

Popliteal Artery Diameter: A Cadaveric Study

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Abstract

Introduction: Femoral artery proceeds as a popliteal artery from the osseo-aponeurotic opening of the adductor magnus to the caudal margin of the popliteal muscle. It passes through the adductor canal, the adductor hiatus then through the popliteal fossa ends at the lower margin of the popliteal muscle, in further course it divided into the anterior and posterior tibial arteries. Popliteal aneurysm i.e. abnormal dilation of the whole or part of the popliteal artery causes edema and pain in the popliteal fossa. The popliteal artery serves as bypass grafts in specific location i.e. above or below-knee. It is also often affected by penetrating and blunt trauma of the lower limb. As a consequence, the exposure of this artery is frequently and needed exploration of either in emergency or in elective vascular procedures.

Material and Method: The present Study was carried out in the department of anatomy at Jawaharlal Nehru Medical College in Collaboration with department of anatomy and Datta Meghe Medical College, Nagpur Maharashtra. Total 102 lower limbs of 51 cadavers were included in the study.

Observation and Results: In males the mean diameter of popliteal artery at its origin is 6.7 ± 0.7 mm on right and 6.6 ± 0.6 mm on left respectively, whereas in females the mean diameter on right is noted as 6.4 ± 0.5 mm and on left it is 6.2 ± 0.3 mm. At proximal to termination the mean diameter of popliteal artery in males is observed to be 6.9 ± 0.7 mm on right and 6.8 ± 0.7 mm on left, while in females it is noted to be 6.6 ± 0.5 mm on right and 6.4 ± 0.4 mm on left respectively.

Conclusion: To conclude the data from the present study is useful for the vascular surgeons, radiologists.

Keywords: *Popliteal artery, popliteal aneurysm, popliteal artery diameter.*

Introduction

Femoral artery proceeds as a popliteal artery from the osseo-aponeurotic opening of the adductor magnus to the caudal margin of the popliteal muscle. It passes through the adductor canal, the adductor hiatus then

through the popliteal fossa ends at the lower margin of the popliteal muscle, in further course it divided into the anterior and posterior tibial arteries. The artery may divide just proximal to popliteus muscle in its terminal branches, in this case the anterior tibial artery sometimes descends anterior popliteus muscle¹⁻⁴ The popliteal artery is palpable and one can easily able to locate it and count the pulse in the back of the knee.⁵ If the knees are slightly bent to approximately 45 degrees, the pulse will be easier to locate. Pulsations are best experienced in the lower part of the fossa, where the popliteal artery is close to the tibia.⁶ The weakening or failure to palpate the popliteal pulse is a sign of femoral artery obstruction.⁷ Popliteal aneurysm i.e. abnormal dilation of the whole or part of the popliteal artery causes edema and pain in

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the popliteal fossa.⁸ The popliteal artery serves as bypass grafts in specific location i.e. above or below-knee. It is also often affected by penetrating and blunt trauma of the lower limb. As a consequence, the exposure of this artery is frequently and needed exploration of either in emergency or in elective vascular procedures.^{9,10} Knowledge of the normal popliteal artery diameter is important to assess popliteal artery dilation, as it is known sites for aneurysm formation. Knowledge of popliteal artery is valuable not only for anatomists, but also for radiologists and vascular surgeons. Considering the clinical significance, this study was conducted to assess the circumferential diameter of the popliteal artery.

Material and Method

The present Study was carried out in the department of anatomy at Jawaharlal Nehru Medical College in Collaboration with department of anatomy and Datta Meghe Medical College, Nagpur Maharashtra. Total 102 lower limbs of 51 cadavers were included in the study. Out of 51 specimens 40 cadavers were males and

11 were female. All the cadavers were age group ranging between the 25-70 years.

Incision was taken and exposes the region of adductor hiatus which is the origin of popliteal artery and into the popliteal fossa. The following landmarks have been identified i.e. at the adductor hiatus and the termination of popliteal artery at the level of lower border of popliteus, the circumferential diameter of the popliteal artery was measured at its origin, and at its proximal to termination.

