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Anatomical Variations of Medial Circumflex Femoral Artery: A Cadaveric Study

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Abstract

Introduction: The Profunda femoris artery is a large branch that arises from the lateral or posterolateral part of the femoral artery, about 3 to 5cm below the inguinal ligament. Profunda femoris artery [1,2,4] gives Medial circumflex femoral artery, Lateral circumflex femoral artery, and Perforating arteries and muscular branches. Medial circumflex femoral artery (MCFA) originates from the posteromedial aspect of the Profunda but may originate from the femoral artery. It gives three branches ascending and transverse, acetabular branches. **Methods:** The present observational study was conducted on the dissection of 70 lower limbs of 35 adult cadavers (27 male & 8 female). Contents of the femoral triangle were dissected as per Cunningham's manual. The source of origin distance of the origin of MCFA was noted. Collected data were analyzed statistically. **Results:** In the present study, MCFA from the P.F.A. in 85.71% (60/70) in both Right and Left lower limbs. The common source of Right MCFA from the Femoral Artery followed by a common stem with P.F.A. The following common source of Lt MCFA as a common stem with P.F.A. Distance of origin of MCFA from the P.F.A. was seen between 1-2cm in 34.29% of Right and 28.5% of Left Limbs in the present study. **Conclusions:** In most limbs (60/70 limbs), the MCFA was taking origin from P.F.A. in both Right & Left limbs (85.72%). Distance of origin of MCFA from the P.F.A. was seen between 1-2cm in 34.29% of Right and 28.5% of Left Limbs in the present study.

KEYWORDS: Tissue Diagnosis; GeneXpert; Culture; HMedial Circumflex femoral artery, Origin, Distance, Profunda femoris artery

Introduction

The Profunda Femoris Artery (Deep Femoral Artery) [1,2,3] is a large branch that arises from the lateral or posterolateral part of the Femoral Artery, about 3 to 5cm below the inguinal ligament.

Profunda femoris artery [1.2,4] gives Medial circumflex femoral artery, Lateral circumflex femoral artery, and Perforating arteries and muscular branches. It is the main blood supply to most of the muscles and skin of the thigh.

Medial circumflex femoral artery (MCFA): Originates from the posteromedial aspect of the profunda but may originate from the femoral artery. It supplies the adductor muscles and curves medially around the femur between the pectineus and psoas major and then obturator externus and adductor brevis, finally appearing between quadrates femoris and the upper border of adductor magnus, and divide into two branches ascending and transverse branches

Ascending branch: Ascends on the tendon of obturator externus, anterior to the quadrates femoris, to the trochanteric fossa, where it forms trochanteric anastomoses with the branches of the inferior gluteal and lateral circumflex femoral arteries.

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An acetabular branch given at the proximal edge of the adductor brevis enters the hip joint under the transverse acetabular ligament & supplies the fat in the fossa and reaches the femoral head along its ligament.

Transverse branch: Emerges from the upper border of adductor magnus and takes part in cruciate anastomoses.

Precise knowledge of the anatomy of MCFA is essential while performing both trochanteric and intertrochanteric osteotomies as it is also helpful to avoid iatrogenic avascular necrosis of the head of the femur in reconstructive surgery of the hip and fixation of acetabular fractures through the posterior approach [5]

Objectives: To study the anatomical variations of MCFA in source of origin, site of origin of MCFA.

Material And Methodology

Study design: An observational study

Ethics approval: The study was approved by the institutional ethics committee of our institute (Ref No ,PMRIMS/2021/Office/IEC/112)

Locus of study: Department of Anatomy S.V.S Medical College, MahabubNagar

Time frame: 2 Years

Sample size: The present observational study was conducted on the dissection of 70 lower limbs of 35 adult cadavers (27 male & 8 female).

Methodology: Contents of the femoral triangle were dissected by giving the following incisions.

Incisions:

Incision I: From anterior superior iliac spine to the public tubercle.

Incision II: A transverse incision at the junction of the middle third and lower 1/3rdof thigh.

