

A PRO-ATLANTAL INTERSEGMENTAL ARTERY BETWEEN THE VERTEBRAL AND OCCIPITAL ARTERIES

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SUMMARY :

A pro-atlantal intersegmental artery between the vertebral and occipital arteries in a patient is described. The intersegmental artery was treated by acrylic coating.

KEY WORDS :

Carotid artery, vertebral artery.

INTRODUCTION:

A pro-atlantal intersegmental artery may originate either from the cervical internal carotid or the external carotid artery and its persistence has been reported as an incidental and angiographic observation (2,4,6,7,11). This report describes a pro-atlantal intersegmental artery between the vertebral and carotid arteries.

CASE REPORT:

A nine-year-old male child was admitted to the Department of Neurosurgery of Hacettepe University with a fifteen-day history of vomiting and ataxia which had begun spontaneously.

Neurological examination revealed cerebellar ataxia and dysdiadochokinesia. The right suboccipital area was not pulsatile and no bruit was detected. Computerized tomography (CT) showed a hypodense area near the left part of the fourth ventricle and bone erosion of the posterior part of the right occipital condyle (Figure 1). Lumbar puncture was performed and there was no abnormality.

Transfemoral carotid and vertebral angiograms revealed an excessive vascular structure at the right vertebral artery (Figure 2) and it was decided to explore at this region.

A right paramedian vertical incision was made. The superficial muscles and periosteum were incised with electrocauterisation. An artery located next to the atlas was observed. This was a huge, thin walled aneurysmatic intersegmental artery with a diameter of 8-10 mm and a length of 5-6 extending from the right vertebral to the occipital artery (Figure 3). Transient clipping showed that the blood was flowing

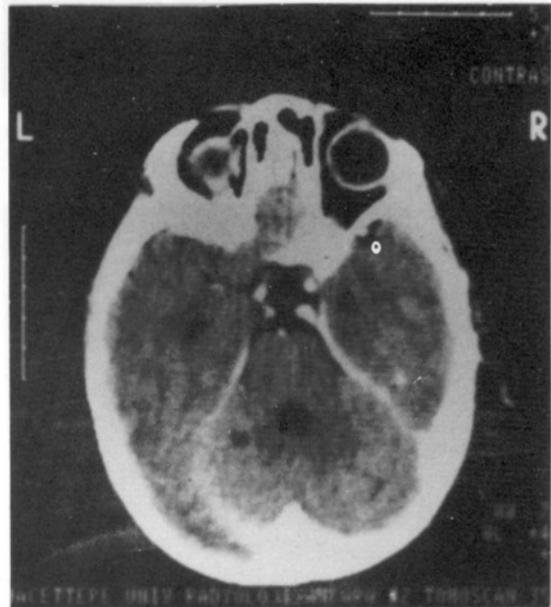


Figure 1 : Preoperative computerized tomogram showing a hypodense area near the left part of the fourth ventricle.

from the vertebral artery. This abnormal channel was coated with acrylic. Postoperatively intravenous digital subtraction angiography (IVDSA) demonstrated a congenital anastomosis between the right vertebral and occipital arteries. Configurations of the other part of the carotid and vertebral systems were normal (Figure 4). Cerebellar signs improved in fifteen days.

DISCUSSION:

The pro-atlantal intersegmental artery is extremely rare (6). Padgett (10) noted that it starts to regress at the 7th to 12th stage of embryonic develop-

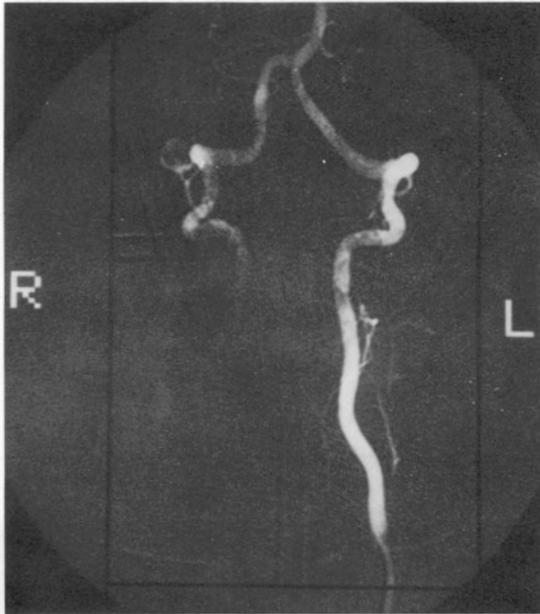


Figure 2 : Transfemoral vertebral angiogram demonstrating an excessive vascular structure at the atlantal part of the right vertebral artery.



