



Case Report

A CASE OF FIBULAR ARTERY VARIATION

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ABSTRACT

During the dissections, it was observed that the fibular arteries undertook the supply of the feet. In this case, on the right foot, the dorsalis pedis artery arose from the fibular artery. On the left foot, lateral and medial plantar arteries were terminal branches of the fibular artery. Both the distal part of the right anterior and the left posterior tibial artery were hypoplastic. It is important to consider whether these variations exist in every surgical application in this region.

Key words: Fibular artery, variation, dorsalis pedis artery

INTRODUCTION

The popliteal artery continuing the femoral artery traverses the popliteal fossa; it descends obliquely to the distal border of the popliteus muscle, where it divides into the anterior and posterior tibial arteries. The anterior tibial artery passes through the ankle to the dorsum of the foot as the arteria dorsalis pedis. The posterior tibial artery divides into the medial and lateral plantar arteries under abductor hallucis muscle. The fibular artery arises about 2.5 cm distal to the popliteus muscle from posterior tibial artery. Reaching the inferior tibiofibular syndesmosis, it divides into the calcaneal branches. Its Perforating branch traverses the interosseous membrane about 5 cm proximal to the lateral malleolus to enter the extensor compartment, where it anastomoses with the anterior lateral malleolar artery. Its Communicating branch connects to a communicating branch of the posterior tibial artery about 5 cm proximal to the ankle (1-3).

CASE REPORT

During the dissection of a 52 year old male cadaver, it was observed that both distal part of the right anterior and the left posterior tibial artery were hypoplastic (Fig 1). On the right side, the dorsalis pedis artery arose from the

fibular artery and on the left side, lateral and medial plantar arteries were terminal branches of the fibular artery (Fig 2). The levels of the popliteal arterial branching were usual. The right anterior tibial artery and the left posterior tibial artery were weak calibre. Both of them ended near about the tibiofibular syndesmosis. The right posterior tibial artery and the left anterior tibial artery were usual. On the both sides, after passing through the fibrous canal between flexor hallucis longus and tibialis posterior muscles, it was observed that the fibular artery was far from usual. On the right side, it gave a branch that pierced the interosseous membrane and then it continued as dorsalis pedis artery (Fig.1). On the left side, after passing behind medial malleolus, it divides into two branches, lateral and medial plantar arteries, under the abductor hallucis muscle.

DISCUSSION

The axial artery, arising from the dorsal root of the umbilical artery, is the primordial central artery of the lower limb. The femoral artery passes along the ventral surface of the thigh, opening a new channel to the lower limb. The femoral artery gradually increases in size and coincidentally most of the axial artery disappears. In early development, the axial artery passes ventral to the popliteus muscle (the deep popliteal artery). At the proximal margin of the popliteus muscle the axial artery provides a primitive posterior tibial and a primitive fibular branch, which run distally on the dorsal surface of that muscle. These two arteries undergo a gradual

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proximal to distal fusion from the axial artery to just inferior to the popliteus muscle, the definitive part of the popliteal artery (or the superficial popliteal artery) has been formed dorsal to the popliteus muscle. A communicating branch joins the newly formed superficial popliteal artery to the distal part of the deep popliteal artery thereby forming a new takeoff for the anterior tibial artery and effecting the disappearance of most of the remainder of the deep popliteal artery. The typically more proximal origin of the posterior tibial stem of the axial artery leads to its role as the source of the fibular artery. (1,4,5).



Figure 1. The right dorsalis pedis artery F: fibular artery, DP: dorsalis pedis artery, LM: lateral malleolus, DF: deep fibular nerve

The variations in the arteries of the leg can be best explained by treating the fibular artery as the main artery and defining the tibial arteries as its branches. If one of the tibial arteries is lacking or very small, the fibular artery supplies that part of the foot. The fibular artery is therefore a major contributor to the blood supply of the foot in about 12% of all cases (2).

Classification of Kim et al which is a modification of Lippert's system includes variations in both the branching of the popliteal artery and the arterial supply to the foot:

I. Normal Level of Popliteal Arterial Branching

II. High Division of Popliteal Artery

III. Hypoplastic or Aplastic Branching with Altered Distal Supply

(A) Hypoplastic-aplastic posterior tibial artery; distal posterior tibial artery replaces to fibular artery.

(B) Hypoplastic-aplastic anterior tibial artery; dorsalis pedis artery replaces to fibular artery.

(C) Hypoplastic-aplastic posterior and anterior tibial artery; plantar arteries and dorsalis pedis artery replaces to fibular artery (6).

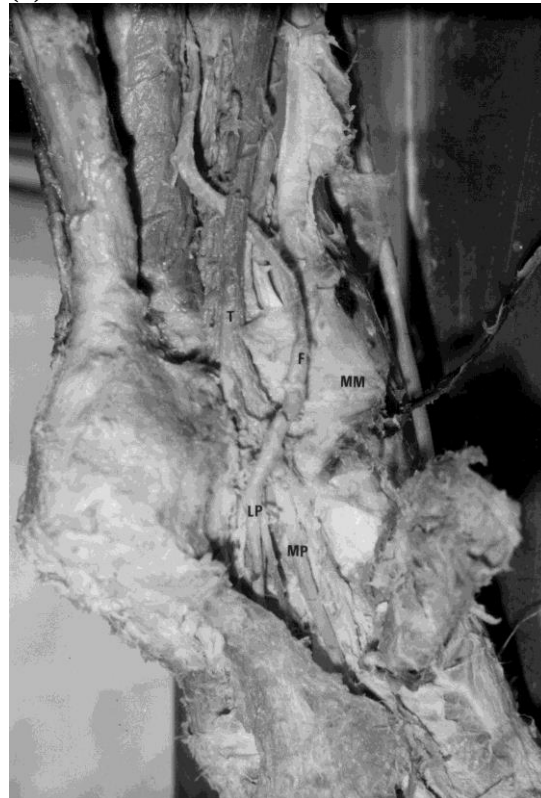


Figure 2. The left plantar arteries F: fibular artery, LP: lateral plantar artery, MP: medial plantar artery, T: tibial nerve, MM: medial malleolus

Type IIIC was described as the Peronea Magna by Senior (8).

In our case, on the right side, the distal part of the anterior tibial artery was hypoplastic and the dorsalis pedis artery replaced to the fibular artery (IIIB). On the left side, distal part of the posterior tibial artery was hypoplastic and lateral and medial plantar arteries replaced to the fibular artery (IIIA).

In angiographies and dissections, frequency of Type III popliteal arterial variations have been reported by several authors indicating that these rates vary for Type IIIA between 0.9% to 5% and for Type IIIB between 1.6% to 7.1%. In accordance with the literature, Type

IIIC was rarely observed. This type was reported as 0.2% by Kim et al (1,2,5,6,9,10).

Bilateral anomaly of arterial supply of the foot has been reported (11). Bilaterality was found as 27.5% by Keen (9).

It is important to consider, especially for the vascular and reconstructive surgeons and the radiographers, whether these variations exist in applications such as diagnosis of arterial injury, vascular grafting and embolectomy (4,12,13)

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