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CASE REPORT **OLGU SUNUMU**

A DIFFERENT ANATOMIC VARIATION IN AORTIC ARCH BRANCHING

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ABSTRACT

There are many anatomical variations in the branching of the aortic arch. Although these are generally asymptomatic, it is useful to know them in terms of preventing complications in radiological and surgical interventional procedures. We aimed to present a patient who has undergone cervicocerebral angiography for the etiology of ischemic stroke and has a previously unpublished aortic arch branching variation.
Keywords: Aortic arch, branching anomaly, angiography.

ARKUS AORTA DALLANMASINDA FARKLI BİR ANATOMİK VARYASYON

ÖZ

Arkus aorta dallanmasında birçok anatomik varyasyon mevcuttur. Bunlar genellikle asemptomatik olmasına rağmen, radyolojik ve cerrahi girişimsel işlemlerde komplikasyonları önlemek açısından bilinmesinde yarar vardır. İskemik strok etyolojisi açısından servikoserebral anjiografi yaptığımız ve daha önce yayınlanmamış arkus aorta dallanma varyasyonu olan hastamızı sunmayı amaçladık.
Anahtar Sözcükler: Arkus aorta, dallanma anomalisi, anjiografi.

INTRODUCTION

There are various anatomical variations in the branching of the aortic arch (AA). These anatomical variations differ between breeds. The most common branching type of AA is the type originating from the truncus brachiocephalic (TB), left common carotid artery (LCC), and left subclavian (LS) artery, respectively (1). This branching type is observed in humans with a frequency ranging from 49.7% to 94.3% (1,2).

Although these vessel variances are frequently asymptomatic, they are crucial in averting problems during radiological and surgical interventional treatments (1).

In our case, a patient's cerebral angiography revealed an unreported AA branching anomaly.

CASE REPORT

A 76-year-old female patient presented to the emergency department at the 12th hour of acute onset of weakness in the left arm and leg and was admitted to our neurology service. She had a history of hypertension and diabetes mellitus. There was no finding other than left central facial paralysis, left hemiparesis, and left plantar response extensor in her neurological examination. Diffusion magnetic resonance (MR) imaging revealed right middle cerebral artery (MCA) infarction. Dual antiaggregant was started. For etiology, the patient underwent echocardiography and cervical MR angiography. There were signs of stenosis in the right internal carotid artery, although MR angiography could not

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be appropriately examined due to artefact induced by patient movement (ICA). Cervicocerebral digital subtraction angiography (DSA) was planned to evaluate the patient more clearly. Aortography using a 5F Pigtail catheter inserted via the right main femoral artery revealed differences from the normal configuration of the main vessels coming out of the AA. From the AA, the right common carotid (RCC) and LCC were originating from the same root (Figure 1), while the right subclavian (RS) and left subclavian (LS) arteries were coming together from a second root (Figure 2). A 5F Head Hunter catheter was used to obtain angiography images of the right carotid and vertebral systems. A 5F Simmon 2 catheter was used for LCC catheterization. It was noted that the right vertebral artery (VA) emerged from the RCC (Figure 3). An 80% stenosis was observed in the right ICA proximal (Figure 3). Right MCA and anterior cerebral artery (ACA) were normal. Atherosclerotic irregularities were observed in the left proximal ICA that did not cause significant stenosis. For technical reasons, images of Left MCA and ACA could not be acquired. Left VA could not be visualized (Figure 2). A signed informed consent form was obtained from the patient for this publication.

Figure 1. The right and left common carotid arteries emerge from the same root from the aortic arch, as shown in DSA.

Figure 2. In DSA, it is seen that right and left subclavian arteries arise from the same root.

Figure 3. Stenosis proximal to the right internal carotid artery and the right vertebral artery originate from the right common carotid artery.

DISCUSSION AND CONCLUSION

The embryological development of the aortic arch and its branches in humans occur between the fourth and eighth weeks of fetal life, and the underlying cause is unknown. However, differences in this developmental period lead to the formation of variations and abnormalities related to the aortic arch and its branches (1,3,4).

In the most common classical type, the truncus brachiocephalicus, LCC, and left subclavian artery originate from the aorta from right to left, respectively. The truncus brachiocephalicus then gives off two branches, the right subclavian artery and the right common carotid artery.

The incidence of this classical type varies from 49.7% to 94.3% (2).

Ergun et al. examined the branching pattern of the aortic arch in CT angiography images of 1,001 patients. They defined the aortic arch branching, which has 2 main trunks (for the carotids and the subclavian vessels), as type 6, like our case, but there were no patients with type 6 branching in their case. A case with the right vertebral artery coming from the right common carotid artery was similar to ours (2).

Karacan et al. examined 1,000 computed CT angiography images; there was variation in 20.8%, and they divided the aortic arch branching into 7 types. They did not observe the branching pattern seen in our patient in any of the patients (5).

Uğur et al. reported a 54-year-old patient in whom they found that the left common carotid artery originated from the truncus brachiocephalicus in cervical MRI angiography (6).

Kıvrak et al. found a mirror image of the aortic arch in thorax CT angiography. The presence of truncus brachiocephalicus on the left and absence of truncus brachiocephalicus on the right were due to the origin of the arteries on the right side, first the right common carotid artery and then the right subclavian artery (7).

In their cadaver dissection, Karaköse et al. detected 2 cases with left vertebral artery originating from the aortic arch (8).

Müller et al. analyzed the contrast-enhanced CT of 2,033 patients and divided the patients into two groups, A and B, based on the age range. 3 months-49 years of age were named as group A, and 50-94 years of age were named as group B. They found 13.5% of patients in group A and 13.2% in group B with the aortic arch anomaly. Truncus bicaroticus, the direct origin of the vertebral artery from the aortic arch, aberrant subclavian artery were the branching anomalies of the aortic arch they detected (9).

As seen in the above studies, there are many studies on the aortic arch branching pattern. Some of them were made by DSA, some by CT and CT angiography, MR angiography, and cadaver examinations. In our patient, in DSA, right and left common carotid arteries originated from one root, right and left subclavian arteries originated from a second root, and the right vertebral artery originated from the right common carotid artery. Ergun et al. (2) defined this pattern as type 6, but they never encountered this type of branching pattern in their series. The case closest to ours was reported by Kumar et al., as truncus bicaroticus, aberrant right subclavian artery, and the right vertebral artery originating from the right common carotid artery (10). However, a variation including all the variations seen in our patient was not found in case series and studies.

As a result, the branching pattern of the aortic arch can result in different variations. Most of these anomalies are discovered incidentally during surgery or angiographic procedures. Clinically, it is usually asymptomatic. However, knowing these anomalies may help minimize the risk of complications during thoracic, cardiac surgical interventions and angiographic interventional procedures.

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Ethics

Informed Consent: The authors declared that informed consent form was signed by the patient.

Copyright Transfer Form: Copyright Transfer Form was signed by the authors.

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