Observation and Results

In males the mean diameter of popliteal artery at its origin is 6.7 ± 0.6 mm on right and 6.6 ± 0.5 mm on left respectively, whereas in females the mean diameter on right is noted as 6.3 ± 0.4 mm and on left it is 6.2 ± 0.3 mm. Near just proximal part to its termination the mean diameter of popliteal artery in males is observed to be 6.9 ± 0.7 mm on right and 6.8 ± 0.6 mm on left, while in females it is noted to be 6.6 ± 0.5 mm on right and 6.4 ± 0.4 mm on left respectively.

Table 1: Mean diameter of popliteal artery at origin

	Total Specimen	Mean diameter of right popliteal artery	Mean diameter of left popliteal artery	P value
Male	40	6.7 ± 0.6 mm	6.6 ± 0.5 mm	0.42
Female	11	6.3 ± 0.4 mm	6.2 ± 0.3 mm	0.49

Table 2 : Mean diameter of popliteal artery at proximal to its termination

	Total Specimen	Mean diameter of right popliteal artery	Mean diameter of left popliteal artery	P value
Male	40	6.9 ± 0.65 mm	6.8 ± 0.6 mm	0.47
Female	11	6.6 ± 0.5 mm	6.4 ± 0.4 mm	0.21

Table 3: At origin

	Male (n = 40)	Female (n = 12)	P value
Mean diameter of right popliteal artery	6.7 ± 0.6 mm	6.3 ± 0.4 mm	0.03
Mean diameter of left popliteal artery	6.6 ± 0.5 mm	6.2 ± 0.3 mm	0.01

Table 4: At proximal to its termination

	Male (n = 40)	Female (n = 12)	P value
Mean diameter of right popliteal artery	6.9 ± 0.65 mm	6.6 ± 0.5 mm	0.04
Mean diameter of left popliteal artery	6.8 ± 0.6 mm	6.4 ± 0.4 mm	0.03

Mean difference in diameter of popliteal artery was significantly higher in males compared to females on either side at origin. There is statistically significant difference between mean diameter of popliteal artery of males and females at just proximal to its termination.

Discussion

Popliteal artery is having considerable importance in various diagnostic and therapeutic procedures in the world of healthcare such as bypass surgery, transluminal angioplasty and sub intimal angioplasty. Popliteal aneurismal and vascular injuries proceeded to be extremely dangerous leads to high percentage of leg amputations^{11,12} Various researchers like Thomas Sandgren et al.¹³ Zuhail et al¹⁴ Morris-stiff et al¹⁵ and Debasso et al¹⁶ measured the mean diameter of the popliteal artery was 7.4 mm \pm 0.9., 7.5 mm \pm 1.3, 7.4 \pm 1.3 mm and 7.4 mm respectively in their study. This was the higher value in comparison to our study. Crawford et al¹⁷ and Wolf YG et al¹⁸ Dhaval K Patil et. Al¹⁹ found that the mean diameter was 6.7 mm 10 and 6.8 \pm 0.8 mm and 6.3 \pm 0.6 mm respectively in their study. This result is almost comparable with our study. One more study by Anjali Vishwanath Telang et. al. observed that the mean diameter was 4.7 \pm 0.9, 4.4 \pm 0.7 and which was lower than what we get in our study. The variation in the measurement may be due to the difference in live and cadaveric spacemen or due to the method of measurement used by the researchers on the basis of i.e. whether they take inner or outer diameter.

Conclusion

To conclude the data from the present study is useful for the vascular surgeons, radiologists. The variation in the measurement may be due to the difference in live and cadaveric spacemen or due to the method of measurement used by the researchers on the basis of i.e. whether they take inner or outer diameter.

Ethical Clearance: Taken from institutional ethics committee.

Source of Funding: Self.

Conflict of Interest: Nil.

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