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RIGHT APLASTIC AND LEFT HYPOPLASTIC INTERNAL CAROTID ARTERIES: A CASE REPORT

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SUMMARY

Congenial aplasia and/or hypoplasia of internal carotid arteria is a rare anomaly in the congenital cranial vascular malformations. We report a case had right aplastic and left hypoplastic internal carotid arteries who presenting with subarachnoid hemorrhage.

Key Worlds: Internal carotid arteries, aplasia, hypoplasia, subarachnoid hemorrhage.

CASE

A 53 years old woman was referred to Ondokuz Mayıs University, School of Medicine, Department of Neurosurgery and with a diagnosis of subarachnoid hemorrhage vascular radiology department to be investigated assessment was planned subarachnoid hemorrhage. Bilateral common carotid angiography revealed absence of the right internal carotid artery and no evidence of intracranial filling, whereas left internal carotid artery was severely hypoplastic (Fig. 1a and b). Left vertebral arteriography showed an enlarged left vertebral artery and a tortuous, widened basilar artery. Anterior and middle cerebral arteries were filled through the enlarged posterior communicating arteries which normally participated to the circle of Willis (Fig. 2a and b). Neither digital subtraction angiography nor MR angiography depicted aneurysm. High-resolution skull base computed tomography (CT) demonstrated severe hypoplasia of both carotid canals (Fig. 3).

DISCUSSION

Congenital absence of ICA is a very rare anomaly and may be due to agenesis or aplasia. Agenesis is a primary failure of development characterized with the absence of the carotid canal. In the present case, the right internal carotid artery is aplastic whereas the carotid canal is present altough severely hypoplastic and the remnant of the vessel persists on the left. The absence of the bony carotid canal will verify true agenesis of the artery as apposed to aplasia or hypoplasia and can be easily determined with the use of CT (1, 3). The absence or hypoplasia of the carotid canal in the sphenoid bone is basic findings of differantial diagnosis from the carotid artery stenosis or obstruction (Figure 3).

ICA anomalies are usually discovered incidentally. Skull base CT may show absence of the carotid canal (8). CT or MR of head define the enlarged collateral vessels. These findings should alert us for internal carotid artery agenesis or aplasia. Then MRA or DSA should be performed to demonstrate the vasculature of the brain and to investigate whether there is any aneurysm.

Patients with this congenital vascular anomaly can be completely asymptomatic for the majority of their lives, because extensive collateral supply to the involved ICA vascular territory develops (6). Symptoms if present can not be directly explaned by the absence of the internal carotid arteries and include subarachnoidal bleeding (intracranial hemorrhage), recurrent headaches, hearing loss, seizures and hemiparesis (4, 9, 10). Subarachnoidal hemorrhages may be due to ruptured intracranial aneurysm. Our patient had no ischemic symptoms. Incidence of intracranial aneurysms in cases of absence of the ICA is significantly higher up to 25 % (4, 11, 12). This high incidence can be explained by deranged hemodynamic forces or developmental errors. We found no aneurysm by DSA or MRA in our case. We therefore supposed that increased hemodynamic stress on the enlarged vessels is the cause of hemorrhage .

In most cases of bilateral internal carotid artery aplasia, blood flow to the anterior and middle cerebral arteries has been supplied by vertebrobasiller system via posterior communicating arteries (5, 6, 9). Furthermore, persistent primitive circulation present before the formation of the circle of Willis, may form transsellar anastomoses, finally transcranial anastomoses may develop from the external carotid system (3, 7, 9).

The most common type of collateral circulation in patients with bilateral ICA absence is through the basilar and posterior communicating arteries (Figure 2a) (11). In these cases, involution of the ICA probably occurrs after the completion of the circle of Willis (3).

Although rare, bilateral ICA absence may cause subarachnoid bleeding, mainly because it is commonly associated with aneurysms. In these cases hemodynamic stress possibly contributes to

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the development of aneurysms, and, as suggested in the present case may also cause bleeding even in the absence of an aneurysm.

