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Case Report

TALE OF A MISSING TUNNEL-UNILATERAL AGENESIS OF CAROTID CANAL: A RARE CASE REPORT

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ABSTRACT

Agenesis of the internal carotid artery is a rare congenital anomaly, occurring in less than 0.01% of the population. The patients with ICA agenesis are asymptomatic, sometimes discovered incidentally, or diagnosed by finding a collateral circulation .The most common type of collateral flow is through the Circle of Willis. The only method to the diagnosis of aplasia or agenesis of the ICA is based on angiographic findings and the presence of an absent or hypoplastic bony carotid canal by temporal bone CT. Carotid agenesis must be considered as a differential diagnosis while diagnosing many other clinical cases.

KEY WORDS: Agenesis, Carotid canal, Collateral circulation, Internal carotid artery.

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INTRODUCTION

Agenesis and aplasia of the internal carotid artery are rare congenital anomalies, occurring in less than 0.01% of the population [1]. The term absence incorporates agenesis, aplasia, and hypoplasia of the ICA. Intracranial circulation in the involved internal carotid artery territory is maintained by collateral circulation from the contralateral internal carotid artery through the anterior communicating artery and from the vertebrobasilar system through the posterior communicating artery. Thus in this context, the most common type of collateral flow is through the circle of Willis. Less commonly, collateral flow is provided via persistent embryonic vessels or from transcranial collaterals originating from the external carotid artery (ECA) system.

Alternatively, persistent foetal communications through the sella turcica may provide a source of blood supply from one supraclinoid carotid artery to its contralateral counterpart [2].

CASE REPORT

During routine osteology classes in the department of anatomy, VIMSAR, Burla, it was found that one out of the 103 skull bones showed unilateral complete agenesis of carotid canal.

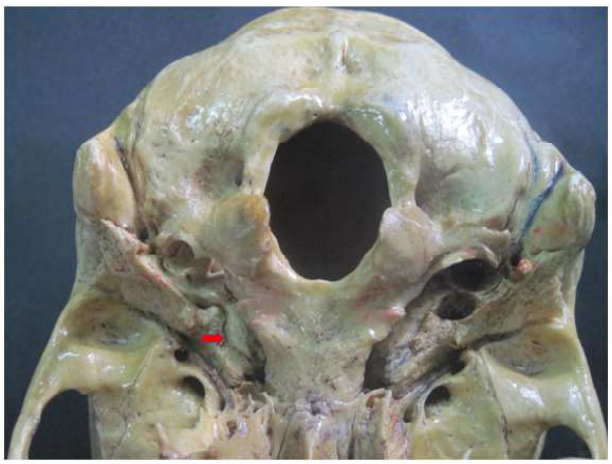

Fig. 1: Showing absence of left side carotid canal and a normal right side carotid canal in the petrous temporal bone.

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On observation all other bony structures on the skull base was normal (fig 1 & fig 2). Examination of rest of the 102 skulls present in the department did not show similar type of finding.

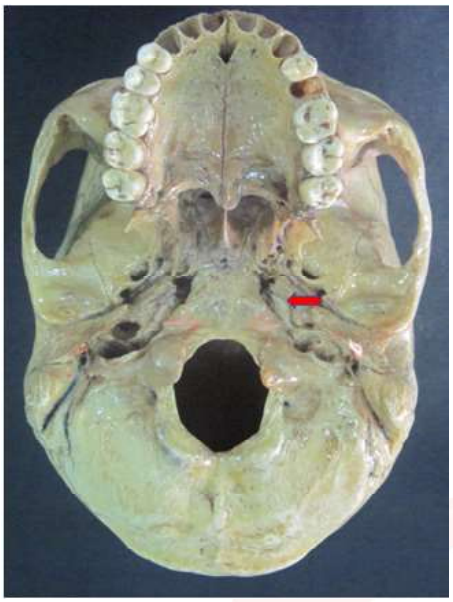

Fig. 2: Showing absence of left side carotid canal with a normal skull base.

DISCUSSION

The development of the primordial ICAs occurs from the terminal segment of the dorsal aorta and the third aortic arch arteries by the fourth week. The skull base does not begin to form until fifth to sixth week of foetal life. The carotid canal develops afterwards and is dependent on the primordial ICA. Therefore, if the embryonic primordium of the ICA fails to develop or involutes early in embryonic life, consequential it is not present during the skull base formation, subsequently leading to underdevelopment or no development of the carotid canal [3].

Tode in 1787, first reported a case of ICA agenesis on a post-mortem examination [4] and Verbiest in 1954 gave the first description of ICA agenesis using cerebral angiography [5]. In 1980, Handa et al first reported the absence of the bony carotid canal [6].Most of the patients with ICA agenesis are asymptomatic under normal condition, however some are discovered incidentally, or the diagnosis is suggested by the finding of collateral circulation [7,8]. The collaterals thus developed increases the risk of aneurysm formation and subarachnoid haemorrhage, following a higher risk for ischemic stroke [9].

Most of the cases of absent ICA may remain asymptomatic and go unrecognized. Though asymptomatic, yet they may present with common symptoms like headaches, blurred vision, hearing loss, epilepsy and in the most severe cases, intracranial haemorrhage due to a ruptured aneurysm which may present later in life with symptoms related to cerebrovascular insufficiency [10]. Agenesis of ICA associated with congenital Horner's syndrome is also reported [11]. Horner's syndrome results from interruption of the sympathetic nerve to the eye, upper lid and facial glands, occurs due to carotid agenesis, because the ocular sympathetic nerve runs along the ICA. Patients with absent Internal carotid artery may also present with neurological deficits. A case of right internal carotid agenesis in a young female with recent onset amnestic syndrome is also reported in literature [12]. Uchino A et al have described a case with trigeminal neuralgia (caused by a tortuous enlarged basilar artery) in whom MRA revealed unilateral absence of ICA [13]. The only diagnosis of aplasia or agenesis of the ICA is based on angiographic findings and the presence of an absent or hypoplastic bony carotid canal by temporal bone CT [14,15]. Heth et al reported a case in which the hypoplastic nature of the ICA was not revealed until it was exposed at carotid endarterectomy [16].

Failure to recognize the inter-cavernous collaterals can have grave complications during trans-sphenoidal hypophyseal surgeries [17].

CONCLUSION

This case is reported because of its rare occurrence in the population so that proper awareness can be spread while treating a case of simple migraine or performing a major surgery like trans-sphenoidal hypophysectomy .It is usually discovered incidentally during investigation of head and neck done for some other reason. Therefore we need to consider carotid agenesis in the differential diagnosis of other cases, after all, much more lies hidden if it's unknown.

Conflicts of Interests: **None**

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