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**Bilateral Anomalous Occipital Artery of  
Internal Carotid Origin : Case Report**

ISAO MATSUDA, JYOJI HANDA, HAJIME HANDA,  
and HIROYUKI MIZUNO

Department of Neurosurgery, Kyoto University Medical  
School and Hospital, Kyoto (I.M., J.H., H.H.), and Ohtsu  
Municipal Hospital, (H.M.),

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Usually no branch arises from the cervical segment of the internal carotid artery<sup>5,13</sup>. Reviewing the literature, we have found only few reported cases of the occipital artery originating from the cervical internal carotid artery. We are reporting here another case where such anomalies were present on both sides.

**Case Report**

This 46-year-old, right handed man, presented with the history of dysphasia and spastic right hemiparesis, which had been rapidly progressing since the onset 3 days before. Left carotid angiogram disclosed a large frontal intracerebral mass, and a brain abscess was evacuated on the day of admission.

Reviewing the angiogram later, it was found that an anomalous artery had arisen from the cervical segment of the internal carotid artery 2 cm distal to the carotid bifurcation. Judging from further course and the final territory of supply of this anomalous branch, it was considered to represent the occipital artery. No other branch corresponding to the occipital artery was found to have originated from the external carotid artery (Fig. 1).

Postoperatively, bilateral carotid angiographies were performed because of the protracted clinical course. An anomalous origin of the left occipital artery was confirmed. In addition, the occipital artery of the right side originated also from the cervical segment of the internal carotid artery (Fig. 2).

**Discussion**

The occipital artery arises from the posterior surface of the external carotid artery opposite the external maxillary artery, and extends superiorly and posteriorly to supply the skin and muscles of the suboccipital region.

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Key Words : carotid arteries, cerebral angiography, cerebral arteries.

Present Address : Department of Neurosurgery, Kyoto University Medical School, Sakyo-ku Kyoto, Japan. 〒 606



Fig. 1. Left carotid angiogram, arterial phase, lateral projection. The common carotid artery was punctured low in the neck. The occipital artery arises from the internal carotid artery 2 cm distal to the carotid bifurcation. An anomalous origin of the posterior temporal artery is also visualized. (Subtraction not available).

In 1821, BURNS<sup>9)</sup> reported a case in which all branches of the external carotid artery had arisen from the internal carotid artery. However, this case might be rather an example of the extremely high bifurcation of the carotid artery as has been discussed by LIE<sup>9)</sup>.

To our knowledge, HYRTL<sup>6)</sup> seems to be the first to have reported a definitive case of an anomalous origin of the occipital artery from the cervical segment of the internal carotid artery. Thereafter, several reports on this type of rare vascular anomaly appeared in the anatomical literature<sup>1,2,7,12)</sup>.



**Fig. 2.** Right internal carotid angiogram, arterial phase, lateral projection (second-order subtraction). The occipital artery arises from the internal carotid artery 2 cm distal to the carotid bifurcation.

Angiographic reports of the internal carotid origin of the occipital artery have been limited to 7 cases<sup>8,10,14,15</sup>. In the case of SEIDEL<sup>14</sup>, the distal external carotid artery was obliterated and all of the branches of the normally external carotid origin including the occipital artery were seen arising from the internal carotid artery. In all these 12 previous cases, the anomaly was described on one side only. The present case is unique in that the bilateral anomalies were confirmed for the first time by carotid angiograms (Table 1).

Clinical significance of this type of vascular anomaly seems to be meager. In the case of NEWTON et al.<sup>10</sup>, a complete occlusion of the proximal portion of the internal carotid

**Table 1.** Occipital artery originated from the cervical internal carotid artery.

| Author (s)        | Year | Number of cases | Side fo anomaly | Confirmation |
|-------------------|------|-----------------|-----------------|--------------|
| Hyrtil            | 1841 | 1               | ?               | Pathology    |
| Quain             | 1849 | 1               | ?               | Pathology    |
| Krause            | 1868 | 1               | ?               | Pathology    |
| Adachi            | 1928 | 1               | Right           | Pathology    |
| Altmann           | 1947 | 1               | ?               | Pathology    |
| Seidel            | 1965 | 1               | Left            | Angiography  |
| Newton et al.     | 1968 | 1<br>2          | Right<br>?      | Angiography  |
| Lapayowker et al. | 1971 | 1               | Right           | Angiography  |
| Teal et al.       | 1973 | 1<br>1          | Right<br>Left   | Angiography  |
| Present case      | 1976 | 1               | Bilateral       | Angiography  |
| Total             |      | 13              |                 |              |

artery was demonstrated by subclavian angiography. The distal internal carotid artery was opacified by way of a direct collateral channel between the vertebral artery and the occipital artery which originated from the internal carotid artery distal to the occlusion. In this particular case, an anomalous occipital artery permitted maintenance of the internal carotid blood flow, but this seems to be an exceptional experience.

The embryological mechanism of development of this vascular anomaly remains to be speculative. The stem of the external carotid artery can be observed in the stage 3 embryo (7~12mm), arising from the ventral aspect of the third aortic arch near the origin from the aortic sac. The primitive internal carotid artery arises as a branch from the first aortic arch in the embryo of 3 mm, and it may be seen extending cranially from the dorsal aorta in the 4 mm stage. The third aortic arch is retained in the subsequent stages of development as the root portin of the definitive internal carotid artery<sup>1)</sup>.

The occipital artery and other arterial branches of normally external carotid origin develop from a capillary network, with which vascular buds from the neighboring arteries become connected. During the process of further embryological development, certain parts of the network retain connections with the stem of the external carotid artery, whereas a part of it may well become arisen from the third aortic arch<sup>2,1)</sup>. Thus, a great variability can prevail in the points of origin of these vessels normally given off by the external carotid artery, and some of them may finally become a branch of the internal carotid as in the present case.

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## 和文抄録

### 両側内頸動脈より分枝した後頭動脈の1例

京都大学医学部脳神経外科学教室 (主任: 半田肇教授)

松田 功, 半田 讓二, 半田 肇

大津市民病院外科

水野 博行

後頭動脈は外頸動脈より分枝するのが通常である。本症例は前頭葉脳腫瘍のため、両側頸動脈撮影を行った結果、両側の後頭動脈が、頸動脈分岐部末梢にて内頸動脈より分枝していた。現在まで文献上12例が報告

され、そのうち5例は剖検で、7例は血管撮影で確認されているが、いずれも一側例であり本例のごとく血管撮影で両側の異常分枝を示した例は、まれであるとおもわれたので、文献的考察をくわえてみた。