

Absent Internal Carotid Artery in Circle of Willis

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Abstract: Introduction: Circle of Willis is the balancing mechanism of blood supply to the brain between vertebrobasilar and carotid systems. Literature say, the incidence of absent internal carotid artery in Western population is .01%. This study is to find the incidence of absent internal carotid artery in Circle of Willis among South Indian population.

Materials and methods: 246 cadaveric brains are utilized in this study at various medical colleges in and around Puducherry. Routine dissection instruments were used. The Circle of Willis was studied and photographed.

Results : Left internal carotid artery was absent in 1 brain's circle of willis, bilateral internal carotid artery was absent in 1 brain's circle of willis.

Conclusion: Incidence of absent internal carotid artery in Circle of Willis among south Indian population is 0.81%

Keywords: Circle of Willis - Absent Internal Carotid Artery- South Indian Population

I. Introduction

Variants of the arteries are common findings during radiological investigation¹. Hypoplastic Internal Carotid artery is a rare finding as reported in the literature is less than 0.01%. Most of the studies are radiological. Bilateral absence of internal carotid artery (ICA) is a rare finding and the incidence is 10% of 0.01%^{2,3,4}. Valid Indian cadaveric study is not available regarding the incidence among South Indian population.

Associated conditions with absent ICA are cardiac anomalies, cerebral vascular aneurysms, temporomandibular ankylosis, corpus callosum agenesis⁵ etc. The aim of this study is to find the incidence of bilateral absence of ICA in Circle of Willis among South Indian cadavers.

II. Materials And Methods

246 whole brain specimens were used for this study collected from various medical college's anatomy department in and around Puducherry. The base of the brain were observed for the cut end of ICA. The observations were recorded with a digital camera.

III. Results

Among 246 whole brain specimen's circle of willis, the ICA was absent in 2 brain specimens. Unilateral (fig.1,2) absence (left) in 1 and bilateral (fig.3,4) absence in 1 brain specimen.

IV. Discussion

Circulus arteriosus is a large arterial anastomosis which unites internal carotid and vertebrobasilar arterial systems. Underdeveloped carotid canal could be a causative factor for the hypoplastic internal carotid artery. Collateral circulation is through, Circle of Willis itself, persistent foetal vessels and transcranial anastomosis⁶.

Cerebral and communicating arteries individually, may all be absent, variably hypoplastic, double or even triple⁸. As per the literature, the incidence of congenital agenesis or hypoplasia of the Internal carotid artery is less than 0.01% and the incidence of aneurysm is 20-30% in western population^{9,10}.

Mazakazu Hanaqama 2007 reported a case of unilateral absence of right internal carotid artery in the autopsy of a severe burns case. He also reported that the death was not due to the anomaly. The blood flow to either side of the brain was compensated by the Circle of Willis. As per the literature these cases go undetected, some may lead to arterial aneurysms and thromboembolic manifestations.

Embryological reasons for absent ICA are constricting amniotic bands, exaggerated folding of the embryo. Genetically Fog 2 gene is attributed for the vascular anomaly¹¹. In functionally independent patients with symptomatic ICA occlusion, the middle cerebral artery flow territory ipsilateral to the occluded ICA is mainly supplied by the vertebrobasilar arteries, whereas the anterior cerebral artery flow territory on the occluded side is mainly supplied by the contralateral ICA¹².

V. Conclusion

As per this study with 246 whole brain specimens of South Indian population, the incidence of absence of ICA in Circle of Willis is 0.81% compared to 0.01% in western population.

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Fig.1

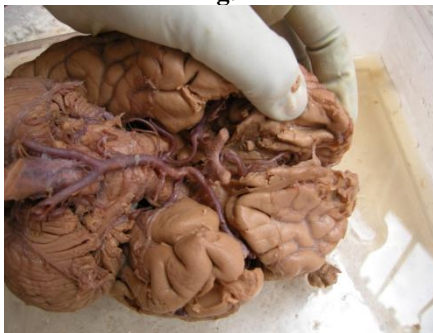


Fig.2



Fig.3



Fig.4