Incision III: A vertical incision from the midpoint of incision I downwards to the middle of incision II and downwards to the knee.

Skin, superficial fascia, deep fascia was reflected, femoral vessels and P.F.A. were exposed by opening the femoral sheath. The following observations are made and recorded after dissecting and exposing the profunda femoris artery and its branches. The pattern of branches, source of origin, and level of origin of the Medial circumflex artery were noted. Collected data were analyzed statistically.

Results

The present study was conducted on 70 lower limbs of 35 adult cadavers. (27 male & 8 female) in the department of Anatomy. The following observations were noted, as shown in table no-1.

Table 1. Source of origin of MCFA on right and left side

Source of origin of MCFA	Right lower Limb (n=35)	Left lower Limb (n=35)	Both lower Limbs (N=70)
	n (%)	n (%)	N (%)
PFA	30 (85.7)	30 (85.7)	60(85.7)
Directly from femoral	2 (5.7)	0	2 (2.9)
From FA common with PFA	3 (8.6)	3 (8.6)	6 (8.6)
Common with PFA and LCFA	0	2 (5.7)	2 (2.9)

Source of origin of MCFA: In the majority of limbs (60/70 limbs), the MCFA was taking origin from P.F.A. in both Right & Left limbs (85.72%) [Figure -1]. Next common origin from F.A. as a common trunk with P.F.A. in 6 (3 Right & Left) lower limbs (8.57%) [Figure-2] followed by origin directly from F.A. in 2 Right (2.86%) limbs [Figure-3]. MCFA taking origin common with P.F.A. & LCFA only in 2 left limbs (2.86%) [Figure-4] as shown in Table no-1

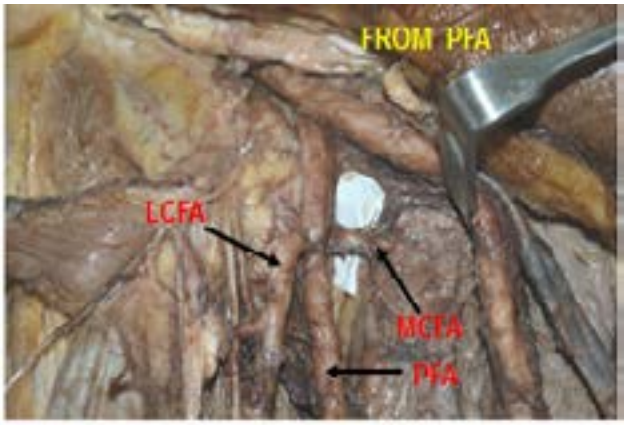

Fig 1: Source of origin of MCFA from P.F.A. (Right limb)

Fig 2. Source of origin of MCFA common stem of P.F.A. & MCFA (Left limb)

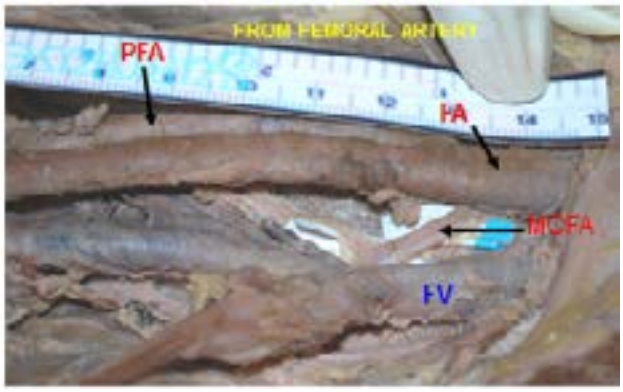

Fig 3. Source of origin of MCFA from F.A. (Left limb)

