Persistent Trigeminal Artery (Carotid-Basilar Anastomosis)

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In the 3 mm. human embryo, vascular channels, known as the trigeminal arteries, connect the intracranial portion of the internal carotid arteries with the paired vessels which later form the basilar artery. The trigeminal arteries usually are obliterated by the time the embryo is 14 mm. long; if one persists into adult life it is called a persistent (or primitive) trigeminal artery, or carotid-basilar anastomosis. The anomalous vessel connects the infraclinoidal portion of the internal carotid artery with the cephalad portion of the basilar artery. In association with the anomaly, the posterior communicating artery may be small or absent, the vertebral arteries may be small, and the basilar artery is small caudal to the anastomosis. One of us reported such a case previously and reviewed the literature. Seven additional cases are described and illustrated here.

Case Reports

Case 1. A 24-year-old woman was admitted in February, 1962, because of bilateral occipital headaches and vomiting of 1 week's duration, and diplopia for 2 days. At the time of admission to the hospital, bilateral papilledema was present, with several small retinal hemorrhages on the right. The visual acuity was 20/20. There was moderate weakness of the right lateral rectus muscle. No other neurological abnormalities were noted. Blood pressure was 110/76 mm. Hg.

A radioactive mercury scan was not abnormal. An electroencephalogram demonstrated a focus of irregular slowing in the left anterior temporal region as well as a small amount of diffuse slow activity. Roentgenograms of the skull and chest and a pneumoencephalogram were within normal limits. Spinal-fluid protein was 25 mg./100 ml. A right carotid arteriogram was also within normal limits except for a persistent right trigeminal artery (Fig. 1).

The patient was treated with Diamox and discharged from the hospital. She was seen twice in follow-up clinic, 2 weeks and 7 weeks later. Improvement had been progressive with subsidence of the papilledema and almost complete return of function of the right lateral rectus muscle. The diagnosis at this time was "pseudotumor cerebri."

Case 2. A 43-year-old woman was admitted in August, 1959. In 1951 she had sustained 2 relatively minor head injuries. Several months later she noted the gradual onset of diplopia, more marked on looking down toward the left, and alleviated by tilting the head to the left.

About 4 years before admission periodic pain developed in the right temporal region, which spread to the right supraorbital and right cervical regions. The pain was of a throbbing nature, lasted several days, and recurred about every 3 to 4 weeks.

On admission the patient was alert, intelligent, and cooperative. There was no cranial bruit, and carotid pulsations were equal bilaterally. The right superior oblique muscle was definitely weak but otherwise neurological findings were within normal limits.

Bilateral carotid angiograms did not demonstrate any abnormality except for a persistent left trigeminal artery (Fig. 2).

Case 3. A 33-year-old woman was admitted in February, 1962. Twelve days prior to entry she had an episode during which she lost consciousness for a few minutes, followed by blurred vision for a half hour. This was followed by intermittent throbbing occipital headaches and nausea and vomiting.

Sixteen years previously she had had a similar episode of unconsciousness with ensuing severe headaches.

Neurologic findings and an electroencephalogram were within normal limits. A lumbar puncture demonstrated that the cerebrospinal fluid was under normal pressure and contained 500 red blood cells/c. mm. Except for a carotid-basilar anastomosis on the left side (Fig. 3), results of bilateral carotid arteriograms were within normal limits.

Case 4. A 52-year-old woman had had frequent headaches during most of her adult life. One week

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