Figure 3 : Operative view showing a huge aneurysmatic intersegmental artery.

ment and has completely disappeared by the time the embryo has reached the 12th to 14th stage. This pro-atlantal intersegmental artery may have persisted because of aplasia of the vertebral arteries (6).

In Gray's (3) Anatomy of the Human Body, the descending branch of the external carotid artery descends in the back of the neck dividing into a

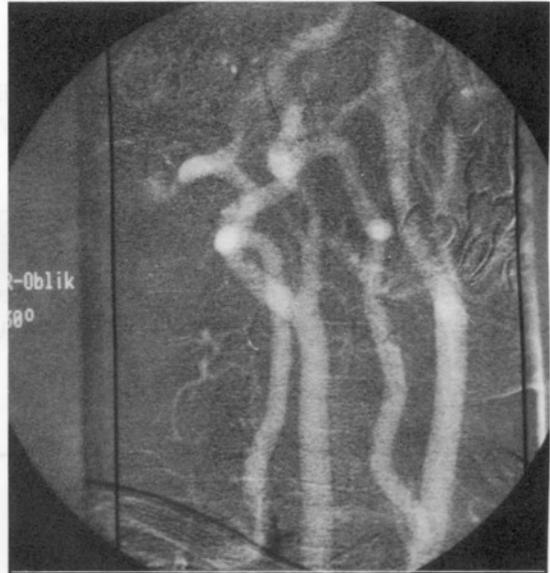


Figure 4 : IVDSA demonstrating an anastomosis between the right vertebral and occipital arteries.

superficial and a deep portion. The deep portion may have anastomosis with the vertebral artery. The vertebral arteries of ruminants are supplied from an artery originating intracranially (5)

Schulze and Saurbrey (13) examined 53 bodies postmortem for the presence of this anastomosis by introducing coloured latex into the vessels and in 45 of the cases, there was a direct anastomosis between both occipital and vertebral arteries. The anastomosis between the occipital branch of the external carotid artery and vertebral arteries in cerebrovascular occlusion is documented by Schechter (12) as an angiographic observation.

Review of the literature revealed four cases of congenital external carotid and vertebral anastomosis similar to the presented case (2,4,7,11). It was demonstrated that the basilar artery received its main supply from the vertebral artery and not from the pro-atlantal intersegmental artery which was seen to fill the vertebral artery in our case. The relative infrequency of radiological demonstration of this anastomosis may be because of the small calibre of the channels. However, in our case the intersegmental artery had an 8-10 mm diameter and an aneurysmal dilatation on the vertebral side. IVDSA demonstrated an anastomotic channel between the right vertebral and occipital arteries in the postoperative period. The anastomosis became radiologically evident by either temporarily increasing the pressure at the level or cutting the muscular tunnel over the intersegmental artery in the surgical intervention.

Aneurysms of the extracranial portion of the vertebral artery are rare and usually secondary to trauma (8,14). There have been a few reported cases involving aneurysm which suggested that the aneurysm was secondary to neurofibromatosis. These aneurysms were treated by endovascular balloon occlusion of the proximal vertebral artery (1,9). Although in our case, angiographic examination revealed a huge, irregular aneurysmal dilatation, at surgical intervention, we did not confirm this diagnosis. In contrast, a huge intersegmental artery was found. We hesitated to occlude this because we had insufficient information about the circulatory dynamics of the exposed vertebral artery. In order to exclude the possibility vertebro-basilar insufficiency, we decided to coat this anomaly. Our review of the literature failed to find any other case report which received surgical intervention. This intersegmental artery was accepted as a congenital anastomosis between the external carotid and vertebral arteries.

In conclusion, in the view of our surgery findings and as shown in the postoperative investigations, we accepted this variation as a pro-atlantal intersegmental artery.

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