International Journal of Research in Biosciences
Vol. 4 Issue 1, pp. (55-59), January 2015
Available online at http://www.ijrbs.in
ISSN 2319-2844

Research Paper

Femoral artery and its branches in femoral triangle: A cadaveric study in Rajkot

[*]Chauhan Pradip[1], Chauhan Alpa[2], Adhvaryu Monika[3], Rathwa Ashish[4], Adhvaryu Ankit[3], Rathod Suresh[1]

[1]Department of Anatomy, P.D.U. Govt. Medical College, Rajkot, Gujarat, INDIA
[2]Department of Anatomy, GMERS Medical College, Gandhinagar, Gujarat, INDIA
[3]Department of Anatomy, Government Medical College, Jamnagar, Gujarat, INDIA
[4]Department of Anatomy, GMERS Medical College, Junagadh, Gujarat, INDIA

(Received December 10, 2014, Accepted January 07, 2015)

Abstract

The femoral artery is commonly used for various diagnostic and therapeutic purposes in cardiovascular diseases. This study was conducted to compare the cross sectional area of left and right side femoral artery, and to compare the distance of origin of femoral artery branches from midinguinal point. In this cross sectional study, 51 human femoral triangles from 26 (18 male and 08 female) human cadavers in P.D.U. Government Medical College, Rajkot were dissected and studied during regular dissection classes. Femoral artery and its branches were dissected and studied. Circumference of Femoral artery at the level of inguinal ligament was measured in millimeters. Cross sectional area and diameter of femoral artery were calculated by standard mathematical formulas. All data were calculated and analyzed by standard statistical formulas with the help of Microsoft excel 2007 and Epi info ™ 7 software. In this study there was not any significant difference found in calculated cross sectional area of the right side femoral artery (79.50 ± 22.19 mm) and left side femoral artery (84.87 ± 23.93 mm). There was a significant difference in distance of origin of right and left superficial circumflex iliac artery ($p < 0.05$). The mean distance of origin of the right and the left profunda femoris artery was 31.58 mm and 30.76 mm respectively. Extensive study is required to identify the variation patterns in femoral artery branches and 66 estimate its prevalence.

Keywords: Deep external pudendal artery, profunda femoris Artery, Superficial circumflex iliac artery, superficial epigastric artery.

Introduction

The femoral artery is commonly used for arterial catheterization as it can be readily accessed. Thereby it is used for investigation of any arterial system in the body and for various clinical procedures like coronary angioplasty. The femoral artery at the femoral triangle is directly opened at the origin of the profunda femoris artery for femoral embolectomy in lower limb arterial thromboembolism [1]. Femoral arteriography is the main line of investigation in peripheral occlusive arterial diseases and in the diagnosis of suspected congenital anomalies. As the femoral arteries are commonly used for these procedures, the internal diameter and as well as the origin of the profunda femoris artery and its branches in front of the thigh are of clinical significance in the procedures of Judkins and Seldinger techniques used for diagnosis

[2]. Increasing radiological interventions through the femoral artery, as well as surgical interventions in the upper thigh and hip joint justify the requirement of the study.

Aims and Objectives

The aims of the study were to compare the right and left femoral artery cross sectional area, and to compare the distance of origin of the femoral artery branches from midinguinal point. For aims following objectives were followed

- To measure the femoral artery circumference
- To calculate diameter and cross sectional area of the femoral artery
- To measure distance of origin of the branches of the femoral artery from the midinguinal point

Materials and Method

This cross sectional study was conducted at Pandeet Dindayal Government Medical College, Rajkot during 2011 to 2013.

Figure 1: Femoral artery and its branches in femoral triangle.

51 human femoral triangles from 26 (18 male and 08 female) human cadavers in P.D.U. Government Medical College, Rajkot were dissected and studied during regular dissection classes. Femoral artery and its branches were dissected and studied (Figure 1). Circumference of Femoral artery at the level of inguinal ligament was measured in millimeters by measure tap. With the help of following mathematical equations femoral artery diameter and circumference were calculated.

Diameter of femoral artery = (Circumference of femoral artery ÷ 3.14)
Cross sectional Area of femoral artery = (3.14 × Diameter of femoral artery) ÷ 4

Superficial and deep branches of the femoral artery and their origins were identified. Distance of origin of the femoral artery branches was measured from the midinguinal point and noted in protested Performa. All data were calculated and analyzed by standard statistical formulas with the help of Microsoft excel 2007 and Epi info ^{TM} 7 software.

Results and Discussion

Table 1: Gender wise femoral artery circumference, diameter and cross sectional area

Femoral artery	Circumference (mm)		Diameter (mm)		Cross-sectional Area (mm^2)	
	Male	Female	Male	Female	Male	Female
Mean	31.86	31.47	10.15	10.02	82.60	79.78
Median	31.00	33.00	9.87	10.51	76.51	86.70
Mode	30.00	33.00	9.55	10.51	71.66	86.70
Standard Deviation	4.79	3.56	1.53	1.13	25.14	17.65
Standard Error	0.80	0.92	0.25	0.29	4.19	4.56
Range	20.00	11.00	6.37	3.50	108.28	55.18
Minimum	24.00	26.00	7.64	8.28	45.86	53.82
Maximum	44.00	37.00	14.01	11.78	154.14	109.00
Number of cases	36	15	36	15	36	15

There was no significant difference in the femoral artery circumference between male and female (95% confidence interval, two tailed unpaired t-test, p = 0.7755).

