VOLUME - 12, ISSUE - 02, FEBRUARY - 2023 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Anatomy

STUDY OF ANATOMICAL VARIATIONS OF ORIGIN OF PROFUNDA FEMORIS ARTERY

Dr. T. KAVITHA	M.D., Assistant Professor, Dept. of Anatomy, A.C.S.R. Govt. Medical College, Nellore.
Dr. K. Deva Priyanka	M.D., Assistant Professor, Dept. of Anatomy, A.C.S.R. Govt. Medical College, Nellore.
Dr. C. Yamini Devi*	M.D., Associate Professor, Dept. of Anatomy, A.C.S.R. Govt. Medical College, Nellore *Corresponding Author
Dr. K.V.N. Geetha Devi	M.D., Professor, Dept. of Anatomy, A.C.S.R. Govt. Medical College, Nellore.

ABSTRACT

Introduction: The profunda femoris artery (PFA) is the largest branch of femoral artery, which supplies the muscles of thigh, the hip joint and the femur, along with its branches. Anatomical variations of profunda femoris or deep femoris artery constitute a matter of great interest to anatomists, surgeons, and interventional radiologists, due to their significant clinical relevance. **Aims And Objectives:** To study the site of origin of profunda femoris artery from femoral artery in the femoral region. **Materials And Methods:** In the present study, among 50 properly embalmed and formalin fixed adult male and female human cadavers 100 femoral triangles were dissected in the lower extremities. Only the properly preserved and intact vessels were considered for study purpose. Damaged vessels, if any, were excluded in this procedure. **Results:** The most common site of origin of PFA from FA is posterolateral in 46 (46%) and posterior in 29 (29%). In 11 (11%) cases, PFA originated from lateral aspect of FA. PFA originated from posteromedial aspect in 4(4%) cases. High origin of PFA is seen in 2 cases, 1(1%) in right limb (beneath Inguinal ligament) of one specimen and 1(1%) in left limb (just below Inguinal ligament) of another specimen. **Conclusion:** In the present study, posterolateral and posterior are the common sites of origin of PFA from FA followed by lateral site. Rare variation like posteromedial origin and high origin of PFA was observed. Awareness of anatomical variations of origin of PFA from FA is informative for the radiologists to avoid the misinterpretations, during the preoperative vascular assessments.

KEYWORDS : Profunda femoris artery, Variations, Femoral arteriography, Congenital anomalies.

INTRODUCTION:

The femoral artery (FA) is the continuation of external iliac artery arising posterior to the inguinal ligament, midway between anterior superior iliac spine in the pubic symphysis[1]. This is the point where femoral artery pulsations can be felt and can be used for catheterization in procedures like angiography and for cannulation to place arterial line (second only to radial artery)[2].

The profunda femoris artery (PFA) is the largest branch of femoral artery, which supplies the muscles of thigh, the hip joint and the femur, along with its branches. This vessel is useful for the doppler imaging, ultrasound, arteriography, angiography and magnetic resonance imaging. Femoral arteriography is the main line for investigation in peripheral occlusive arterial diseases and in diagnosis of suspected congenital anomalies[3]. Anatomical variations of profunda femoris or deep femoris artery constitute a matter of great interest to anatomists, surgeons, and interventional radiologists, due to their significant clinical relevance[4].

During 14mm embryo stage, FA develops from the external iliac artery. The proximal segment of the axial artery persists as the inferior gluteal artery, and middle segment disappears after giving FA. Any anomaly during this stage of development may lead to variation in FA and related vessels[5]. Therefore, study of anatomical and embryological knowledge of branching pattern of FA is of great importance.

AIMS AND OBJECTIVES:

To study the site of origin of profunda femoris artery from femoral artery in the femoral region.

MATERIALS AND METHODS:

In the present study, among 50 properly embalmed and formalin fixed adult male and female human cadavers 100 femoral triangles were dissected in the lower extremities. The incision was given in the skin and was reflected to expose superficial fascia. The superficial inguinal lymph nodes, superficial lymph vessels and nerves were dissected by fine dissection. The fascia lata is reflected and femoral triangles were exposed. After identifying femoral sheath contents, profunda femoris artery and its branches were dissected and identified. Only the properly preserved and intact vessels were considered for study purpose. Damaged vessels, if any, were excluded in this procedure. The mode of origin of profunda femoris artery is observed and documented and the results were analysed.

RESULTS:

In the present study, 100 lower limbs were dissected and observed for the site of origin of PFA.

Table.1. Site of origin of Profunda femoris artery (PFA) from Femoral artery (FA)

S. No.	Site of Origin		No. of limbs (Right side)	No. of limbs (left side)	No. of limbs (bilateral)	Percentage
1	Posterolateral aspect		8	22	16	46
2	Posterior aspect		15	10	4	29
3	Lateral aspect		11	6	2	19
4	Posteromedial aspect		4	0	0	4
5	High	Beneath inguinal ligament	1	0	0	1
		Just below inguinal ligament	0	1	0	1
6	Total		39	39	22	100

The most common site of origin of PFA from FA is posterolateral in 46 (46%) and posterior in 29 (29%). In 11 (11%) cases, PFA originated from lateral aspect of FA. PFA originated from posteromedial aspect in 4(4%) cases. High origin of PFA is seen in 2 cases, 1(1%) in right limb (beneath Inguinal ligament) of one specimen and 1(1%) in left limb (just below Inguinal ligament) of another specimen.

DISCUSSION:

The knowledge of anatomy of femoral artery and its branches is important for various flap surgeries, iatrogenic AV fistulas, hip joint replacement and osteotomies. Variations in branching pattern of FA are important for diagnostic and therapeutic radiology, proximal thigh surgeries, because they cause variations in occurrence of atheroma. The profunda femoris artery, its branches and their variations are very helpful for interventional radiologists and vascular reconstructive procedures.

