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Comment on "Bilateral Anomalous Posterior Inferior Cerebellar Artery-Anterior Inferior Cerebellar Artery Anastomotic Arteries Associate with a Ruptured Cerebral Aneurysm"

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Abstract

We previously reported an unusual case of bilateral posterior inferior cerebellar artery (PICA)-anterior inferior cerebellar artery (AICA) anastomosis associate with a ruptured aneurysm. Moreover, also this case had segmental absence of both distal vertebral arteries (VA). During the 7 to 12 mm embryonic stage, the basilar artery is formed by fusion of the longitudinal neural arteries. The VAs is formed by fusion of multiple segmental arteries, from C1 to C6. Inferior cerebellar arteries develop later than VAs. There is no literature concerning bilateral regression of the VAs. There is in contradiction of developmental stage between segmental regression of the VA and formation of VA-PICA-AICA-basilar artery anastomosis. Phylogenetically, PICA and AICA belong to pial arteries of the spinal cord. It is appropriate to consider segmental regression/occlusion of VAs to be acquired, and followed by development of pial collateral network involving the anterior spinal artery, the lateral spinal artery and inferior cerebellar arteries, same as the leptomeningeal anastomosis of the supratentorial circulation.

Keywords: Development of neurovascular; Inferior cerebellar artery; Vertebral artery

In this case report, we report an unusual case of bilateral posterior inferior cerebellar artery (PICA)-anterior inferior cerebellar artery (AICA) anastomosis associate with a ruptured aneurysm. Moreover, also this case had segmental absence of both distal vertebral arteries (VA). The origin of these PICAs is at the C1 level (not shown on our original report). Siclari F and Lesly WS described unique studies of PICA origin and variant. Named PICA-AICA anastomotic arteries associate with C1 origin of PICAs similar to double origin of PICA [1-3].

The developmental anatomy was well described Padget in human [4].

During the 4mm embryonic stage, the forebrain is supplied by the carotid system; along the surface of the hindbrain there are two parallel longitudinal neural arteries, which eventually fuse to form the basilar artery. The paired longitudinal neural arteries are supplied by the carotid-vertebrobasilar anastomosis (CVBA). During the 5- to 6-mm embryonic stage, an anastomosis forms between the distal internal carotid artery and corresponding longitudinal neural artery, this becomes the posterior communicating artery. Subsequently, the presegmental arteries and proatlantal intersegmental artery regress and obliterate. During the 7 to 12 mm embryonic stage, the basilar artery is formed by fusion of the longitudinal neural arteries. The VAs is formed by fusion of multiple segmental arteries, from C1 to C6.

Failure of fusion results in duplications or fenestration of the VAs. However, there is no literature concerning bilateral regression of the VA. Until 2 months of fetal development, posterior part of telencephalon is fed by VAs together with development of pial arteries [5]. Inferior cerebellar arteries develop later than VAs. Variations of cerebellar arteries are well known. However, we now think this morphological change might be congenital or acquired in our case. There is in contradiction of developmental stage between segmental regression of the VA and formation of VA-PICA-AICA-basilar artery anastomosis.

Phylogenetically, PICA and AICA belong to pial arteries of the spinal cord same as the spinal arteries, which form the vasa corona [6]. Thus, it is appropriate to consider segmental regression/occlusion of VAs to be acquired, and followed by development of pial collateral network involving the anterior spinal artery, the lateral spinal artery and inferior cerebellar arteries, same as the leptomeningeal anastomosis of the supratentorial circulation.

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