RECENT TRENDS IN DIAGNOSIS AND MANAGEMENT OF CAROTID ARTERY DISEASE

An Essay

submitted

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By

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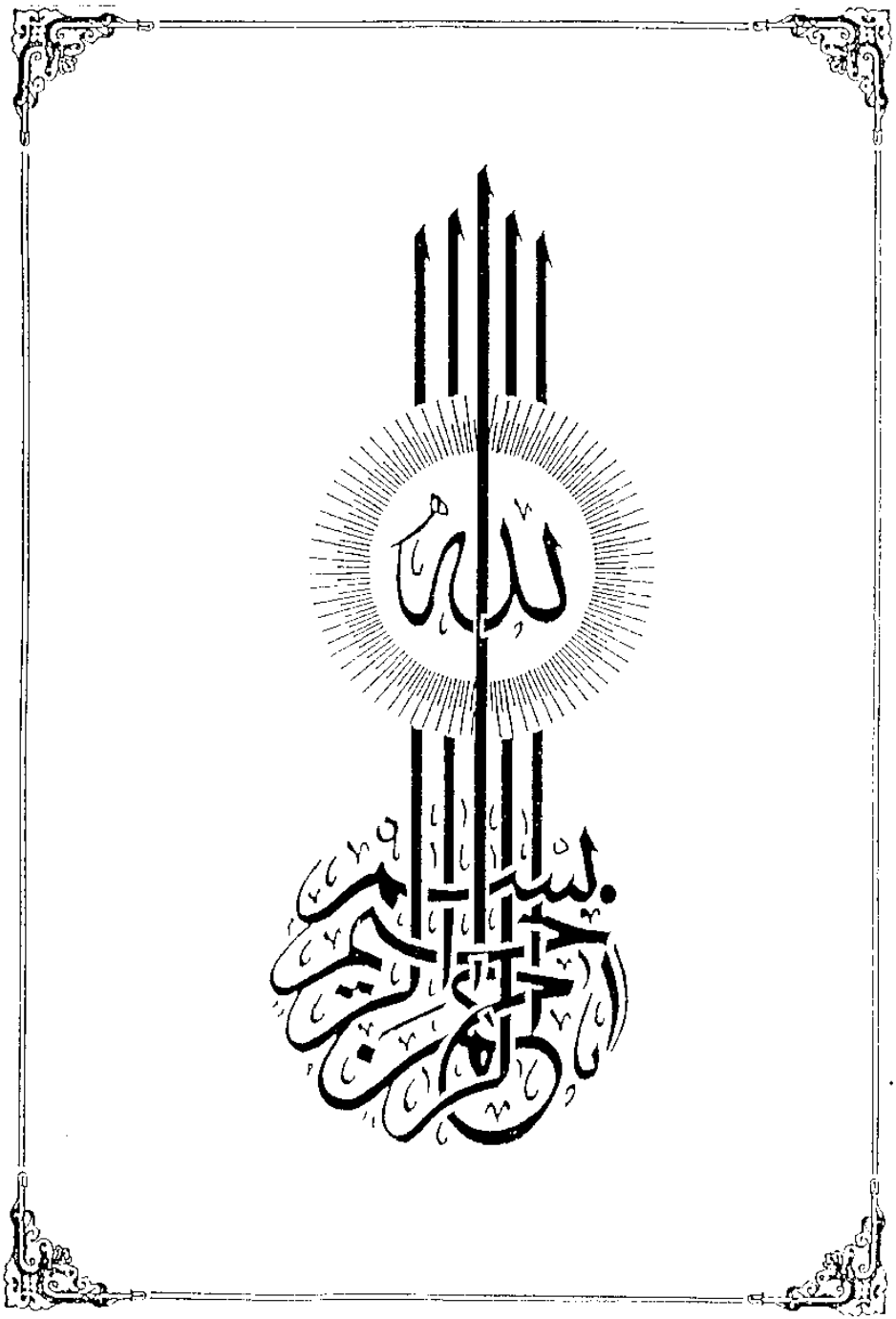

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The word "carotid " is derived from the Greek, meaning to stupefy or plunge into a deep sleep. According to Dandy, Hippocrates and Galen were aware that hemiplegia resulted from a lesion in the opposite side of the brain .(Thompson ,1986)

The occlusive disease of the carotid and vertebral arteries was recognized as early as 1658, being described in that year as a post-mortum finding by Jhon James-Wepfer .

