Original Research Article

MORPHOLOGICAL STUDY OF ORIGIN OF PROFUNDA FEMORIS ARTERY IN HUMAN CADAVERS

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ABSTRACT

Background: Profunda femoris artery (PFA) is the largest and deep branch from the femoral artery. It is the chief blood supply to the extensor (anterior), flexor (posterior) and adductor (medial) compartments of thigh. It is also called as Deep femoral artery. It is useful for many invasive and non invasive procedures like Doppler, ultrasonography, digital subtraction angiography arteriography and magnetic resonance imaging etc.

Materials and methods: A total 10 embalmed formalin fixed cadavers (totally 20 lower limbs) allotted to the undergraduates of 2017-18 batch in the department of Anatomy, Tirunelveli Medical College, Tirunelveli is taken in the present study.

Results: In all the 20 lower limb specimens PFA was originated from the femoral artery except one. In one specimen PFA originated directly from external iliac artery as the bifurcation of external iliac artery. Relation of PFA with femoral artery was postero lateral in 65% and lateral in 35%. Distance between the point of origin of PFA and mid-inguinal point was between 3.47cm to 4.55cm in 90 %.

Conclusion: This study will be very helpful to the radiologists & surgeons to understand possible variations before planning different diagnostic and therapeutic interventions on the femoral artery and its branches.

KEY WORDS: Profunda femoral artery, Femoral artery and Mid-inguinal point.

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Access this Article online	Journal Information
Quick Response code DOI: 10.16965/ijar.2018.207	International Journal of Anatomy and Research ICV for 2016 90.30 ISSN (E) 2321-4287 ISSN (P) 2321-8967 https://www.ijmhr.org/ijar.htm DOI-Prefix: https://dx.doi.org/10.16965/ijar
	Article Information
	Received: 28 Mar 2018 Peer Review: 17 Mar 2018 Revised: None
	Accepted: 08 May 2018 Published (O): 05 Jun 2018 Published (P): 05 Jun 2018

INTRODUCTION

Profunda femoris artery (PFA) is the largest and deep branch from the femoral artery. It is the chief blood supply to the extensor (anterior), flexor (posterior) and adductor (medial) compartments of thigh. It is also called as Deep femoral artery.

Profunda femoris artery usually arises from the postero-lateral side of femoral artery. The origin of profunda femoris artery is about nearly

3.5cm from the mid-inguinal point (Mid -point between the anterior superior iliac spine and pubic symphysis). It leaves the femoral triangle by passing between pectines & adductor longus, then between the adductor longus and adductor brevis and then between the adductor longus and adductor magnus. Finally continuous as fourth perforating artery after piercing the adductor magnus. In the femoral triangle it gives medial circumflex femoral artery, lateral

circumflex femoral artery, muscular branches and perforating arteries.

It is useful for many invasive and non invasive procedures like Doppler, ultrasonography, digital subtraction angiography arteriography and magnetic resonance imaging etc. Its branches also form feeder arteries for many cutaneous and musculo-cutaneous flaps.

Objectives

The main objectives of this study is

- 1) To know the pattern of origin of profunda femoris artery.
- 2) To know the relation between the profunda femoris artery and femoral artery.
- 3) To know the distance between mid-inguinal point and the point of origin of PFA

MATERIALS AND METHODS

A total 10 embalmed formalin fixed cadavers (totally 20 lower limbs) allotted to the undergraduates of 2017-18 batch in the department of Anatomy, Tirunelveli Medical College, Tirumelveli is taken in the present study.

This study was conducted by the dissection method described in the Cunningham's Manual of Practical Anatomy. First skin was incised and reflected along with superficial fascia. Then deep fascia is reflected and femoral sheath was removed. Femoral artery along with femoral vein was dissected. Femoral vein was medial to femoral artery. Femoral artery traced proximally up to mid-inguinal point and branches of femoral artery including Profunda femoris artery also traced. The origin of profunda femoris artery and relation with femoral artery was studied. The distance between the mid-inguinal point to point of origin of profunda femoris artery was measured using digital vernier caliper.

