CEREBRAL VASCULAR OCCLUSION

DURING INFANCY AND CHILDHOOD

ESSAY

SUBMITTED FOR PARTIAL FULFILMENT

FOR THE MASTER DEGREE OF PEDIATRICS

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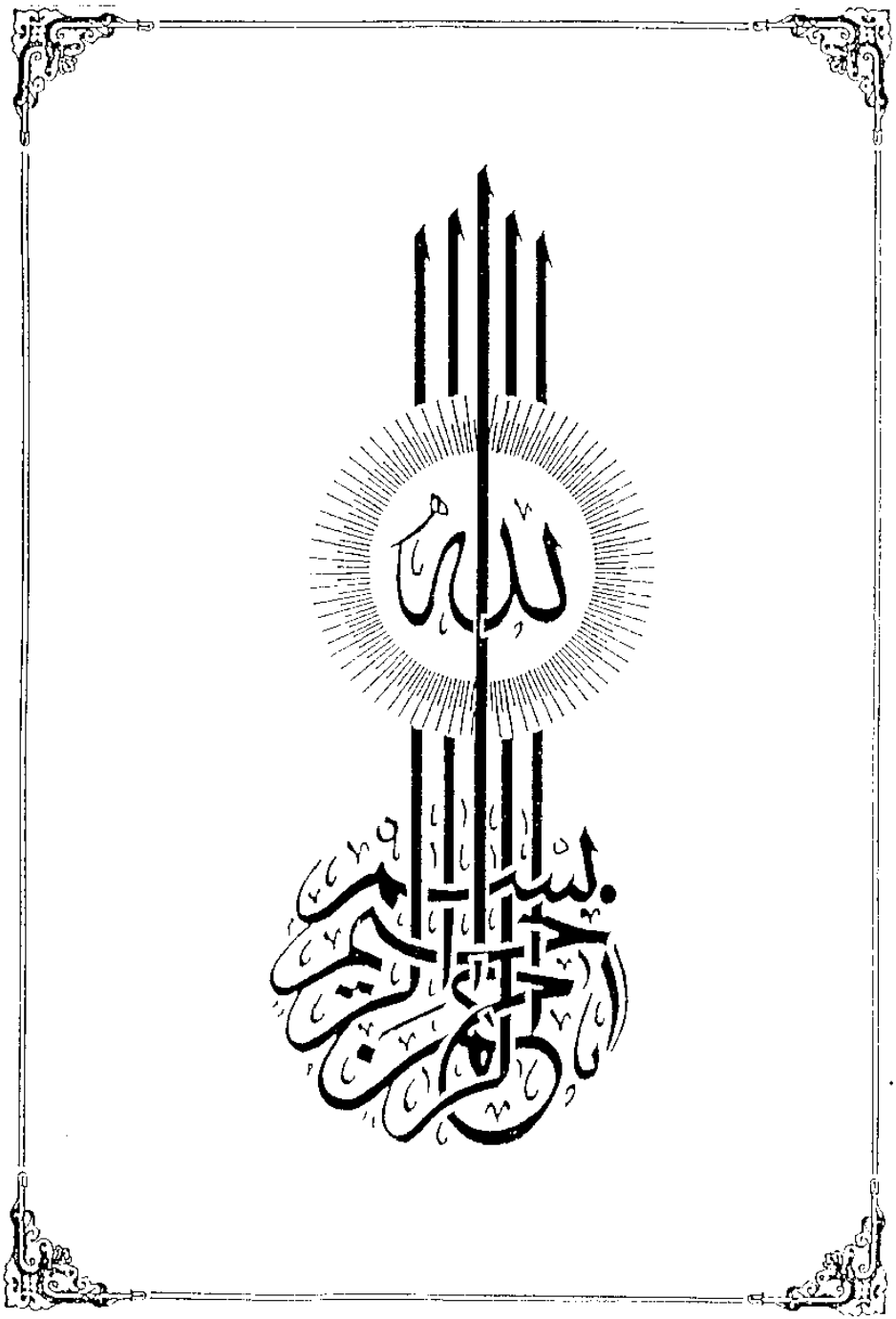

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CHAPTER [1]

INTRODUCTION

I - I N T R O D U C T I O N

The Ad. Hoc. Committee 1958, defined cerbrovascular diseases as:

All diseases in which one or more blooc vessels of the brain are primarily involved in a pathological process which would include an abnormality of the vascular wall, occlusion by tnrombosis or embolism, change in the caliber of the lumen and altered permeability to and blood cells.

Cerebral thrombosis and cerebral emboli produce clinical symptoms by causing cerebral infarction, which means neural death from ischemia.

Cerebral ischemia is the result of either a generalized or a localized prolonged reduction of blood flow to the brain.

If ischemia is transient, less than 10 to 15 minutes, usually no descernible neurologic deficit remains. If it lasts longer than that, neural damage results, producing neurologic dysfunction, disability and death. (Fletcher H. McDowell 1975).

CHAPTER [II]

HISTORY OF OCCLUSIVE CEREBROVASCULAR DISEASES IN INFANCY AND CHILDHOOD

II - HISTORY OF OCCLUSIVE CEREBROVASCULAR DISEASES IN INFANCY AND CHILDHOOD

Since the seventeenth century, the occurance of cerebrovascular diseases in infants and children has been well documented. Initially the phenomenon was considered rare enough to merit case reports (McDonald, Korb, 1939).

The latter part of nineteenth century found investigators grouping all pediatric hemiplegias together without separation by possible etiology. Osler, Sachs 1890 and Freud 1905 described large hospital series of hunderds of children affected with infantile hemiplegia.