In the lower animals, the PFA is the branch of internal iliac artery. During course of evolution, the origin shifted distally from the femoral artery. Hence developmental arrest at different stages may lead to anatomical variations related to the division of femoral artery[6]. The development of the vasculature in the lower limb precedes the morphological and molecular changes that occur in the limb mesenchyme, hence vascular variations are more of a rule than an exception[7].

In the present study most common site of origin of PFA from FA is posterolateral in 46 (46%) and posterior in 29 (29%). In 11 (11%) cases, PFA originated from lateral aspect of FA. PFA originated from posteromedial aspect in 4(4%) cases. High origin of PFA is seen in 2 cases, 1(1%) in right limb (beneath Inguinal ligament) of one specimen and 1(1%) in left limb (just below Inguinal ligament) of another specimen.

Table. 2. Comparison of site of origin of PFA from FA with other studies

S. No.	Studies	Posterolateral (%)	Posterior (%)	Lateral (%)	Posteromedial (%)	Medial (%)	High origin (%)
1	VP Anjankar et.al	47.5	21.66	16.66	14.16	-	-
2	Prakash et.al	50	46.9	-	-	3.1	-
3	Pradeep R Chauhan et.al	52.95	37.25	9.8	-	-	-
4	Jayeeta Chakraborthy et.al	25.75	24.24	50	-	-	-
5	S. Elizabeth et.al	64	24	12	-	-	-
6	Sween et.al	6.25	29.16	62.5	-	2.08	-
7	Present study	46	29	19	4	-	2

VP Anjankar et.al[8], Prakash et.al[6], Pradeep R Chauhan et.al[9] found that most common site of origin of PFA is posterolateral in 47.5%, 50%, 52.95% respectively. The present study correlates with these studies, as most common site of origin of PFA from FA observed was posterolateral aspect in 46%.

According to Jayeeta Chakraborthy Moitra et.al[10], S. Elizabeth et.al[11], Sween et.al[12], common site of origin of PFA from FA was posterior – 24.24%, 24%, 29.16% respectively. In the present study, PFS originated from FA was found in 29 % specimens.

Site of origin of PFA in lateral aspect from FA was reported as 62.5% and 50% respectively by Sween Walia et.al[12], Jayeeta Chakraborthy moitra et.al[10]. In the present study, this was observed in 19% specimens.

CONCLUSION:

Although variations of PFA origin from FA may not affect the normal functioning of the body, the knowledge of variations helps clinicians to plan investigations, surgeries and avoid complications which are due to inadvertent injuries.

In the present study, posterolateral and posterior are the common sites of origin of PFA from FA followed by lateral site. Rare variation like posteromedial origin and high origin of PFA was observed.

Awareness of anatomical variations of origin of PFA from FA is informative for the radiologists to avoid the misinterpretations, during the preoperative vascular assessments.

REFERENCES:

1. Standring S. Gray's anatomy. The anatomical basis of the Clinical Practice. 40th edition. Spain: Churchill Livingstone Elsevier; 2008; 1380.
2. Savithri P. A rare variation of bifurcation of right femoral artery. International journal of anatomical variations. 2013; 6:4-6.
3. Dr. Marina Baptist, Dr. Tassaduq Hussain, Dr. Ferdose Sulthana: Anatomical variations; the origin of profunda femoris artery, its branches and diameter of the femoral artery. Professional Med J. Sep.2007, 14(3); 523-527.
4. Sabnis AS: Anatomical variations of profunda femoris artery J Clin Res Letters.2013,4: 54-56.
5. Kim DS, Kim SW, Lee HS, Byun KH, Choe MS. Rare vascular anomalies in the femoral triangle during varicose vein surgery. Korean J Thorac Cardiovasc Surg 2017;50:99.104.
6. Prakash, Jyotikumari, A. Kumar Bharadwaj, Betty Annajose, S. Kumaryadav, G. Singh: Variations in the origin of profunda femoris, medial and lateral femoral circumflex arteries. A cadaver study in the Indian population. Romanian Journal of Morphology and Embryology 2010: 1 (1): 167-170.
7. Keen JA, A study of the arterial variations in the limbs with special reference to symmetry of vascular patterns. Am J Anat. May 1961: 108(3): 245-61.
8. Vaibhav Prakash Anjankar, Pradnyesh N. Panshewdikar, Gourav Thakre, Uddhavmane, Vishal Tekale. Morphological study on branching pattern of femoral artery. A cadaveric study. Asian Journal of Biomedical and Pharmaceutical sciences; 04(28); 2014: 34-38.
9. Pradip R. Chauhan, Monika A Adhvaryu, Ashish J. Rathwa, Alpap Chauhan, Sanjay Chauda, Suresh P. Rathod. Study of profunda femoris artery of human cadavers in Rajkot city, India. Int. J. Anat Res 2015, Vol 3 (1): 873-77 ISSN 23214287.
10. Jayeeta Chakraborthy Moitra, Pooja Sitholay. Variation and branching pattern of Profunda femoris artery. Int. J. Med Res. Prof 2016; 2(3): 233-37.
11. S. Elizabeth Priyadarshini, S. Chitra. A study on the profunda femoris artery and its perforator branches. Int J Ana Res 2017, Vol.5(1): 3644-47.
12. Sween Walia, Bhavani Shankar Modi, Shikha Sharma, G.S. Bindra. Cadaveric study of variations in branching pattern of femoral artery and profunda femoris artery. Int J Anat Res 2016, Vol. 4(4): 3001-04.