

CASE REPORT

BILATERAL ANATOMIC VARIATION IN THE VASCULAR PATTERN OF THE PROFUNDA BRACHII ARTERY IN A MALE CADAVER

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ABSTRACT

Profunda brachii artery (PBA), known also as the deep artery of the arm, constitutes the largest branch of the brachial artery (BA). Its anatomical variations are due to abnormalities during embryologic development and considered among anatomists as a rare finding, especially if they are found bilaterally. We present a case of a bilateral origin of the profunda brachii from the posterior circumflex humeral artery (PCHA). Awareness towards variations in the vascular branching pattern of the upper limbs is considered essential for plastic, vascular and general surgery and radiology as well.

Key words: profunda brachii artery, posterior circumflex humeral artery, anatomical variation, upper limb, vascular branching.

RÉSUMÉ

Variation anatomique bilatérale dans le modèle vasculaire de l'artère profunda brachii chez un cadavre masculin

L'artère profunda brachii (PBA), connue sous le nom d'artère profonde du bras, constitue la plus grande branche de l'artère brachiale (BA). Ses variations anatomiques sont dues à des anomalies au cours du développement embryologique et considérées parmi les anatomistes comme une découverte rare, surtout si elles sont bilatérales. Nous présentons un cas d'origine bilatérale de la PBA de l'artère humérale circonflexe postérieure (PCHA). La sensibilisation aux variations du patron de ramification vasculaire des membres supérieurs est considérée comme essentielle pour la chirurgie plastique, vasculaire et générale et pour la radiologie aussi.

Mots-clés: artère profunda brachii, artère humérale circonflexe postérieure, variation anatomique, membre supérieur, ramification vasculaire.

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INTRODUCTION

References in anatomical variations of the normal vascular pattern concerning the origin and course of major arteries of the upper limb have always been of interest among anatomists, surgeons and radiologists¹. We present a case of bilateral origin of the profunda brachii artery (PBA), from the posterior circumflex humeral artery (PCHA).

The profunda brachii artery, known also as the deep artery of the arm, is the largest branch of the brachial artery (BA), which arises from the medial and posterior parts of it, just below the border of the teres major and then passes into and supplies the posterior compartment of the arm. It enters the posterior compartment of the arm through the long and medial heads of the triceps alongside the radial nerve². It terminates as two collateral branches (radial and medial) which take part in the anastomosis around the elbow^{2,3}. The PBA gives also rise to muscular branches for posterior compartment of the arm and the nutrient artery of the humerus².

The PCHA branches from the third part of the axillary artery, courses backwards with the axillary nerve through the quadrangular space and supplies

the shoulder joint, the teres major and minor and long and lateral head of triceps¹.

Arterial anatomy of the upper extremities presents many clinically important variations of the normal pattern. Those alternations are attributed to four main groups of anomalies a) failure of the primitive artery to recede, b) failure of the primitive artery to form, c) aberrant origin of the native vessel and d) ectopic location of an otherwise normal vessel^{4,5}. Knowledge of the arm's topographical anatomy is essential for vascular, plastic and general surgery, as well as to radiologists and for patients requiring dialysis⁵.

CASE REPORT

An embalmed male human cadaver of Caucasian (Hellenic) origin was examined during routine educational dissection at the Anatomy Department of the Medical School of the University of Athens, Greece. The cadaver derived from body donation with informed consent signed from the donor himself.

During the anatomical dissection of the axillary and brachial artery of the right arm and their branches, a rather large stem of the PCHA with a diameter of 0.35 cm which after a course of 4.25 cm it gave rise

