda femoris 2cm distal to origin of profunda femoris artery in 3 cases (67.2%) and it is origin from the femoral artery in 21 cases (32.8%) also in 30 cases out of 64 (46.9%) the profunda femoris originated from posterior aspect.

7. Ashraf Y Nasr et.al.[10] - Mentions the statistics of origin of various position of profunda femoris artery i.e.,

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Table 2 - Sites of origin of profunda femoris from femoral artery

Site of PFA origin	Male limbs			Female limbs		
	Right (25)	Left (25)	Both (50)	Right (20)	Left (20)	Both (40)
Posterolateral	11(44%)	10(40%)	21(42%)	940%	8(40%)	117(42.5%)
Posterior	6(24%)	6(24%)	12(24%)	525%	6(30%)	11(27.5%)
Lateral	5(20%)	5(20)	10(20%)	525%	3(15%)	8(20%)
Posteromedial	3(12%)	4(16%)	7(14%)	15%	3(15%)	4(10%)

Clinical significance

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). This collateral pathway is more important if aortoiliac lesions are associated with femoropopliteal lesions. And the knowledge of such variations are highly significant in the diagnostic interventions and awareness of the original sites and distances of the profunda femoris artery and its circumflex femoral branches will allow the surgeon to define the vascular pattern before performing any invasive procedure and to avoid unexpected iatrogenic injuries.

CONCLUSION

The development of vasculature in the lower limb precedes the morphological and molecular changes that occur in the limb mesenchyme, hence vascular variations are more of an rule than exception.[11] A detailed knowledge of the normalanatomy and variations of the site of origin and course of the profunda femoris artery and its circumflex branches is not only of chief surgical importance during vascular diagnostic interventional procedures and surgeries but also helps in reducing the chances of intra-operative secondary haemorrhage and post-operative complications.

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