JOURNAL OF THE ANATOMICAL SOCIETY OF INDIA XXX (2014) 1–5

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/jasi

Original Article

A study of the perforating arteries of the leg derived from the anterior tibial, posterior tibial and peroneal arteries

Arunabha Tapadar [a,*], *Sukanya Palit* [b], *Rajib Kundu* [c], *Aniruddha Sarkar* [d], *Anirban Banerjee* [e]

[a] *Assistant Professor, Department of Anatomy, Medical College, Kolkata, West Bengal, India*
[b] *Professor, Department of Anatomy, Calcutta National Medical College, Kolkata, West Bengal, India*
[c] *Associate Professor, Department of Anatomy, Institute of Post Graduate Medical Education & Research, Kolkata, West Bengal, India*
[d] *Associate Professor, Department of Anatomy, Midnapur Medical College, West Midnapur, West Bengal, India*
[e] *Resident, Department of Anatomy, Medical College, Kolkata, West Bengal, India*

ARTICLE INFO

Article history:
Received 4 March 2014
Accepted 10 April 2014

Keywords:
Leg
Anterior tibial artery
Posterior tibial artery
Perforator flap

ABSTRACT

Introduction: The present study deals with dissection of anterior tibial artery (ATA), posterior tibial artery (PTA) and peroneal artery (PA) angiosomes or their vascular territories in both legs of 10 freshly donated cadavers prior to embalming. The study shows the distribution of perforating arteries in their respective angiosomes.

Methods: Perforating arteries arising from ATA, PTA and PA and passing through the fascial planes between muscles to the skin and subcutaneous tissues were dissected. The numbers of perforating arteries and their distance from easily recognizable anatomical landmarks was measured. The resultant data was tabulated and the average numbers of perforators in each of these three angiosomes was calculated.

Results: PTA angiosome had the largest number of perforating arteries followed by PA angiosome, the least number of perforators being found in the ATA angiosome. The middle and lower thirds of the leg generally had a greater number of perforators in all three territories. Presence of sural artery perforators arising from peroneal/popliteal artery was an additional supply in the PA angiosome.

Discussion: The knowledge of angiosomes and perforating arteries of the leg is essential for flap repairs and reconstruction for injuries of the leg. Such injuries may occur in accidents, burns and non-healing tissue defects due to ischemic ulcers, varicose veins, leprosy, diabetes and nerve injuries.

* *Corresponding author*. Residence – CK – 139, Sector II, Salt Lake, Kolkata, West Bengal 700091, India. Tel.: +91 (0) 33 23590749, +91 9830217818 (mobile).
E-mail addresses: tapadararunabha@gmail.com, medartpub@gmail.com, arunabhatapadar@gmail.com (A. Tapadar).

http://dx.doi.org/10.1016/j.jasi.2014.04.003

Please cite this article in press as: Tapadar A, et al., A study of the perforating arteries of the leg derived from the anterior tibial, posterior tibial and peroneal arteries, Journal of the Anatomical Society of India (2014), http://dx.doi.org/10.1016/j.jasi.2014.04.003

1. Introduction

Angiosomes are three dimensional anatomical territories supplied by source arteries and accompanying veins and are composed of skin, underlying fascia, muscles and bones. They may be further classified into arteriosomes and venosomes. Each angiosome has an extensive anastomotic network (by choke vessels) with adjacent territories.[1] Each of these source arteries has a number of perforating branches supplying discrete territories of skin and subcutaneous tissue. The present study deals with the dissection of these perforators in the anterior tibial artery (ATA), posterior tibial artery (PTA) and peroneal (fibular) artery (PA) territories. These perforating arteries are used for raising viable pedicle flaps for successful tissue reconstruction in lacerated wounds in road traffic accidents/bomb blast injuries, diabetic neuropathy causing skin ulcers and rupture of tendo Achilles, non-healing venous ulcers in thalassemia/varicose veins, 3rd degree burn injuries etc. The anatomical knowledge of these angiosomes and their contained perforating arteries act as guidelines to determine the approximate size and orientation of fasciocutaneous and musculocutaneous flaps for tissue reconstruction in lesions of the legs.[2]

2. Materials and methods

Dissections were carried out on 10 freshly donated cadavers prior to embalming, over a period of 1 year at the Institute of Post Graduate Medical Education and Research, Kolkata, in the Department of Anatomy, with the help of the Department of Plastic Surgery. Dissections were carried out in both legs between the knee and ankle. The legs were dissected along anterior and posterior borders of the tibia and the back of the

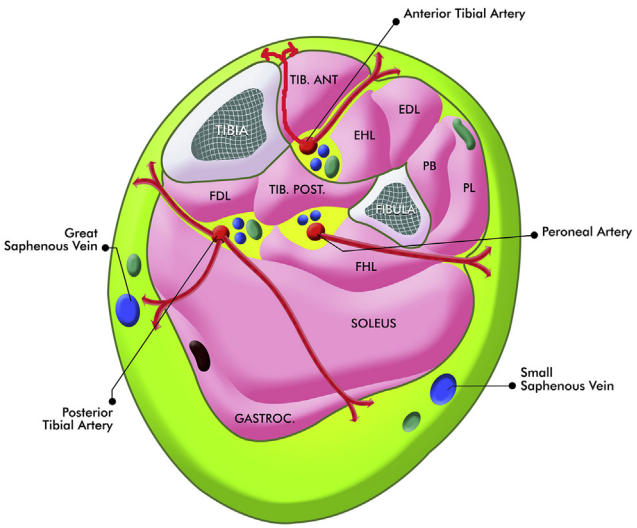

Fig. 1 – Points of emergence of perforating arteries in the leg [EDL – Extensor Digitorum Longus, EHL – Extensor Hallucis Longus, FDL – Flexor Digitorum Longus, FHL – Flexor Hallucis Longus, PL – Peroneus Longus, PB – Peroneus Brevis, Gastroc –Gastrocnemius].

Table 1 – Numbers of perforating arteries of ATA, PTA & PA territories.

Cadaver no.	Number of perforating arteries dissected					
	Ant. tibial artery territory		Post. tibial artery territory		Peroneal artery territory	
	Right	Left	Right	Left	Right	Left
1	4	4	3	4	4	4
2	3	3	4	4	3	3
3	4	4	7	7	5	5
4	4	4	5	5	4	4
5	3	3	6	6	5	5
6	4	4	5	5	5	5
7	3	3	6	6	4	4
8	4	4	5	5	5	5
9	4	4	5	5	5	5
10	3	3	5	5	4	4
Total	36	36	51	55	44	44

Fig. 2 – Posterior tibial artery angiosome area shown by bluish discoloration due to dye injection.

Fig. 3 – A posterior tibial artery perforator injected with dye.

Please cite this article in press as: Tapadar A, et al., A study of the perforating arteries of the leg derived from the anterior tibial, posterior tibial and peroneal arteries, Journal of the Anatomical Society of India (2014), http://dx.doi.org/10.1016/j.jasi.2014.04.003