

A Posterior Inferior Cerebellar Artery Originating from the Posterior Meningeal Artery

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ABSTRACT

The authors present a case of an aberrant origin of the posterior inferior cerebellar artery (PICA), which was found incidentally during examination for stenosis of the middle cerebral artery. The PICA originated from the posterior meningeal artery. The embryology of the anomaly is briefly discussed.

Keywords: Posterior inferior cerebellar artery, Posterior meningeal artery, Aberrant origin

Abbreviations: PICA: Posterior Inferior Cerebellar Artery; PMA: Posterior Meningeal Artery

INTRODUCTION

The posterior inferior cerebellar artery (PICA) is the most important, largest, and most variable of all the cerebellar arteries [1]. The PICA usually originates from the vertebral artery at the anterolateral aspect of the brain stem. Variations in its origin are reported that from a hypoglossal artery, proatlantal artery, internal carotid artery, and so on [2,3]. We present a case demonstrating an unusual origin of PICA arising from the posterior meningeal artery (PMA).

CASE REPORT

A 58 year old woman with a history of hypertension was admitted because of transient weakness of the left extremities. Because a magnetic resonance angiogram showed a stenosis of a right middle cerebral artery, a digital subtraction angiogram was requested by a referring physician to evaluate the patient for vascular disease. A right common carotid angiogram showed moderate-to-severe arteriosclerotic stenosis of a right middle cerebral artery. And a left vertebral angiogram demonstrated a large PMA arising from the third segment of the vertebral artery (**Figure 1**). The course of the PMA corresponded to the tonsillohemispheric branch of the left PICA. The proximal portion of the left PICA did not arise from the distal vertebral artery. The patient was discharged on medical management for transient ischemic attack without complications.

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Figure 1. Frontal (A) and lateral (B) views of left vertebral angiogram show a large posterior meningeal artery (PMA). The PMA arises from third segment of left vertebral artery and supplies to the territory of the tonsillohemispheric branch, which supplies the inferior surface of the cerebellar hemisphere and tonsil.

DISCUSSION

The PMA arises from the vertebral artery above the level of the arch of the atlas just below the foramen magnum. This artery usually supplies the occipital dura mater, the falx cerebelli, the tentorium cerebelli and posterior part of the falx cerebri [4-6] and it does not supply the cerebellum. However anastomosis of the PMA and PICA has been recognized [4], only nine cases have been reported in the literature. They are one case of PICA originating from the PMA [7], five cases of PMA originating from the PICA [4,5,8,9] and three cases of PICA obstruction with collateral circulation from PMA [6,10,11]. In only one case that Ogawa et al. [7] reported, the tonsillohemispheric branch of the PICA arose from the PMA, just like our case.

The hypothesis of Tanohata et al. [5] is clear about the possible embryogenesis of the anomalous origin of the PICA and the PMA. They reported two cases of anomalous origin of the PMA from the PICA, and explained for this anomalous origin as follows. The primitive blood vessels of the head differentiate into three main strata (the external, the dural and the cerebral) in the 12 mm to 20 mm embryo. Anastomotic channels exist between these three vascular

systems prior to such differentiation. Consequently, anastomosing channels are likely to exist between the primitive vessels of the future PICA and the future PMA. The anomalous origin results from persistence of one of the preexisting anastomotic channels between the primitive vessels of the future PICA and the future PMA, with regression of the proximal portion of the PMA at this time. The anomalous origin of the PICA from the PMA might occur with regression of the proximal PICA by the similar mechanism.

The PICA arising from the PMA is clinically important. In neurosurgical and neuroendovascular intervention, knowledge of this type of anomalous connection would be useful for preventing inadvertent damage of the medulla or the cerebellum.

DISCLOSURE OF INTEREST

The authors declare that they have no competing interest.

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