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A CADAVERIC STUDY ON ANATOMICAL VARIATIONS IN THE FEMORAL ARTERY AND ITS BRANCHES AT RNT MEDICAL COLLEGE

Anatomy

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ABSTRACT

Introduction: The femoral artery is a continuation of the external iliac artery.A good knowledge of vertical topography and significant patterns might aid in avoiding arterial damages during robotic and laparoscopic surgery. This is equally important for interventional radiologists during catheterizations, as well as for vascular surgeons, oncologists, and anatomists. **Methodology:** 46 formalin fixed limbs were dissected in Dissection Hall, Department of Anatomy, RNT Medical College, Udaipur, Rajasthan. **Results:** In our present study type 1 pattern was seen in 80.43%, type 2 pattern is seen in 15.21%, type 3 pattern is seen in 2.17% of cases. The range of DMP is in between (30 -50) mm. and the mean is 3.72. The superficial external pudendal artery was posterior to the arch of the great saphenous vein in 6.52% of cases. The deep external pudendal in 8.69% of cases, passes below the great saphenous vein. The origin of the femoral artery coincided with the mid-inguinal point in most of the cases (58.69%) **Conclusion:** The origin of the femoral artery to the mid-inguinal point have been observed. The femoral artery has a complex variation in its origin, relationship with the arch of the great saphenous vein, and branching patterns. Since branches of PFA involved in extensive anastomosis around the hip joint, which play an important role in providing alternative pathways, thereby helping surgeons to pick it for replacement surgeries for arteries like the coronary artery, the aorta, and the popliteal artery .The present study will be useful for surgeons as it provides guidance before surgical interventions, as much data is not available from southern Rajasthan on anatomical variations of the femoral artery and its branches.

KEYWORDS

INTRODUCTION

The femoral artery is a continuation of the external iliac artery. It begins behind the inguinal ligament, at the midinguinal point, i.e, midway between the anterior superior iliac spine and the pubic symphysis, and descends along the anteromedial part of the thigh in the femoral triangleThe femoral artery gives off several branches in the femoral triangle, including the superficial epigastric, superficial circumflex iliac, superficial external pudendal, deep external pudendal, and profunda femoris artery. It gives off muscular branches and the descending genicular artery within the adductor canal.

The profunda femoris artery is the largest and deep branch of the femoral artery that arises postero-laterally from the femoral artery about 3 - 3.5 cm distal to the inguinal ligament. It descends in the femoral triangle at first lateral to the femoral vessels lying on psoas, iliacus, and pectineus up to the upper border of the adductor longus, and it then passes behind the adductor longus that separates it from the femoral artery. It then descends on adductor brevis and magnus and goes back of the thigh as the 4th perforating artery through the 4th osseoaponeurotic opening at the insertion of adductor magnus and anastomoses with the upper muscular branches of the popliteal artery. This terminal part is sometimes named the fourth perforating artery.

The profunda femoris artery gives off the lateral and medial circumflex arteries, perforating arteries and muscular branches.The descending genicular artery, the distal branch of the femoral artery, arises just proximal to the adductor opening and immediately supplies a saphenous branch.

AIMS AND OBJECTIVES

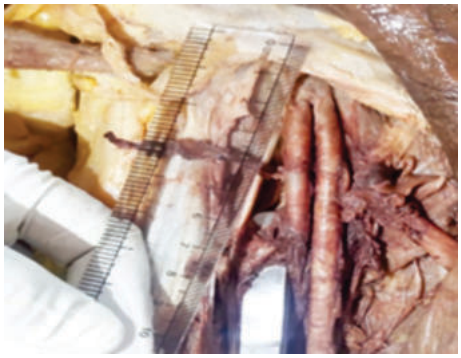
1. To study the variations in origin, course, and branching pattern of the femoral artery in cadavers.
2. To study the clinical importance of anatomical variations in the branching pattern of the femoral artery.

MATERIALS AND METHODS

1. Study Type- Observational study
2. Study Design- Descriptive cross-sectional study design
3. Study Setting- Dissection Hall, Department of Anatomy set up under R.N.T. Medical College, Udaipur, Rajasthan.
4. Sample Size- 46 formalin-fixed limbs (from 23 cadavers)
5. Study Subjects- Inclusion Criteria- Embalmed Cadavers without any external visible injuries and scar marks. **Exclusion Criteria-** 1. Cadavers where embalming is from the femoral artery.2. Cadavers with any pathology of lower limbs.

OBSERVATIONS AND RESULTS

Photograph – 1 Measuring disatance between anterior superior iliac spine and pubic symphysis showing that femoral artery arises from the midpoint distance.profunda femoris branch arising from medial aspect of femoral artery.



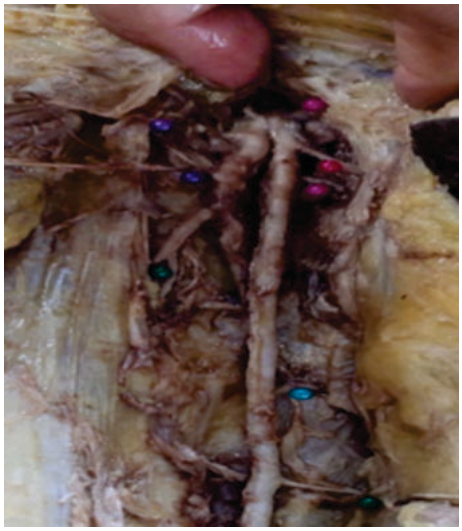
Photograph- 2 Higher origin of profunda femoris from femoral artery when measured from inguinal ligament

Table 1: Origin of profunda femoris from femoral artery

ASPECT OF ORIGIN OF PFA FROM FA	NO. OF CASES	PERCENTAGE
LATERAL	15	32.56%
POSTEROLATERAL	3	6.52%
POSTERIOR	26	56.52%
MEDIAL	1	2.173%
ABSENT	1	2.173%

Photograph- 3 profunda femoris artery is absent and all branches arising from femoral artery.

