

Superficial External Pudendal Artery in Femoral Triangle-A Cadaveric Study

MAHESHWARI MYAGERI, BHAVYA BANGALORE SURESH, MANIKYA RAMESH

ABSTRACT

Introduction: The femoral artery is the main artery of lower limb. Superficial external pudendal artery is superficial branch of femoral artery. The importance of the superficial external pudendal artery in cases of lower limb obstructive arteriopathies has been established and perfect knowledge of its anatomy is desirable for the creation of successful flaps involving it.

Aim: To know the origin of superficial external pudendal artery and its distance of origin from midinguinal point and side of origin of superficial external pudendal artery in femoral triangle.

Materials and Methods: Forty lower limbs from embalmed cadavers allotted for dissection to the MBBS students were dissected. The inguinal region of all lower limbs was exposed. After refracting skin at inguinal region, Femoral

artery and its superficial branch- Superficial external pudendal artery was traced in femoral triangle.

Results: Superficial external pudendal artery originated from femoral artery in 27 specimens, by a common trunk with superficial epigastric artery in five specimens and by a common trunk with both superficial epigastric artery and superficial circumflex iliac artery in eight specimens. The distance of origin from the midinguinal point was within 3 cm in 37 specimens and between 3.1 – 6 cm in three specimens. The superficial external pudendal artery arises from medial side in 32 specimens, from anterior side in seven specimens and anteromedial side in one specimen.

Conclusion: The present study is important for surgeons as it provides knowledge about the anatomy and variations of superficial external pudendal artery to achieve best results in surgeries.

Keywords: Femoral artery, Penile reconstruction, Reconstructive flap, Vulvar reconstruction

INTRODUCTION

The superficial external pudendal artery arises medially from the femoral artery close to the preceding branches. Emerging from the cribriform fascia, it passes medially, usually deep to the long saphenous vein across the spermatic cord (or round ligament) to supply the lower abdominal, penile and scrotal or labial skin, anastomosing with branches of the internal pudendal artery [1]. The anatomical knowledge of superficial external pudendal artery is very important for the creation of successful flaps involving it and one of the most challenging reconstructive surgeries is of defect of groin and perineum. The suprapubic axial pattern flap is used for reconstruction of such defects is based on vascularisation from superficial external pudendal artery [2-4]. Since the knowledge of this is insufficient and not many studies were found in Karnataka population, therefore the present study was conducted to know the origin of superficial external pudendal artery and to know the distance of origin from mid-inguinal point, side of origin of superficial external pudendal artery in femoral triangle.

MATERIALS AND METHODS

The specimens for the study were obtained from the Department of Anatomy, JJM Medical college, Davangere. Ethical committee approval was taken for the study. Requisite consent had been obtained from Head of the Department to conduct this study. Forty lower limbs among which 36 were male and four female with age varying from 50 years to 65 years, were procured from the department of Anatomy during the course of study over a period of two years – August 2011 to August 2013. All cadavers available during the period of study were included. Deformed or traumatized lower extremities and femoral artery used for embalming were excluded from the study. Dissection of femoral artery and superficial external pudendal artery was carried out in femoral triangle. Incision was taken on skin from pubic tubercle to anterior superior iliac spine. Another incision from pubic tubercle and downwards vertically to adductor tubercle. Transverse incision from adductor tubercle to lateral side of thigh was done and skin flap was reflected laterally. The superficial fascia and lymph nodes were cleared and superficial branch of femoral artery- superficial external pudendal artery was identified and cleaned.

Site of origin, distance of origin from mid-inguinal point and side of origin were noted. The variations of superficial external pudendal artery were noted [5]. Photograph of each specimen was taken after dissection. The results were expressed in terms of percentage and numbers.