RESULTS

Point of origin of PFA: In all the 20 lower limb specimens PFA was originated from the femoral artery except one. In one specimen PFA originated directly from external iliac artery as the bifurcation of external iliac artery.(Fig 1)

Position of the PFA in relation to Femoral artery: Table 1 shows the percentage of different positions of profunda femoris artery in relation with femoral artery. Out of 20 specimens,

in 13 specimens profunda femoris artery was poster-lateral to femoral artery and in remaining 7 specimens it was lateral to femoral artery. (Fig 2), (Fig 3)

Distance between the point of origin of PFA and mid-inguinal point: The table 2 shows the readings of all 20 specimens. Among the 20 lower limb specimens, in 18 specimens (90%) the distance between the point of origin of PFA and mid-inguinal point between 3.47cm to 4.55cm. Only two specimens (10%) having higher origin of PFA. In one specimen (5%) the distance between the point of origin of PFA and mid-inguinal point is 1.65cm. In only one specimen (5%) PFA is directly arises from external iliac artery.(Fig 4 & 5)

Fig. 1: Bifurcation of external iliac artery into femoral and PFA.

Table 1: Relation of PFA with femoral artery.

Position	No of Specimens (Out of 20)	Percentage
Postero-lateral	13	65%
Lateral	7	35%

Fig. 2: Postero-lateral Relation of PFA with femoral artery

Fig. 3: Lateral relation of PFA with femoral artery.

Table 2: Distance between origin of PFA & MIP (in cm).

No of Specimen	Distance between origin of PFA & MIP (in cm)
1	3.47
2	1.65
3	3.57
4	0
5	3.85
6	3.95
7	3.85
8	3.73
9	3.48
10	4.4
11	4.55
12	3.62
13	3.75
14	3.95
15	4.25
16	4.05
17	4.1
18	4.2
19	4.3
20	3.5

Fig. 4 & 5: The distance between the origin of PFA and mid-inguinal point-By Using vernier calliper.

DISCUSSION

Point of origin of PFA: In all the studies, the profunda femoris artery arises from the femoral artery. But in this study out of 20 specimen, in one specimen profunda femoris arose from external iliac artery (Bifurcation of External iliac artery)

Table 3: Position of the PFA in relation to Femoral artery:

S.no	Name of the study	Year	Relation of PFA to FA
1	Dixit et al [4]	2001	Postero lateral
2	Keith Moore [6]	2006	Lateral or Postero lateral
3	Susen Grey [10]	2008	Postero lateral
4	Richerd Snell [9]	2008	Lateral
5	MB Samarawickrama et al [5]	2009	Posterior
6	Nachiket Shankar Roopa R et al [7]	2009	Postero lateral
7	Brijesh R et al [2]	2015	Postero lateral
8	Ashwin et al [1]	2017	Postero lateral
9	Present study	2018	Postero lateral

Most of the above studies, PFA is postero lateral to femoral artery. This study also correlated with the above study and PFA is postero lateral to FA.

Distance between the point of origin of PFA and mid-inguinal point: According to Susen Grey and Richerd Snell [9,10], the distance between the origin of PFA and MIP is 3.5 cm to

4 cm. In many cases, deviation was noted where PFA originated above or below this point. In the present study, 90% specimens the distance between the origin of PFA and MIP was between 3.47cm to 4.55cm and 10% specimens having higher origin of PFA ie 0 -1.65cm. ⁴Dixit et al 2001, studied that the low origin was found in only one limb and the range was 7.7-8.8cm. In Brijesh R et al (2015) [2] only 2 right limbs showed where PFA originated at a lower level and distance was 7.1-8.0cm. MB Samarawickrama et al [5] study the level of origin of the profunda femoris was varying from 3.0 to 7.0cm from the mid point of the inguinal ligament.

CONCLUSION

Sound anatomical and embryological knowledge of branching pattern of femoral artery is important while performing clinical procedures in femoral region such as catheterization, surgical intervention of embolism, angiography, colour Doppler flow imaging, repair of femoral hernia, musculocutaneous flaps, and vascular reconstructive surgeries. This study will be very helpful to the radiologists & surgeons to understand possible variations before planning different diagnostic and therapeutic interventions on the femoral artery and its branches.

ABBREVIATIONS

PFA – Profunda femoris artery

FA – Femoral artery

MIP – Mid- Inguinal Point

Conflicts of Interests: None

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How to cite this article:

G.A.Jos Hemalatha, K. Arumugam. MORPHOLOGICAL STUDY OF ORIGIN OF PROFUNDA FEMORIS ARTERY IN HUMAN CADAVERS. Int J Anat Res 2018;6(2.3):5360-5363. DOI: 10.16965/ijar.2018.207