Wepfer seems to have appreciated the potential significance of such lesions as causes of stroke, but unfortunately, he had a much more influential contemporary Thomas Willis , who disagreed with that concept.

* In 1665 Willis described similar autopsy findings in an almost asymptomatic patient, but was convinced that the collateral potential of the polygonal arrangement of interconnecting arteries at the base of the brain (later to be know as the "circle of Willis") would render stenotic or occlusive lesions of the major extra cranial vessels insignificant.

Willis' views were widely accepted by the scientific community, and thus, for several hundred years it was believed that strokes and symptoms of cerebral ischemia must be due to intra-cranial rather than extra-cranial vascular disease . (Gurdjian and Gurdjian, 1979)

* The first operation on the carotid artery were ligation procedure for trauma .

Hebenstreit of Germany in 1793 did the first ligation for injury, although Jhon Abernathy in England is credited with the first deliberate ligation following control of hemorrhage by direct compression .

Abernathy's patient had a torn left carotid artery from a gorging injury by the horn of a cow in 1798 . Sir Astley Cooper was the first to ligate the carotid artery for a cervical aneurysm in 1805. The patient died of sepsis but in 1808 Cooper repeated the operation, this time successfully . The patient lived until 1821.

* in 1809 Benjamin Travers first ligated the common carotid artery for a carotid cavernous fistula , and in 1885 Victor Horsley first ligated the cervical carotid artery for non-fistulous intracranial aneurysm .

By 1868 Pilz had been able to collect 600 recorded cases of carotid ligation for hemorrhage or cervical aneurysm with a mortality of 43% . (Thompson, 1986)

* The early report linking cervical carotid artery disease with stroke is credited to Savory, who in the 1856 described a young woman with left monocular symptoms in combination with a right hemiplegia and dysesthesia .

Post-mortum examination demonstrated an occlusion of the

cervical portion of the left internal carotid artery together with bilateral subclavian artery occlusions . Gower, in 1875 , reported a similar case and subsequent reports of individual cases were made by Chiari 1905, Gurthrie and Mayou in 1908 and Cadwater in 1912 . (Moore and Quinones - Baldrich, 1991)

*By 1914, Ramsey Hunt , in an important publication, emphasized the relationship between extracranial carotid artery disease and stroke.

He also described the phenomenon of intermittent cerebral symptoms associated with partial occlusion and used the term "cerebral intermittent claudication" as characterizing analogy.

Hunt also pointed out that the clinicopathologic observations in patients with stroke were hampered by the fact that routine autopsies did not include examination of the cervical carotid arteries. He emphasized that no examination of cerebral infarction can be considered complete without examination of the cervical vessels. (Moore and Quinones - Baldrich, 1991)

* The next significant contribution was the report of Egas Monis of Portugal who in 1927 first described the technique of cerebral arteriography .

The First report of carotid thrombosis demonstrated by arteriography was that of Sjoqvist in 1936. The Following year (1937) Moniz, , Lima, and de Lacerda reported four patients with

occlusion of the cervical portion of the internal carotid artery diagnosed by arteriography.

* By 1951, Johnson and Walker were able to collect from the literature 101 cases of carotid thrombosis all diagnosed by this technique .

In the same year (1951) and again in 1954, Dr. Miller Fisher published two important papers .

Fisher re-emphasized the relationship between disease of the carotid artery in the neck and cerebrovascular insufficiency .