RESULTS

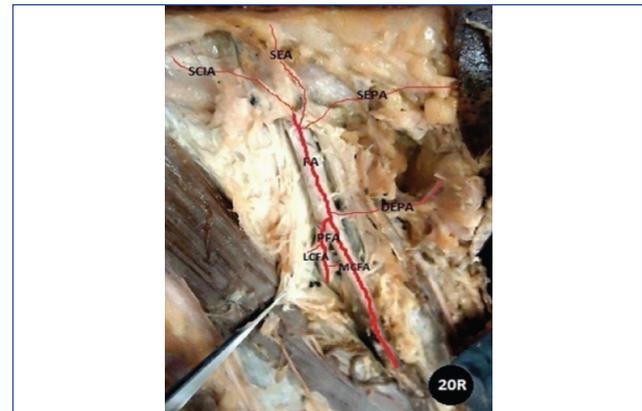
In the present study, superficial external pudendal artery was found to arise from Femoral Artery (FA) as a separate branch in 27 specimens (67.5%), from femoral artery by a Common Trunk (CT) with Superficial Epigastric Artery (SEA) in 5 specimens (12.5%) and by a common trunk with both Superficial epigastric artery and Superficial Circumflex Iliac Artery (SCIA) in 8 specimens (20%) [Table/Fig-1,2]. Superficial external pudendal artery originated at medial side of femoral artery in 32 specimens (80%), at anterior side of femoral

artery in 7 specimens (17.5%) and at anteromedial side in 1 specimen (2.5%) [Table/Fig-3,4]. They all pierced the fascia of thigh and passed towards pubic symphysis. The distance of origin from the mid-inguinal point ranges from 0.5 – 5.5 cm. It arose within 3 cm in 37 specimens (92.5%) and between 3.1 to 6 cm in 3 specimens (7.5%) [Table/Fig-5,6].

Origin	No. of specimens	Percentage
FA	27	67.5 %
FA by CT with SEA	5	12.5 %
FA by CT with SEA+SCIA	8	20 %
Total	40	100%

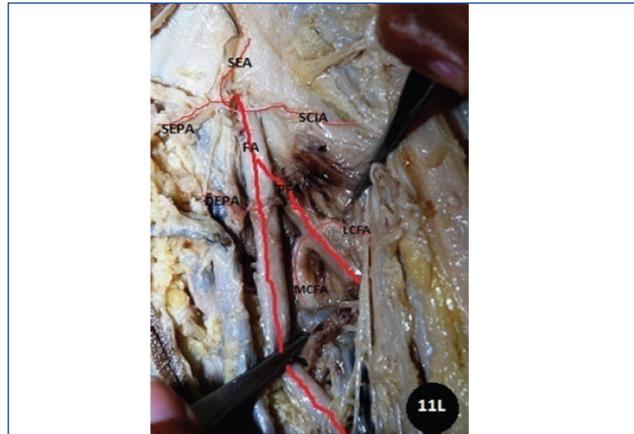
[Table/Fig-1]: Origin of superficial external pudendal artery.

FA : Femoral Artery; CT: Common Trunk; SEA : Superficial Epigastric Artery; SCIA: Superficial Circumflex Iliac Artery



[Table/Fig-4]: Showing common trunk for SCIA, SEA & SEPA originating from anteromedial side of FA at 1.5 cm from midinguinal point.

FA: Femoral Artery; SEA : Superficial Epigastric Artery; SCIA: Superficial Circumflex Iliac Artery; SEPA: Superficial External Pudendal Artery; LCFA: Lateral Circumflex Femoral Artery; MCFA: Medial Circumflex Femoral Artery; DEPA: Deep External Pudendal Artery; PFA : Profunda Femoris Artery



[Table/Fig-2]: Showing common trunk for SCIA, SEA & SEPA originating from FA, on its medial side at 2cm from midinguinal point.