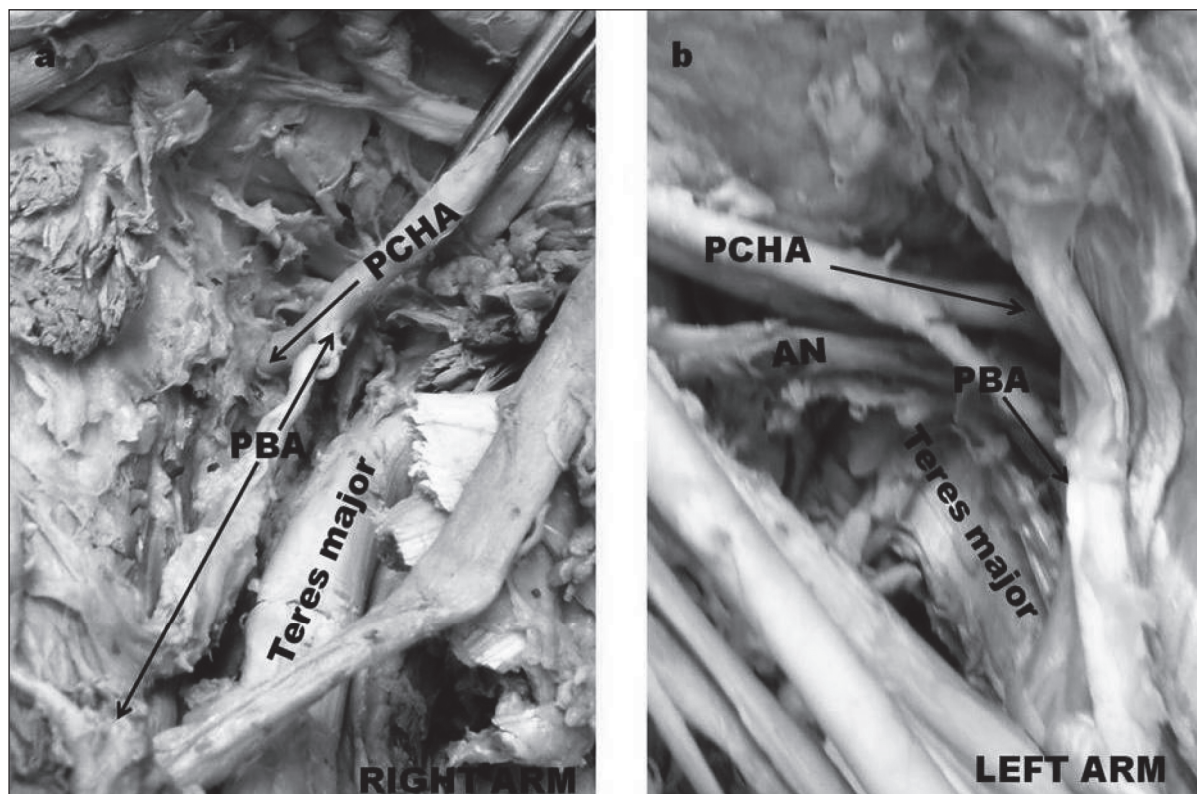


Figure 1. Anatomical variations of the vascular pattern in the upper limbs of the cadaver
a: right arm, origin of the profunda brachii artery (PBA) from the posterior circumflex humeral artery (PCHA).
b: left arm, same variation. AN: axillary nerve.

to a thin branch which passed downwards, following the radial nerve and was finally identified as the right PBA. The PBA presented a diameter of only 0.18 cm, while the PCHA continued with a diameter of 0.32 cm (Figure 1a).

A similar pattern was discovered at the left arm where the PBA was also a thin branch of the PCHA. The left PCHA (d=0.31 cm before and d=0.27 cm after) and coursed for 4.05 cm before the PBA (d=0.17 cm) originated from it (Figure 1b).

Both the described arteries (PCHA and PBA) followed the usual course and branching pattern bilaterally.

DISCUSSION

Various anatomic deviations from the classic pattern of the PBA are reported in the literature. Most of them are related to the duplication of the vessel. The incidence of a double PBA has been reported to be between 4% to 12% on various studies⁶. Other reported alternations include the origin of the PBA from PCHA with an incidence of 7-13%¹, the origin of the PCHA from the PBA in 16% of the cases⁷⁻⁸, a common point of origin of the subscapular and PBA from the axillary artery in 19% of the cases⁹ or a common origin of PBA, PCHA and subscapular¹⁰⁻¹¹, a PBA originating from the radial artery (rare)¹², while agenesis of the brachial and PBA has been also observed (rare)^{5,13}. The incidence of these variations decrease if they are discovered bilaterally¹¹. Thus, our case which presents bilaterally an unusual origin of the PBA from the PCHA should be considered as a rare branching variant of the upper extremities vascular pattern.

Such variations are considered to be occurring during embryologic development, long before their discovery in adult individuals¹⁴.

As PBA is significant for possible revascularization of the flaps used for head and neck reconstruction surgery, is presenting an important reserve in vascular surgery⁶ and is a useful vessel during an ultrasound examination¹⁵, knowledge of its both normal and altered clinical anatomy is crucial for all interventional practitioners¹⁶.

CONCLUSION

With an increasing tenancy for external interventions being performed annually, awareness of the topographical branching patterns is essential and all vascular variations should be considered during any operational procedure of the upper limbs.

Compliance with Ethics Requirements:

„The authors declare no conflict of interest regarding this article“

„The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law. Informed consent was obtained from the patient included in the study“

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