VERTEBRAL ARTERY FISTULA DETECTED BY RADIONUCLIDE ANGIOGRAPHY: CASE REPORT

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A vertebral artery fistula was detected as increased neck vessel activity by rapid-sequential scintigraphy.

Dynamic scintigraphy after intravenous bolus injection of ^{99m}Tc-pertechnetate has been applied to the study of the head and neck (*1,2*). This procedure has proved useful in detecting occlusive vascular lesions, particularly in the carotid and middle cerebral arteries (*3–7*). These occlusive vascular lesions appear as decreased perfusion. Here we report a vertebral artery fistula that was evident as increased activity in the neck vessel distribution during the dynamic study.

CASE REPORT

A 52-year-old woman was admitted with complaints of "roaring" in the left ear of 7 months' duration. Loud carotid bruits were heard bilaterally. On the day after admission, a cerebral angioscintigram and a brain scan were performed with the Anger camera. The studies were obtained after intravenous injection of 15 mCi of ^{99m}Tc-pertechnetate, preceded by an oral dose of 200 mg of potassium perchlorate to block the choroid plexus.

The patient stated that the left-sided tinnitus had begun after a cervical disk was surgically removed by a posterior approach. Accordingly we elected to perform the radionuclide study in the posterior position. Serial images were obtained every 2 sec, synchronizing hand-pulled films with the timer on the camera. Scintiangiography showed that right neck activity, representing vertebral and carotid perfusion, was prominent (Fig. 1).

The increased extracranial activity persisted throughout the dynamic study. Intracranial and left neck perfusion appeared to be decreased relative to right neck radioactivity. On three or four of the scintiphotos, there appeared to be a vascular communication across the midline from the right neck vessel to the left side. In the venous phase, the relatively higher concentration of the tracer in the right

Received June 26, 1975; revision accepted July 29, 1975.

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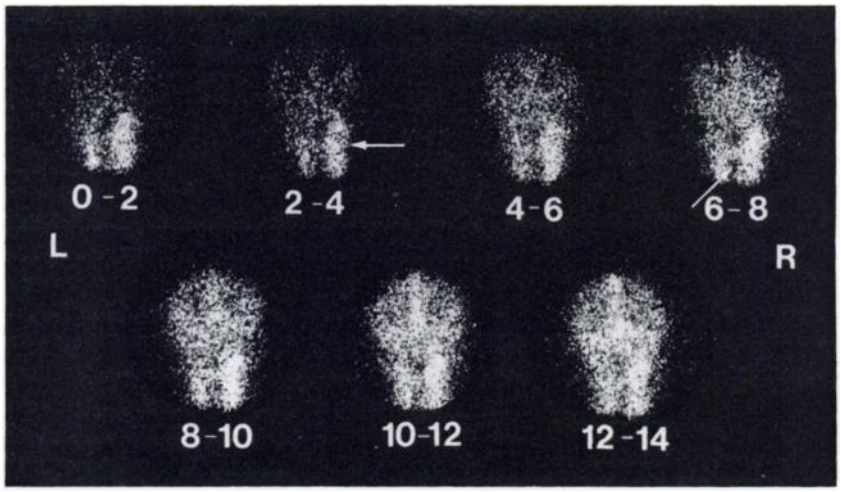

FIG. 1. Scintiphotos from radionuclide angiogram of neck (posterior position) and immediate postinjection brain images. Arrows point to vertebral artery fistula and draining vein coursing to right neck. Numbers denote time range in seconds.

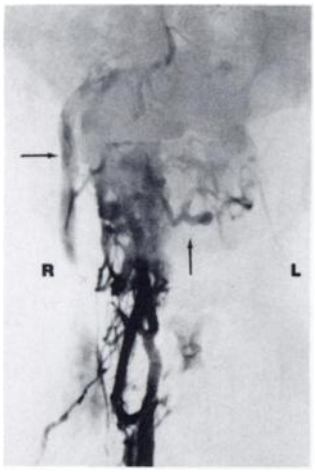

FIG. 2. Subtraction vertebral angiogram showing multiple arteriovenous communications. Arrows point to right internal jugular vein and draining vein across midline.

neck was much less evident. The abnormality was not seen on the immediate postinjection scintiphotos or on subsequent brain images. This was thought to be either a vascular tumor, or more likely, an arteriovenous communication between the right vertebral artery and/or the right carotid system and the left-sided veins.

Contrast injection into an enlarged right vertebral artery (Fig. 2) showed multiple arteriovenous communications in the right neck. The ascending cervical branch of the thyrocervical artery was also enlarged. There was early opacification of the right internal jugular vein. Selective injections into the right and left common carotid arteries and the left vertebral artery revealed no additional vascular abnormalities. At surgery a 1.5-mm fistula in the right vertebral artery was found. The arteriovenous communication, which apparently resulted from the cervical disk surgery, was ligated.

DISCUSSION

Asymmetry in the neck vessels, visible on scintigrams, does not always indicate occlusive disease. Serafini and Weinstein (*8*) reported a carotid body tumor that was seen on rapid-sequential scintigraphy as a region of increased activity overlying a carotid artery.

In our case, the arteriovenous communication was seen as asymmetry or unusual increase in activity during the ^{99m}Tc-pertechnetate perfusion study. The characteristic pattern of an arteriovenous malformation was observed: early accumulation of the radiopharmaceutical, with subsequent rapid washout, in the area of the vascular communication (*9*). In addition to carotid body tumors and abnormal arteriovenous communications, we would expect an aneurysm of the internal carotid artery, glomus jugulare tumors, or other vascular neck tumors to cause a regional increase in neck activity on a radionuclide angiogram.

This unusual case is reported to increase one's awareness and index of suspicion for hypervascular abnormalities in the major neck vessels.

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