Not until Ford and Schaffer's study in 1927 was each case of hemiplegia analyzed for etiology and quality of survival

By the 1930, there were detailed case reports and autopsy series with pathologic descriptions of the cerebral lesions in childhood strokes (Irish Cwj, 1939).

Two decades later, investigators were analyzing hospital series by such factors as age of onset, initial symptoms and surgical autopsy findings (Mackenize I. 1953).

There were also case reports of cerebral infarcts and hemorrhages in previously healthy children (Wisoff, Rothballer, 1961).

Occlusive cerebrovascular disease was observed with congenital heart diseases (Mymin, 1960). Pointing out that pre-existing heart disease was a risk factor for childhood stroke. Leukemia in chilchood was also postulated as a predisposing condition for subsequent stroke (Pierce, 1962).

In 1965 Leeds and Abbott described a telangie ctatic vascular network at the base of the brain and distal occlusion of internal carotid artery in two American born Japanese children.

In 1968 two Japanese studies detailed the abnormal network of vessels at the base of the brain in association with either occlusion of vessels comprising the circle of willis (Kudo T., 1968) or occlusion of both internal carotid arteries (Nisnimoto, Takeuchi, 1968) in children.

The term moyamoya disease was introduced in 1969 (Suzuki, Takaku, 1969) to describe the angiographic appearance of the telangiectatic network of vessels. The word Moyamoya in Japanese means (Hazy, like a puffy of cigarette smoke difting in the air).

Cases have also been reported in Japanese children. (Carlson, Harvey Loop, 1973).

Childhood stroke has been documented in case-hospital or autopsy series in all racial and ethenic groups. Congenital heart disease, hematologic abnormalities, ameurysms and arteriovenous malformation have emerged as risk factors for cerebrovascular diseases in children (Schoenberg et al., 1978).

CHAPTER [III]

VASCULAR SUPPLY

OF

THE BRAIN

[ANATOMY]

III - THE VASCULAR SUPPLY OF THE BRAIN

To make accurate clinical diagnosis in patients suspected of having cerebrovascular disease, the clinician requires an effective working knowledge of structural and vascular anatomy of the brain. This is presented in the following paragraphs and diagrams:

The brain is supplied by four large arteries, the two common carotids and the two vertebrals. One common carotic artery arises from the aortic arch and the other from the innominate artery in the upper thorax. The two vertebral arteries originate from the right and left subclavian arteries. The common carotid artery bifurcates in the neck, forming the internal and external carotid arteries. Each internal carotid artery enters the skull through the homolateral foramen lacerum, passes through the cavernous sinus, and gives off branches in the following order: Ophthalmic, anterior choroidal and posterior communicating. It then bifurcates into the anterior and middle cerebral arteries.

The Anterior Cerebral Artery

The anterior cerebral artery supplies the medial and superior surfaces of the cerebral hemisphere and the

whole of the most anterior portion of the frontal lobes. This area contains the motor and sensory cortex for the foot and leg and the supplementary motor cortex. The anterior cerebral artery also supplies several deep structures of importance, including the anterior nucleus of the thalmus and a portion of the anterior limb of the internal capsule. As may be seen in Figures 1 and 2.

The Middle Cerebral Artery

The middle cerebral artery supplies the lateral surface of the cerebral hemisphere with the exception of the occipital and frontal poles.

The cortex supplied include the primary motor and sensory area for the face, hand and arm, the optic radiations, and in the dominant hemisphere, the cortical areas for speech. The perforating branches of the middle cerebral artery reach the center of the cerebral hemisphere supplying the internal capsule and basal ganglia, Figures 2 and 3.

The Posterior Cerebral Artery

The posterior cerebral artery supplies the posterior pole of the lateral surface of the cerebral hemisphere and the posterior portion of the medial and inferior surfaces

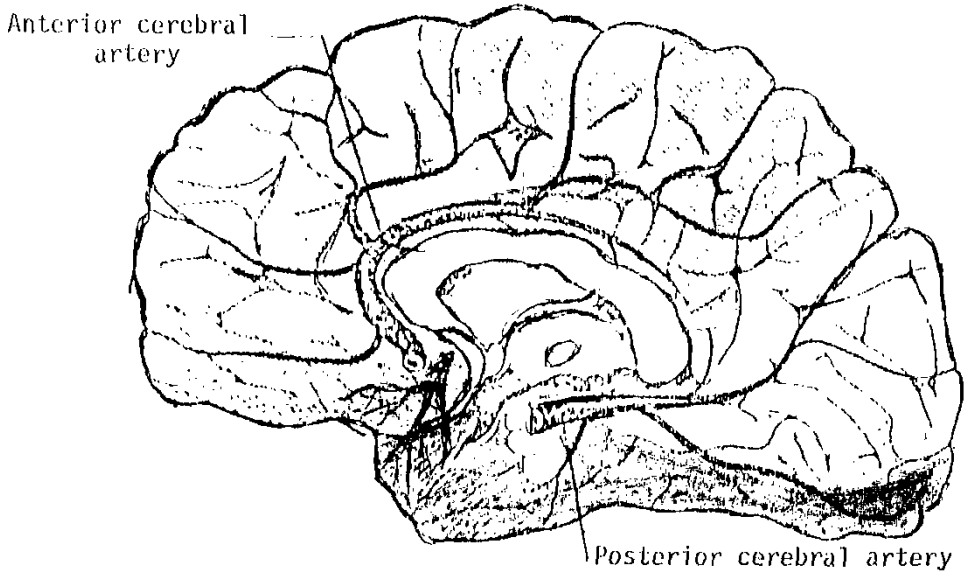

Fig. (1) The medial surface of the cerebral hemisphere showing the course of the anterior and posterior cerebral arteries and the area of brain supplied by each