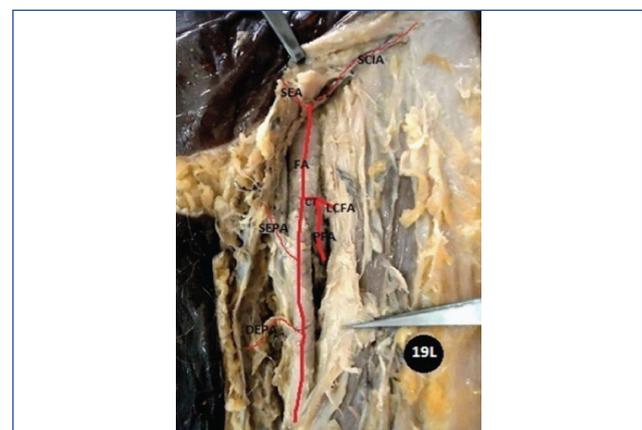
FA : Femoral Artery ; SEA : Superficial Epigastric Artery; SCIA: Superficial Circumflex Iliac Artery; SEPA: Superficial External Pudendal Artery; LCFA: Lateral Circumflex Femoral Artery; MCFA: Medial Circumflex Femoral Artery

Distance (cm)	No. of specimens	Percentage
0 – 3	37	92.5 %
3.1 – 6	3	7.5 %
Total	40	100%

[Table/Fig-5]: Distance of origin of superficial external pudendal artery.

Side	No. of specimens	Percentage
Medial	32	80 %
Anterior	7	17.5 %
Anteromedial	1	2.5 %
Total	40	100%

[Table/Fig-3]: Side of origin of superficial external pudendal artery.



[Table/Fig-6]: Showing origin of SEPA from FA on medial side at 5.5 cm from midinguinal point.

FA: Femoral Artery; CT: Common Trunk; SEA : Superficial Epigastric Artery; SCIA: Superficial Circumflex Iliac Artery; SEPA: Superficial External Pudendal Artery; LCFA: Lateral Circumflex Femoral Artery; DEPA: Deep External Pudendal Artery; PFA : Profunda Femoris Artery

DISCUSSION

The anatomical knowledge of Superficial external pudendal artery and its variations is important for surgeons. Superficial external pudendal artery is a superficial branch of femoral artery in femoral triangle, whose primary function is to supply blood to penis in males and clitoris in females. So any damage to Superficial external pudendal artery will lead to impotence [6]. Superficial External Pudendal Artery flaps have been used in vulvar and penile reconstruction [7,8]. Hemmati H et al., in their study of 228 patients, observed Superficial External Pudendal Artery in all cases [9]; similar to our study. La Falce OL et al., mentions in his study on 50 specimens that the Superficial external pudendal artery was found originating from femoral artery in 45 cases and from deep femoral artery in only one case. Arteries were found to arise as a common trunk in 11 cases [10], where as in the present study it was found in 13 cases and as a single artery in 14 cases (30%) which was higher in our study with 27 cases, this difference may be due to the study conducted on two different geographical population. In the study done by La Falce OL et al., the distance of origin ranged from 0.8 cm to 8.5 cm to inguinal ligament [10] whereas in our study it was found origin ranging from 0.5 cm to 6 cm. Dyl L et al., mentions in his study on femoral artery in Baboon Papiu Anubis that Superficial external pudendal artery arose from the femoral artery separately in 8 specimens (40%), in trunk with Superficial epigastric artery and Superficial circumflex iliac artery in 8 specimens (40%) and in trunk with the Superficial epigastric artery in 4 specimens (20%) [11], similar to the present study. Manerikar K et al., conducted his surgical exploration on 50 patients, origin of Superficial external pudendal artery and its relation to Sapheno-femoral junction was recorded. He found Superficial external pudendal artery was identified in 48 patients but absent in two patients. It was originating from medial side of femoral artery [12], which was found in 32 cases of the present study. Standing S mentions that the Superficial external pudendal artery arises medially from the femoral artery, close to preceding branches [1], similar to our study. Tarek M conducted his study on 10 right and left lower limbs and found Superficial external pudendal artery with three different pattern of origin. Firstly Superficial external pudendal artery and Deep external pudendal artery originated from femoral artery separately above and below the Sapheno -femoral junction, secondly both originated as short common trunk from femoral artery, thirdly single long external pudendal trunk continues as Deep External Pudendal Artery and it gives branch to Superficial External Pudendal Artery [13]. Out of these 3 patterns, only first pattern in which Superficial External Pudendal Artery and Deep External Pudendal Artery originated from femoral artery separately is similar to our study. Most of Superficial External Pudendal Artery originated from mid inguinal point was 4.6 cm [13]. Manjappa T and Raghavendra VP mentions