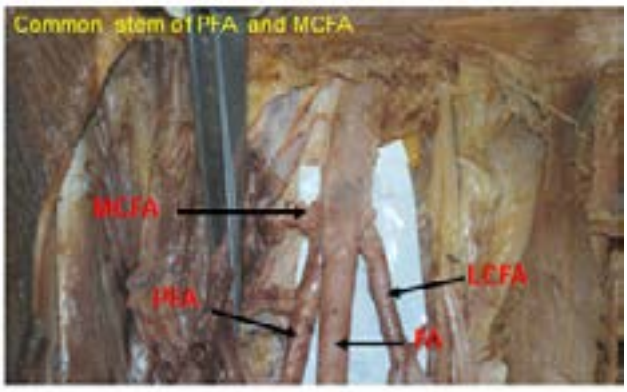

Fig 4. Source of origin of MCFA common with P.F.A. & LCFA (Left limb)

Table 2. Distance of origin of MCFA from that of P.F.A. on right and left side

Distance range (mm)	Right lower Limb (n=35)	Left lower Limb (n=35)	Both lower Limbs(N=70)
0	3(8.6)	5 (14.3)	8 (11.4)
01-10	9 (25.7)	14 (40)	23 (32.9)
11-20	12 (34.3)	10 (28.6)	22 (31.4)
21-30	2 (5.71)	3 (8.6)	5 (7.1)
31-40	5 (14.3)	0	5 (7.1)
41-50	4 (11.4)	3 (8.6)	7 (10)

MCFA was mostly taking origin from P.F.A. and at the distance of 1-2cms in 12 Right limbs (34.29%), next common was within 1cm in 9 limbs (25.71%).

MCFA was mostly taking origin from P.F.A., and within 1cm in 14 Left limbs (40%), next common was at 1-2cms in 10 limbs (28.57%).

In the present study, MCFA was mostly taking origin from P.F.A. and at a distance of less than 1cm in 23 limbs (32.86%), at 1-2cms in 22 limbs (31.43%), beyond 3cms in 17 limbs (24.28%) only.

Discussion

Knowledge of the dispositions of the P.F.A. and circumflex femoral arteries and their variations, the awareness of which is of great help and practical importance while doing any procedures in the femoral triangle and harvesting the flaps from the thigh to avoid unexpected injuries to vessels or flap necrosis.

Source of origin of Rt MCFA from P.F.A. in the majority of limbs 85.7% (30/35 LL) in the present study. Our findings were higher compared to other studies were done by Smith et al. (63%)[6], Daksha et al. (56%) [7], and Dixit et al. (50%)[8].

In the present study, Right MCFA was taking origin directly from Femoral Artery only in 5.71% L.L. These results were lower than studies done by Smith et al. (26%)[6], Daksha et al. (18.4%) [7].

We observed that the Right MCFA was taking origin as a common stem with P.F.A. in 8.5% L.L. in our study compared to 16.6% of Daksha et al. [7].

Left MCFA was taking origin from P.F.A. in most limbs 85.7% (30/35 LL) in the present study. Our findings were higher compared to other studies done by Dixit and Mehta et al. (75%) [8], Daksha et al. (66.7%)[7].

Left MCFA in the present study was not taking origin from the femoral artery even in a single case. In the present study, Lt, MCFA was taking origin as a common stem with P.F.A. in 8.57% L.L. and as a common stem with P.F.A. & LCFA in 5.7% totaling to 14%, these findings were like the results of Daksha et al. (14%) [7].

Distance of origin of Right MCFA from the P.F.A. was seen between 1-2cm in 34.29% of Limbs in the present study. These findings were close to that of studies done by Marina et al. (30%)[9], Dixit et al. (29.2%)[8].

In the present study, the distance of the origin of Lt MCFA from the P.F.A. was seen between 1-2cm in 28.5% of lower limbs. These findings were consistent with that of studies were done by Dixit et al. (29.2%) [8], Daksha et al. (26.3%) [7].

Conclusion

In the present study origin of MCFA from the P.F.A. in 85.71% (60/70) in both Right and Left lower limbs. The following common source of Right MCFA from the Femoral Artery followed by a common stem with P.F.A. Next common source of Lt MCFA as a common stem with P.F.A.

Distance of origin of MCFA from the P.F.A. was seen between 1-2cm in 34.29% of Right and 28.5% of Left Limbs in the present study.

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