There was no significant difference in the calculated Femoral artery diameter between male and female (95% confidence interval, two tailed unpaired t-test, p = 0.7798).

There was no significant difference in the calculated femoral artery cross-sectional area between male and female (95% confidence interval, two tailed unpaired t-test, p = 0.6942).

Table 2: Femoral artery Circumference, Diameter and Cross sectional area according to side

Femoral artery	Circumference (mm)		Diameter (mm)		Cross-sectional Area (mm)	
	Right	Left	Right	Left	Right	Left
Mean	31.31	32.35	9.97	10.30	79.50	84.87
Median	31.50	32.00	10.03	10.19	79.02	81.53
Mode	28.00	30.00	8.92	9.55	62.42	71.66
Standard Deviation	4.36	4.52	1.39	1.44	22.19	23.93
Standard Error	0.86	0.89	0.27	0.28	4.35	4.69
Range	15.00	20.00	4.78	6.37	77.63	108.28
Minimum	25.00	24.00	7.96	7.64	49.76	45.86
Maximum	40.00	44.00	12.74	14.01	127.39	154.14
Number of cases	26	25	26	25	26	25

There was no significant difference in the femoral artery circumference between Right and Left side (95% confidence interval, two tailed unpaired t-test, p = 0.10).

There was no significant difference in the calculated Femoral artery diameter between Right and Left side (95% confidence interval, two tailed unpaired t-test, p = 0.10).

There was no significant difference in the calculated Femoral artery cross-sectional area between Right and Left side (95% confidence interval, two tailed unpaired t-test, p = 0.10).

In this study, the largest femoral artery (154.14 mm^2 cross sectional area) was noted in the left femoral artery of male cadaver. The smallest femoral artery (45.86 mm^2 cross sectional area) was noted in left side of male cadaver.

This study was conducted on cadavers embalmed with formalin injectable fluid. There was no significant difference found in estimated diameter of femoral artery between male and female. That does not correlate with the study of Sandgren (1999) and Lewis (1986), who measured the femoral artery diameter in living subjects with Eco tracking B-Mode ultrasound method and found differences in male and female femoral artery diameter [3,4].

Table 3: Distance of origin of the femoral artery branches from the midinguinal point

Name of the branch	Distance on Right side (mm) n= 26	Distance on Left side (mm) n= 25
Superficial circumflex iliac	12.03	14.00
Superficial external pudendal	26.89	24.05
Superficial epigastric	23.05	22.50
Deep external pudendal	31.11	28.76
Descending Genicular	34.08	33.88
Profunda femoris artery	31.58	30.76

There was a significant difference distance of origin superficial circumflex iliac artery between the right and left side ($p < 0.05$, unpaired two tailed t-test). There was a significant difference distance of origin deep external pudendal artery between the right and left side ($p < 0.05$, unpaired two tailed t-test).

In this study there was no significant difference in distance of origin of profunda femoris artery on the right and left side. That does not correlate with the results of study of Suthar K (2013), who reported a significant difference between right and left side origin of profunda femoris artery[5].

In this study, more commonly the profunda femoris artery was originating in the range of 0-50 mm (45 out of 51 femoral triangles) distance from midinguinal point. The mean distance of origin was 30.17 mm. This was less than the 40 mm mentioned by Snell (1992), 35 mm mentioned by Bannister et al (1995) and 47.5 mm reported by Dixit DP (2001)[6-8].

Conclusion

Knowledge of the femoral artery and its branches is important for not only surgeons, but also for physicians, anatomists and all types of clinical practitioners in medicine. Because it is important in various clinical examinations, clinical procedures and surgical interventions. External circumference, diameter and cross sectional area of the femoral artery is important for various devices (e.g. Arterial catheter) manufacturing, required in clinical procedures. Variations in the branches of femoral artery must be considered. Extensive study is required to find out the variations in femoral artery branches.

References

1. Kirk R.M., General Surgical Operations. 4th Ed. In Churchill Livingston, 542 **(2000)**

2. Davidson C.J., Bonon R., Cardiac Catheterization, Edited by Zipes, Liby et al, Braunwald's Heart Diseases A Textbook of Cardiovascular Medicine, 7th Edn. Vol. I. Pennsylvania, USA. Elseveier Saunders, 402 – 403 **(2005)**

3. Sandgren T., Sonesson B., Ahlgren A.R., Lanne T., The diameter of common femoral artery in healthy human: Influence of sex, age and body size, Journal of vascular Surgery, 29, 503-510 **(1999)**

4. Lewis P., Psaila J.V., Davies W.T., McCarthy K., Woodcock J.P., Measurement of volume flow in the human common femoral artery using a duplex ultrasound system Ultrasound in Medicine & Biology, 10 (12), 777-784 **(1986)**

5. Suthar K., Patil D., Mehta C., Patel V., Prajapati B., Bhatt C., Cadaveric study: morphological study of branches of femoral artery in front of thigh, CIBTech Journal of Surgery, 2 (2), 16-22 (2013)

6. Bannister L.H., Berry M.M., Collins P., Gray's anatomy. In: Cardiovascular system. 38th Edn: Churchil Livingstone, Medical Division of Longman group, UK Ltd. 1566-8 **(1995)**

7. Snell R.S., Clinical Anatomy of Medical students. 4th edn. Little Brown and Co. Boston, 607 **(1992)**

8. Dixit D.P., Mehta L.A., Kothari M.L., Variations in the origin and course of profunda femoris, J Anat. Soc. India, 50(1), 6-7 **(2001)**.