He defined the basic nature of the lesions as atherosclerosis and noted partial and complete occlusions . He also observed that with severe stenosis at the carotid bifurcation the distal vessels could be entirely free of disease .He realized the importance of these observation and stated " It is even conceivable that some day vascular surgery will find a way to bypass the occluded portion of the artery during the period of ominous fleeting symptoms. .Anastomosis of the external carotid artery or one of its branches with the internal carotid artery above the area of narrowing should be feasible".

Fisher's prophecy of surgical reconstruction of the coratid artery in the neck as thereby for occlusive disease was soon fulfilled.

* The first successful surgical reconstruction of a carotid artery was performed by Carrea, Molins and Murphy in Buenos Aires on October 20,1951, after reading Fisher's article.

It was reported in 1955 . The patient had a stroke and stenosis of the left internal carotid in the neck.

They performed an anastomosis between the external carotid and the distal internal carotid arteries after partial resection of the stenosed area .The patient made an uneventual recovery .

In1951, E.J.Wylie introduced into United States the procedure of thromboendarterectomy for the removel of atherosclerotic plaques in the aortoiliac segment, but it was not used on the carotid artery.

* On January 28,1953, Strully, Hurwitt, and Blankenberg first attempted thromboendarterectomy of the cervical internal carotid artery but were unable to obtain retrograde flow .

They suggested that endarterectomy should be feasible in such cases when the distal vasculature was patent .

The first succesaful carotid endarterectomy was performed by Dr. Michael DeBakey on August 7, 1953 . The patient had a frank stroke and total occlusion of the left carotid artery.

Thromboendarterectomy was carried out with good retrograde flow from the internal carotid artery.

An arteriogram performed postoperatively on the operating table showed the internal carotid artery to be patent in both its extracranial and intracranial portions . This patient lived for 19 years without having further strokes and died in 1972 of emphysema . (Thompson, 1986).

The report that was most important in calling the world's attention to the feasibility of carotid artery reconstruction come from Eastcott, Pickering, and Rob, Who published their experience in the Lancet in November, 1954.

Their operation was performed on May 19,1954 on a patient who was having hemispheric transient ischemic attacks, with demonstrable disease at the carotid bifurcation, using direct end-to-end anastomsis between the common carotid artery and the internal carotid artery distal to the atherosclerotic lesion.

* While operations on the carotid artery were in the early phase of development, surgical attack was also considered feasible on occlusive lesions of the major arch vessels . In 1956, Davis, Grove, and Julian reported thier experience with endarterectomy of the innominate artery done on a patient of March 20 , 1954.

In 1957, Warren and Triedman reported the second case . By this time , the stage was set for explosive development in the aggressive surgical approach for managing extracranial cerebral vascular disease as a means of preventing or treating Cerebral infarction (Moore and Quinones, Baldrich, 1991)

Anatomy and physiology of carotid artery and vertebrobasilar system

Anatomy and Physiology of Carotid Artery and Vertebrobasilar System

The Common Carotid arteries

The common carotid arteries differ in length and in their mode of origin.

The right artery begins at the bifurcation of the brachiocephalic trank behind the right sternoclavicular joint and is confind to the neck.

The thoracic portion of the left common carotid artery:-

It ascends from the arch of the aorta to the level of the left sternoclavicular joint, where it is continuous with the cervical portion. It lies at first in front of the trachea, but later inclines to its left side (Davies, 1969).

The cervical partions of the common carotid arteries:-

The cervical portions of the common carotid arteries have similar courses, each passes abliquely upwards, from behind the sternoclavicular joint to the level of the upper border of the thyroid cartilage, where it divides into the external and internal carotid arteries.

The common carotid arteries ascend in the neck, running anterior to the transverse processes of the cervical vertebrae and separated from them by the scalenus anterior, longus coli, and capitis muscles and by the sympathetic trunk (Deutch, 1989).