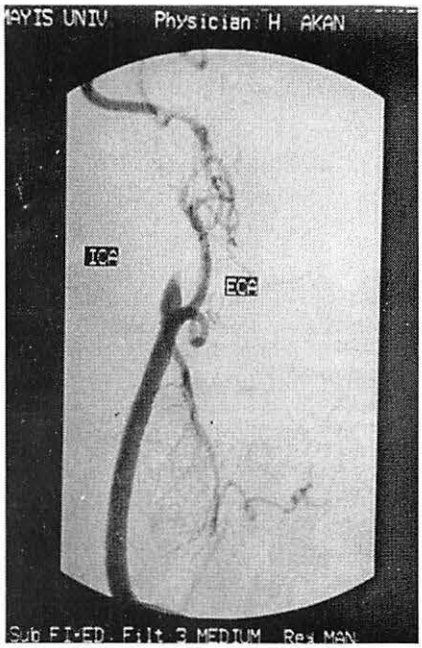

Fig 1. (a)

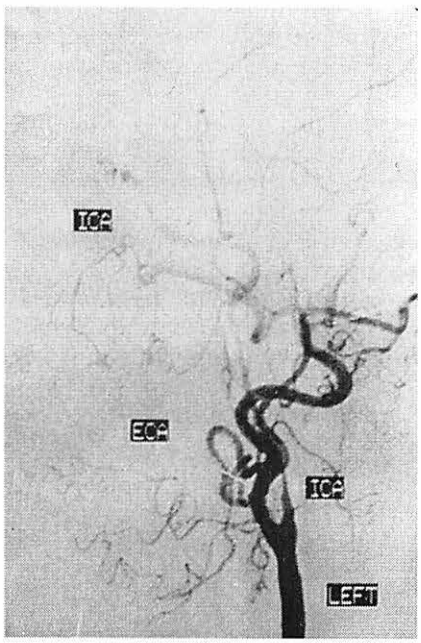

Fig 1. (b)

Fig 1. (a) Right common carotid subtracted angiogram shows opacification of external carotid artery only. No internal carotid artery is demonstrated. (b) Left common carotid angiogram demonstrates severe hypoplasia of the left internal carotid artery.

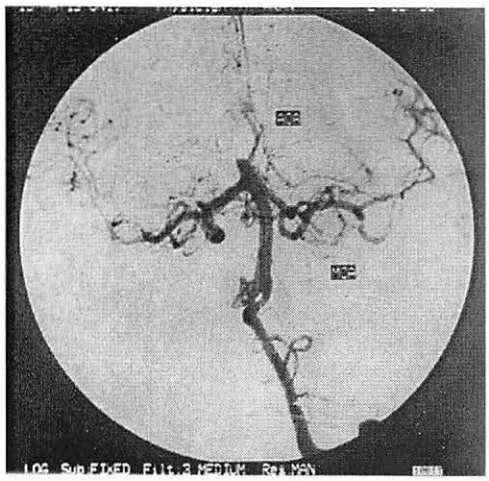

Fig 2. (a)

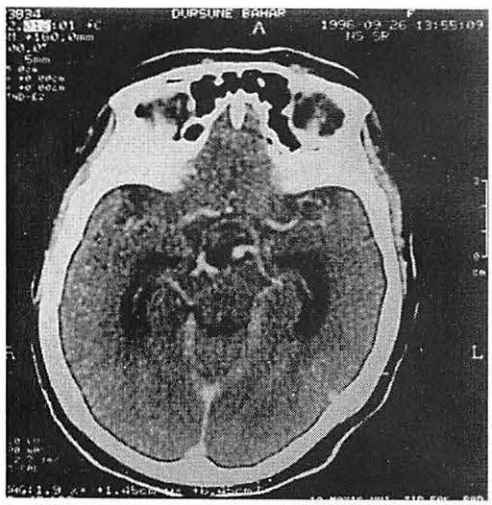

Fig 2. (b)

Fig. 2. (a) Anteroposterior view of the left vertebral artery filling intracranial vessels through posterior communicating arteries bilaterally. (b) Contrast enhanced CT scan showing the arteries of the Willis circle.

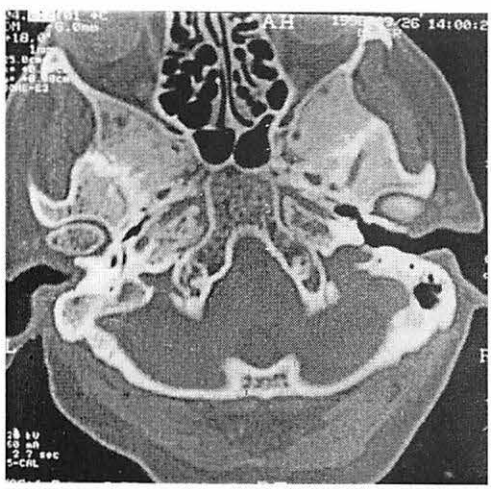

Fig 3. High-resolution skull base CT scan shows severe hypoplasia of both carotid canals.

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