

Persistent Trigeminal Artery in Vertebral Angiography

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Summary. As a rule the primitive trigeminal artery opacifies from the internal carotid artery. Two cases are reported in which this carotidobasilar anastomosis was demonstrated from the vertebrobasilar side. Only three similar cases have been found in the literature.

Artère trigéminal persistante de montrée par l'angiographie vertébrale

Résumé. L'artère trigéminal primitive est généralement opacifiée à partir de l'artère carotide interne. Deux cas sont rapportés dans lesquels cette anastomose carotido-basilaire est opacifiée par voie vertébrobasilaire.

Uniquement trois autres cas sont décrits dans la littérature médicale.

Arteria primitiva trigemina im Vertebralis-Arteriogramm

Zusammenfassung. In der Regel wird die a. primitiva trigemina von der a. carotis interna ausgefüllt. Die Autoren berichten über 2 Fälle mit angiographischer Darstellung dieser karotidobasilaren Anastomose über die a. basilaris. In der Literatur wurden nur 3 ähnliche Beobachtungen gefunden.

It is generally accepted in the literature that the primitive trigeminal artery as demonstrated angiographically arises from the internal carotid artery (Tönnis and Schiefer, 1959; Krayenbühl and Yaşargil, 1965; Jirout, 1966; Seifert, 1969). Angiographic experience has confirmed the direction of blood flow away from the carotid artery. Nadjmi (1961) as well as Krayenbühl and Yaşargil (1965) described contrast opacification of a primitive trigeminal artery from the vertebral artery during compression of the ipsilateral internal carotid artery in the neck. Only three other cases can be found in the literature in which a primitive trigeminal artery was opacified from the basilar artery without the aid of carotid compression (Huber, 1961; Nielsen and Jonson, 1967, and Winkelmann, 1970).

The ready connections between the carotid and vertebral trees can perhaps be explained on the basis of early embryonal development. Until the intracranial circulatory pattern through the vertebral arteries develops, the carotid arteries on both sides represent the sole source of supply of the brain (Krayenbühl and Yaşargil, 1957). The entire blood supply to the posterior cranial fossa and its contents reaches it through embryonal anastomoses (primitive trigeminal, hypoglossal and acoustic arteries). Huber (1961) discounted blood flow from the carotid to the vertebral territory in adults, because similar pressure relations must be presumed to exist in both circulatory territories.

Two cases were found in the authors' series of catheter vertebral angiograms (femoral artery puncture), in both of which complete filling of a persistent trigeminal artery and partial filling of the carotid circulation from the basilar artery could be demonstrated (Fig. 1 and 2).

The first patient showed a space-occupying lesion in the posterior cranial fossa (operation¹ and subsequent histology: ependymoma of the fourth ventricle). The question arises of whether the accompanying raised pressure in the posterior cranial fossa provoked a reversal of blood flow through the persistent trigeminal artery. Nielsen and Jonson in their patient attributed

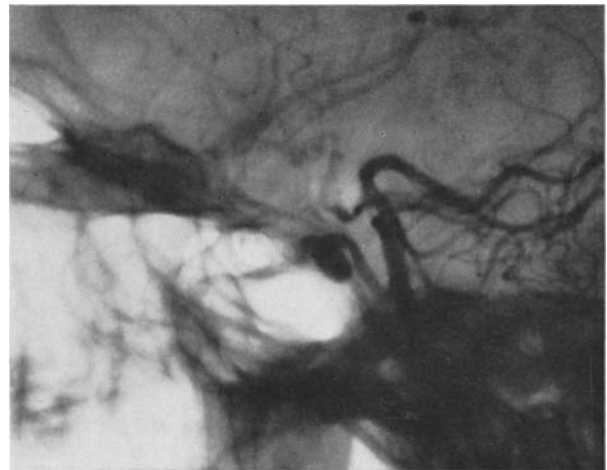


Fig. 1. Catheter vertebral angiogram in 23-year-old man, lateral projection: broad tortuous primitive trigeminal artery. Weak contrast opacification of the internal carotid artery and its branches

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filling of the persistent trigeminal artery from the vertebral tree to an extracranial stenosis of the ipsilateral internal carotid artery. Such carotid stenosis exerts a similar effect to carotid compression. On the other hand, it is known that the pressure of injection

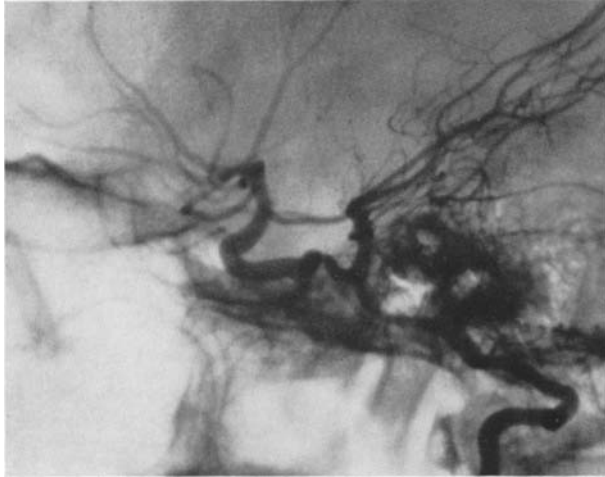


Fig. 2. Catheter vertebral angiogram in 26-year-old woman, lateral projection: primitive trigeminal artery of a relatively narrow calibre, resulting in contrast opacification of the internal carotid artery and its branches. Vessel displacement in the region of the fourth ventricle

influences the degree of filling of the posterior cerebral arteries from both intracranial systems — a factor that should not be ignored. According to Nadjmi (1961), opacification of a persistent trigeminal artery during vertebral angiography depends chiefly on the haemodynamic factors present during the examination.

Reference has been made in a previous paper (Szdzuy and Lehmann, 1970) to the possibility of partial filling of a persistent trigeminal artery from the vertebrobasilar tree, and the diagnostic difficulties created by it. In the case described, the appearances could only be explained by carotid angiography.

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