Original Article

Numerical Variation in the Branches of the Lateral Circumflex Femoral Artery: Cadaveric Research

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ABSTRACT

Background: The lateral circumflex femoral artery (LCF) is the major blood supply the thigh. It divides in ascending, transverse and descending branches. Knowledge of the branches of LCF is important in the anterolateral surgical flap from the thigh for skin grafting.

Aim: This study was conducted to study the numerical variation in the branching pattern of the lateral circumflex femoral artery.

Materials and Methods: 50 extremities from 25 cadavers (18 Male and 7 Females) were dissected. Lateral circumflex femoral artery and its branches were identified, dissected and studied for numerical variation in the branches.

Results:10 types of numerical branching pattern were found in the present study. Descending pattern had the maximum type of variety. Transverse branches show minimum variations. Most common type (46%) of numerical variety in branches was one ascending, one transvers and one descending branch.

Conclusion: Numerical branching pattern of the Lateral circumflex femoral artery show extensive variations. These variations in the branching pattern must be considered during skin grafting and other clinical interventions.

Key words: Lateral circumflex femoral artery, branching pattern, ascending branch, transverse branch

INTRODUCTION

The lateral circumflex femoral artery is the major artery of the profunda femoris artery. It passes laterally between the two divisions of the femoral nerve and divides into ascending, transverse and descending branches [1].

Ascending branch is generally one in number and participates in the trochanteric anastomosis. Transverse branch send limbs in the cruciate anastomosis. The twig from the descending branch takes part in the anastomosis around the knee joint [1, 2]. Lateral circumflex artery is the major deep arterial supply of the thigh [3]. Lateral circumflex artery branches vary extensively. This study was conducted the various branching pattern of the lateral circumflex femoral artery.

Aims: Present study was conducted with aim to study the numerical variation in the branches of the Lateral Circumflex Femoral artery. For aims objectives were as follows:

1. Identification of the Lateral Circumflex Femoral artery and its branches
2. Calculation the number of ascending, transverse and descending branches
3. Categorizing the pattern of the branches.

MATERIAL AND METHODS

This cross sectional study was conducted at Pandit Dindayal Upadhyay Government Medical College, Rajkot, Gujarat (India) during 2011 to 2013. 50 human femoral triangles from 25 (18 male and 07 female) human cadavers in P.D.U. Government Medical College, Rajkot were dissected. Lateral circumflex femoral artery and its branches were identified and traced on the basis of their course and relations. Ascending, transverse and descending branches of the Lateral circumflex femoral artery were traced, their number were calculated. Only the branches originating from the lateral circumflex femoral artery directly were included.

Data was collected in pretested form and analyzed for the variation in the branching pattern of the Lateral circumflex femoral artery by standard statistical formulas with the help of Microsoft excel 2013 and Epi info 7 [TM] software.

RESULTS AND DISCUSSION

50 lower limbs were dissected carefully 10 type of variation were noted. 11 cadavers had same type of branching pattern on both sides of lower limbs; while remaining 14 (10 male and 4 female) cadavers had different type of branching pattern on both limbs.

Side wise variation pattern [Table 1]: Right side 9 type and left side 7 type variations were noted. 14 out of 25 cadavers had nonmatching numerical branching pattern between two limbs. Most frequent (46%) numerical pattern was ascending (1), transverse (1) and descending (1).

Not a single left limb show ascending branch more than 1 in number; while one right limb had two ascending branches.

Table 1: Side wise variation in the number of branches of lateral circumflex artery

Name and Number of branches			Frequency	
Ascen-ding	Transverse	Descen-ding	Right side (n=25)	Left side (n=25)
0	1	1	2 (8.0%)	1 (4.00%)
1	1	1	11 (44.0%)	12 (48.00%)
1	1	2	5 (20.0%)	5 (20.00%)
1	1	>2	2 (8.00%)	4 (16.00%)
1	2	1	1 (4.00%)	1 (4.00%)
1	2	2	0 (0.00%)	1 (4.00%)
1	2	>2	1 (4.00%)	1 (4.00%)
2	1	>2	1 (4.00%)	0 (0.00%)
0	1	1	1 (4.00%)	0 (0.00%)
1	2	0	1 (0.00%)	0 (0.00%)
Total type variation in number of branches			9	7

Gender wise variation pattern [Table 2]: Both male and female had 8 type variety of branching pattern. Most common numerical pattern was ascending (1), transvers (1) and descending (1) pattern both in males and females. Out 36 male extremities not a single extremity had more than one ascending branch, while in one female extremity had two ascending branches.