Photograph- 4 Profunda femoris artery arising just beneath inguinal ligament and lateral circumflex femoral artery arising from femoral artery



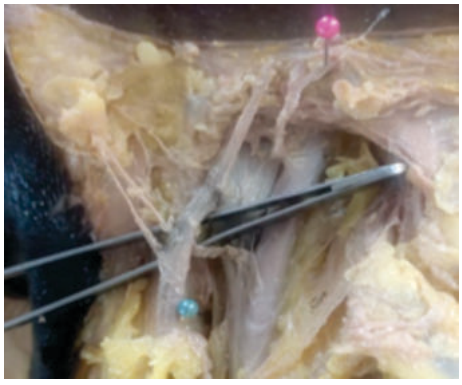
Photograph- 5 Additional branches arising near deep external pudendal artery

PARAMETER	NO. OF SPECIMENS	PERCENTAGE
BOTH LCFA AND MCFA FROM FA	1	2.17%
LCFA FROM PFA	38	82.60%
MCFA FROM P FA	42	91.30%
MCFA ABSENT	1	2.17%
LCFA FROM FA	3	6.52
MCFA FROM FA	2	4.34%
LCFA FROM BOTH FA &PFA	4	8.69%

Photograph- 6 lateral circumflex arising from femoral and profunda femoris and making anastosmosis in femoral triangle

Photograph- 7 Lateral circumflex femoral artery arising from the femoral artery

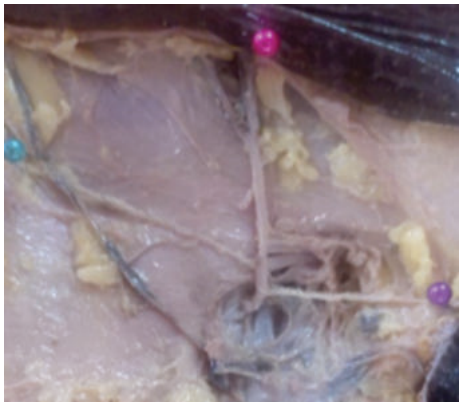
Photograph- 8 Deep circumflex arising from femoral artery which is a branch of external iliac artery and deep external pudendal artery arising from profunda femoris.



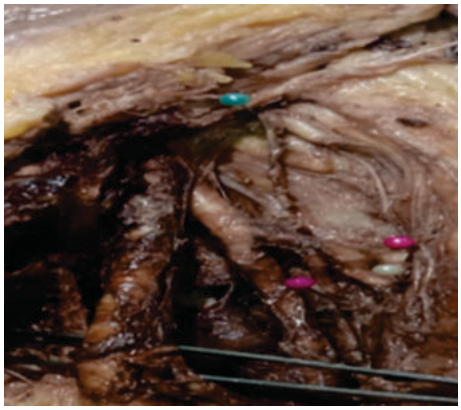
Photograph- 9 Superficial external pudendal artery passing below great saphenous vein.

Photograph- 10 Superficial external circumflex femoral artery and superficial epigastric artery have common trunk and superficial external pudendal artery passes below great saphenous vein

Photograph- 11 Deep external pudendal artery passes below great saphenous vein



Photograph- 12 Common trunk of all three superficial branches of femoral artery.



Photograph- 13 Superficial epigastric artery arising from profunda femoris artery instead of femoral artery

Photograph- 14 Superficial circumflex artery and superficial epigastric artery having common origin

DISCUSSION Classification Pattern[28]**:**

Type 1 Pattern- **(a)** Lateral circumflex is branched distal to medial circumflex, & medial circumflex is arising from Profunda femoris.

(b) Medial circumflex is branched distal to Lateral circumflex & Profunda femoris, Medial circumflex are arising as a common trunk from the Femoral artery.

(c) Lateral circumflex is branched at the same level as the medial circumflex

Type 2 Pattern- **(a)** Profunda femoris, Lateral circumflex are arising as a common trunk from the femoral artery & Medial circumflex is arising as an individual branch from the Femoral artery

(b) Pattern- Medial circumflex arises from Profunda femoris & Lateral circumflex arises from femoral artery.

Type 3 Pattern- **(a)**Medial circumflex & Lateral circumflex both are arising from the Femoral artery.

Authors name	No. of limb (observed)	Type 1 (%of limbs)	Type2 (%of limbs)	Type3 (%of limbs)
Videu et al3, (1964)	70	60%	38.6%	1.5%
Marcade Etal,4 (1978)	100	66%	14%	20%
Guillot et al5, (1979)	90	63.3%	33.3%	1.1%
Massoud &fletcher etal6 (1997)	188	83.8%	9.2%	6.6%
Vasanti &raoet al28(2019)	50	76%	20%	4%
Vishal k et al18 (2014)	48	56.2%	39.65%	4.2%
Present study	46	80.43%	15.21%	2.17%

S.No	Study	Distance of origin of pfa from mip in cms
1	Vuksanovic BA et al10 (2007)	3.5
2	Dixit et al7	4.75
3	Prakash et al14	4.2
4	Pretty rathnakar et al22 (2016)	4.33

5	Ashwini et al25	6.02
6	Present study	3.72

SUMMARY AND CONCLUSION

I hereby conclude that the femoral artery has a complex variation in its origin, relationship with the arch of the great saphenous vein, and branching patterns. I hope that this study of the branching pattern and surgical anatomy of the femoral artery will be useful to cardiologists, radiologists, plastic surgeons, and vascular surgeons in the future.

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