in the study conducted on 40 lower limbs, Superficial External Pudendal Artery arises from femoral artery separately in 23 cases (57.7%), with common trunk with SEA in 4 cases (10%) and with common trunk with Superficial epigastric artery and Superficial circumflex iliac artery in one case (2.5%). Superficial External Pudendal Artery arises from medial aspect in 67.5% cases and distance of origin is within 3cm in 45% cases and between 3.1cm to 6cm in 55% cases [14]. In comparison to our study Superficial External Pudendal Artery was found to arise from femoral artery in 67.5%, distance of origin was within 3cm in 92.5% cases and originated from medial side in 80% cases.

LIMITATION

The limitations of the present study were duration of 2 years and number of cadavers assigned for the respective years of study.

CONCLUSION

The present study on Superficial external pudendal artery was meticulously done to arrive at the conclusion that its variations are common, their presence should not be ignored to avoid dreadful complications of haemorrhage. The present study is important for surgeons as it provides knowledge about the anatomy and variations of superficial external pudendal artery to achieve best results in surgeries and perfect knowledge is desirable for the creation of successful flaps involving.

REFERENCES

- [1] Standring S. Grays anatomy - The anatomical basis of clinical practice. 39th ed, Edinburgh: Elsevier Churchill Livingstone; 2005:1451.
- [2] Renard M, Brice M, Borelli J, Stehin P, Schmitt M, Masson JP, et al. Pathways of supplementation of ilio-femoral arterial axes (Radioanatomical study). *C R Ass Anat Liege*. 1974;58:649-60.
- [3] Macchi C, Giannelli F, Cecchi F, Corcos L, Repice F, Cantini C, et al. Collateral circulation in occlusion of lower limbs arteries: an anatomical study and statistical research in 35 old subjects. *It J Anat Embryol*. 1996;101(2):89-96.
- [4] Patil UA, Dias AD, Thatte RL. The anatomical basis of the SEPA flap. *Br J Plastic Surg*. 1987;40(4):342-47.
- [5] Romanes GJ. Cunningham's manual of practical anatomy. Volume 1. 15th ed. Oxford: ELBS; 1992. Pp. 139-143.
- [6] Henriot JP. Saphenofemoral venous confluence and the external pudendal network: anatomical data and new statistics. *Phlebologie*. 1987;40(3):711-35.
- [7] Mayer AR, Rodriguer RL. Vulvar reconstruction using a pedicle flap based on the superficial external pudendal artery. *Obstet Gynecol*. 1991;78(5):964-68.
- [8] Abe S, Takami Y, Yamaguchi Y, Hata K, Yamaguchi T. Penile reconstruction with de-epithelized superficial external pudendal artery flap. *J Urol*. 1992;147(1):155-57
- [9] Hemmati H, Baghi I, Talaei Zadeh K, Okhovatpoor N, Kazem Nejad E. Anatomical variations of the saphenofemoral junction in patients with varicose veins. *Acta Med Iran*. 2012;50(8):552-55.
- [10] La Falce OL, Ambrosio JD, De Souza RR. The anatomy of the superficial external pudendal artery: a quantitative study. *Clinics Sao Paul*. 2006;61(5):441-44.

- [11] Dyl L, Topol M. The femoral artery and its branches in the baboon *Papio Anubis*. *Folia Morphol.* 2007;66(4):291-95.
- [12] Manerikar K, Jadhav V, Bhatia S, Singh G, Dikshit V. A study of superficial external pudendal artery and its variations at saphenofemoral junction. *International Journal of Medical and health research.* 2017;3(6):93-95.
- [13] Mostafa T. Anatomical study of the external pudendal arteries. *AAMJ.* 2006;4(2):177-87.
- [14] Manjappa T, Raghavendra VP. The anatomical study of the superficial branches of femoral triangle. *Int J Pharm Bio Sci.* 2012;3(3):(B)632-37.

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FINANCIAL OR OTHER COMPETING INTERESTS:

None.

Date of Publishing: Oct 01, 2018