Table 2: Sex wise variation in the number of branches of lateral circumflex artery

Name and Number of branches			Sex	
Ascen-ding	Transverse	Descen-ding	Male (n=36)	Female (n=14)
0	1	1	2 (5.55%)	1 (7.14%)
1	1	1	19 (52.78%)	4 (28.58%)
1	1	2	6 (16.66%)	4 (28.58%)
1	1	>2	5 (13.88%)	1 (7.14%)
1	2	1	1 (2.77%)	1 (7.14%)
1	2	2	0 (0.00%)	1 (7.14%)
1	2	>2	1 (2.77%)	1 (7.14%)
2	1	>2	0 (0.00%)	1 (7.14%)
0	1	1	1 (2.77%)	0 (0.00%)
1	2	0	1 (2.77%)	0 (0.00%)
Total type variation in number of branches			8	8

2[nd] most frequent variety was ascending (1), transvers (1) and descending (2) pattern [Table 1, 2; Image 1]. 9 out of 50 extremities had more than 2 descending branches [Image 2]. In of the right side male extremity no descending branch was originating from the Lateral Circumflex femoral artery, instead multiple descending branches originated directly from the profunda femoris artery.

Figure 1: lateral circumflex femoral artery dividing in one ascending, one transverse and two descending branches

IMAGE: LATERAL CIRCUMFLEX ARTERY DIVIDING IN ONE ASCENDING, ONE TRANSVERSE AND TWO DESCENDING BRANCHES.
1: FEMORAL ARTERY, 2: PROFUNDA FEMORIS ARTERY, 3: SUPERFICIAL FEMORAL ARTERY, 4: LATERAL CIRCUMFLEX ARTERY, 5a AND 5b: DESCENDING BRANCHES, 6: TRANSVERSE AND 7: ASCENDIGN BRANCHES OF LATERAL CIRCUMFLEX FEMORAL ARTERY

Out of three types of branches the descending branches had highest variety in number. Numbers

of descending branches were variable (1, 2, 3 or more, Image 1 and Image 2). Transverse branch was most consistent and least variable in number.

Figure 2: Multiple descending branches directly from the profunda femoris artery along with the origin of the LCF

IMAGE: MULITPLE DESCENDIG BRANCHES DIRECTLY FORM THE PROFUNDA FEMORIS ARTERY ALONG WITH ORIGIN OF THE LATERAL CIRCUMFLEX FEMORAL ARTERY
1: FEMORAL ARTERY, 2; PROFUNDA FEMORIS ARTERY, 3: LATERAL CIRCUMFLEX FEMORAL ARTERY, 4: ASCENDING BRANCH, 5: TRANSVERSE BRANCH; 6a, 6b AND 6c DESCENDIG BRANCHES OF THE LATERAL CIRCUMFLEX FEMORAL ARTERY.

In the present study one male right extremity and one male left extremity had double LCF origin from the profunda femoris artery; such type of variation are reported by Atulya et al. (2013). In one right side male extremity ascending branch had origin from the profunda femoris; lateral circumflex divided only in transverse and descending branch.

Agrawal S et al (2014) reported a case with variation in the branch of LCF [5]. Yamashita Y et al (2005), reported variations in the descending branch of LCF in angiographic study [6]. Various other studies had reported variations in the origin of the Lateral circumflex femoral artery [7-12] but study of the branching pattern of the lateral circumflex femoral artery are very less.

CONCLUSION

Branches of the lateral circumflex femoral have critical role in anterolateral surgical flap for skin grafting. Present study report extensive variation in the branching pattern in the LCF branches that is considerable in various skin grafting.

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