PERSISTENT CAROTID-BASILAR ANASTOMOSIS

THREE ARTERIOGRAPHICALLY DEMONSTRATED CASES WITH ONE ANATOMICAL SPECIMEN

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The persistent carotid-basilar anastomosis is a large anomalous vessel joining the cavernous portion of the internal carotid artery to the midportion of the basilar artery. It has been called the persistent primitive trigeminal artery because of its relationship to the gasserian ganglion, especially in early fetal life.

The presence of a carotid-basilar anastomosis such as is seen in the 3 cases here presented is caused by the persistence of a vessel prominent in very early development which is ordinarily obliterated when the embryo has reached the 14 mm. stage. Our understanding of how this comes about is based on the work of Padget18 who first identified this "primitive trigeminal artery" as a branch of the internal carotid in a 20 somite (3 mm.) human embryo. It is in this stage the principal blood supply to the plexus of vessels which form the paired longitudinal neural arteries, precursors of the basilar artery, and is apparently instrumental in their development. The formation of the carotid-basilar anastomosis itself has been suggested by Streeter16 to be related to the precocity of the gasserian ganglion, to which it is constantly related as long as it exists.

As the brain develops, the origin of this anastomotic channel becomes increasingly angulated. With this distortion, with the development of the posterior communicating arteries and later of the vertebrais to supply the basilar artery, and with the eventual interposition of the basal sphenoid cartilage the carotid-basilar anastomosis disappears. Figs. 1 and 2 illustrate several phases in the history of this artery. The close relationship to the gasserian ganglion is maintained in all recorded instances of persistence of this vessel.

REVIEW OF THE LITERATURE

Since the original illustrated case report of Quain in 184414 of a "remarkable branch" between the internal carotid artery and the basilar artery, several authors have described additional cases. The literature is summarized in Table 1. It will be noted that 9 of the anastomoses occurred on the right side and 8 on the left. In 8 of the 16 anatomical specimens, the

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Fig. 1. This illustration and Fig. 2 were assembled by Padget from her original illustrations. The artery under consideration is underlined. (a & b) A 4 mm. embryo showing how the strong trigeminal branch of the internal carotid artery supplies the bilateral longitudinal neural arteries which precede the basilar artery. By the 6 mm. stage (c), the posterior communicating arteries have usually formed to constitute the anterior supply to the neural arteries which are consolidating into the basilar artery. As a result the trigeminal arteries have dwindled.