Double Ophthalmic Artery Visualized with New Technology

K. NAMBA¹, S. NEMOTO²

¹Division of Neuroendovascular Surgery, Center for Endovascular Treatment, Jichi Medical University; Tochigi, Japan

²Department of Endovascular Surgery, Tokyo Medical and Dental University; Tokyo, Japan

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SUMMARY – *The anatomy of the double ophthalmic artery was visualized using fused imaging. The images demonstrate the first angiographic visualization of the course of the vessel.*

The double ophthalmic artery is a rare variant of the ophthalmic artery with which the orbital region is supplied by two arteries. This variant is considered related to the persistence of the embryological ophthalmic arteries. Lasjaunias et al. explained the development of the ophthalmic artery by angiographic, embryologic, and phylogenetic studies¹. In the human embryo at the 4-8 mm stage, the ocular region is supplied by two arteries: the ventral and dorsal ophthalmic arteries. The ventral ophthalmic artery arises from the anterior cerebral artery and courses through the optic canal. On the other hand, the dorsal ophthalmic artery arises from the internal carotid siphon and courses through the superior orbital fissure. The ventral ophthalmic artery subsequently anastomoses with the supracavernous internal carotid artery and the dorsal ophthalmic artery in the orbit. Regression of both proximal portions of the ventral and ophthalmic artery results in the formation of the primitive ophthalmic artery. The proximal remnants of the dorsal ophthalmic artery are the inferolateral trunk arising from the horizontal portion of the carotid siphon.

In rare cases when both ventral and dorsal

ophthalmic arteries persist, a double ophthalmic artery is seen: one artery arising from the supracavernous and the other from the cavernous segment of the internal carotid artery.

An incidental right double ophthalmic artery was found in a 45-year-old woman during workup for left anterior and middle cerebral artery aneurysms. Digital subtraction angiography of the right internal carotid artery shows two ophthalmic arteries arising from the cavernous and supracavernous portions of the internal carotid artery (Figure 1). The three-dimensional rotational angiography image of the right internal carotid artery was fused with the image of the C-arm cone beam computed tomography that was obtained during the angiogram (Figure 2). The fused image shows the first direct angiographic visualization of the persistent dorsal and ventral ophthalmic arteries coursing through the superior orbital fissure and the optic canal respectively. The image was made possible by advances in angiographic technology. The resulting image brings the well-known knowledge of ophthalmic artery development into light again, and may be stimulating not only for neuroradiologists, but also for clinicians and anatomists.

Figure 1 Right internal carotid artery angiogram in anteroposterior (A) and lateral (B) views. The images show a persistent dorsal ophthalmic artery (arrows) originating from the cavernous and a persistent ventral ophthalmic artery (arrowheads) from the supracavernous internal carotid artery.

Figure 2 Fusion images of the three-dimensional rotational angiogram and the C-arm cone beam computed tomogram. The image in right anterior oblique (A) and left posterior (B) views demonstrate direct visualization of the persistent dorsal ophthalmic artery coursing through the superior orbital fissure and the persistent ventral ophthalmic artery passing through the optic canal (arrow).

References

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Katsunari Namba, MD
 Division of Neuroendovascular Surgery,
 Center for Endovascular Treatment, Jichi Medical University
 3311-1 Yakushiji, Shimotsuke, Tochigi 329-0498, Japan
 Tel.: +81-285-58-7373 – Fax: +81-285-44-5147
 E-mail: knamba@jichi.ac.jp