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Case Report

Absence of the right internal carotid artery found during autopsy of a severe burn case

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Abstract

Since absence and hypoplasia of the internal carotid arteries are known to be rare anomalies but often presents no symptoms, most such cases are accidentally revealed by a carotid angiogram performed for patients with cerebrovascular disease. We herein report the autopsy findings for a 65-year-old man who burned to death in an apartment fire. Medicolegal autopsy revealed absence of the right internal carotid artery. However, malformation of the brain was not observed. Generally, it is difficult to decide the manner of death in an autopsy case of death due to burn, however, it is possible that the manner of death was natural death in this case.

Keywords: Burn; Internal carotid artery; Fire; Medicolegal autopsy

1. Introduction

In 1787, the first reported case of the aplastic internal carotid artery was described by Tode, and many cases of absence or hypoplasia of the internal carotid arteries have been reported since then [1]. However, the incidence of absence or hypoplasia of the internal carotid arteries is estimated to be rare. We describe an autopsy case of a fire victim who showed absence of the right internal carotid artery.

2. Case history

A burned male corpse was found in an apartment which had been damaged in a fire. The head was severely burned, exposing the muscles and the skull bone. The lower limbs were also burned heavily and lacerated in parts. It was not possible to identify the corpse at that time because of such severe damage. In order to investigate the cause of death and to identify the corpse, a medicolegal autopsy was performed at Mie University Graduate School of Medicine.

3. Autopsy findings

The deceased was 163 cm tall and weighed 60.5 kg. As for the head, the skin was burned down and the charred skull was exposed. At the trunk and the extremities, most of the skin was charred or showed leathery change. There were no other injuries with the exception of several skin wounds without vital reaction, which had been caused when the house had collapsed.

In the neck, the right common carotid artery was narrow compared with the left common carotid artery. Moreover, the left common carotid artery was divided into the left external and internal carotid arteries at the level of the upper edge of the thyroid cartilage, however, there was no bifurcation into the external and internal carotid arteries in the right carotid artery at the same level (Fig. 1). In addition, we noted that there was absence of

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the right omohyoid muscle, whereas the other cervical muscles did not show any anomalies.

The brain weighed 1420 g. On macroscopic investigation of the arteries at the base of the brain, the right internal carotid artery was found to be absent. Moreover, the right carotid canal was not open at the base of the skull (Fig. 2). The right middle cerebral artery arose from the right posterior cerebral artery via a well-developed right posterior communicating artery, while the right anterior cerebral artery was supplied from the left anterior cerebral arteries through the anterior communicating artery. A thin vessel communicated between the right anterior and middle cerebral artery, which by nature is a start of right anterior cerebral artery (Fig. 3). The bilateral vertebral arteries and the basilar artery were enlarged. These arteries showed severe atherosclerotic changes, however no aneurysms or injuries were detected. In the coronal section, some small infarct lesions were detected in the right basal ganglia of the cerebrum. No significant findings were found in the cerebellum or the brain stem. There was a 7-g extradural hematoma, which was considered to be a heat hematoma. On microscopic examination, severe arteriolosclerosis and a small hemorrhagic lesion were seen in the right cerebral basal ganglia (Fig. 4a–c). Iron granule cells were stained strongly with Berlin blue staining, indicating that this hemorrhage had occurred several days before his death. No significant findings were found at any of the other sites of the cerebrum.

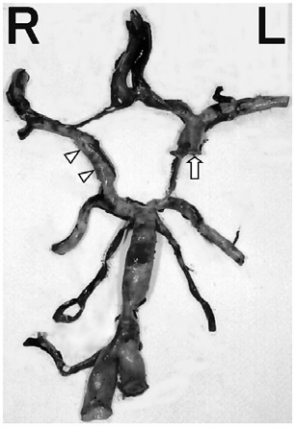

Fig. 3. The circle of Willis. The right internal carotid artery is absent, whereas the left internal carotid artery demonstrates a normal appearance (arrow), and the posterior communicating artery is well developed (arrowhead).

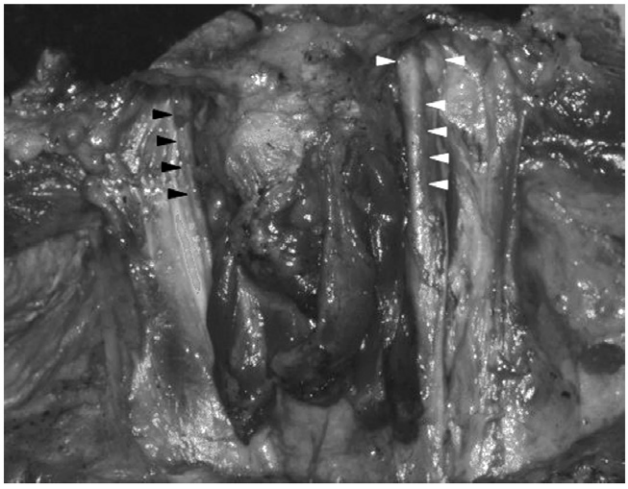

Fig. 1. Macroscopic appearance of the neck. The right common carotid artery is narrow and lacks bifurcation (filled arrowhead) compared to the left common carotid artery (open arrowhead).

Fig. 2. The skull base. The right internal carotid artery is absent.

The heart weighed 505 g, showing concentric hypertrophy, where microscopic investigation of the bilateral ventricles of the heart revealed variation in size among the myocardial cells. The right coronary artery showed 75% stenosis, and atherosclerotic changes in the right and left coronary arteries were seen, however, no scarring or fresh ischemic changes to the myocardium were detected. Atherosclerosis and partial calcification were observed in the aorta macro- and microscopically.

The mucosa of the pharynx and the larynx was reddish and edematous. A small amount of soot was attached to the lumen of the trachea. The saturation of blood hemoglobin by carbon monoxide was determined at 5.2%. No other drugs nor alcohol were detected in either the blood or the urine.

We diagnosed the cause of death as death from burns. Based on dental findings, the deceased was identified as a 65-year-old man who was living in the apartment where the fire had occurred.

4. Discussion

Agenesis, aplasia and hypoplasia of the internal carotid arteries are all rare anomalies. On the basis of the results of carotid angiograms [2] or autopsy findings [3], the incidence of absence and hypoplasia of the internal carotid