THE DIAGNOSTIC ROLE OF D.S.A. IN CEREBROVASCULAR INSUFFICIENCY

Thesis

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RADIO-DIAGNOSIS

By

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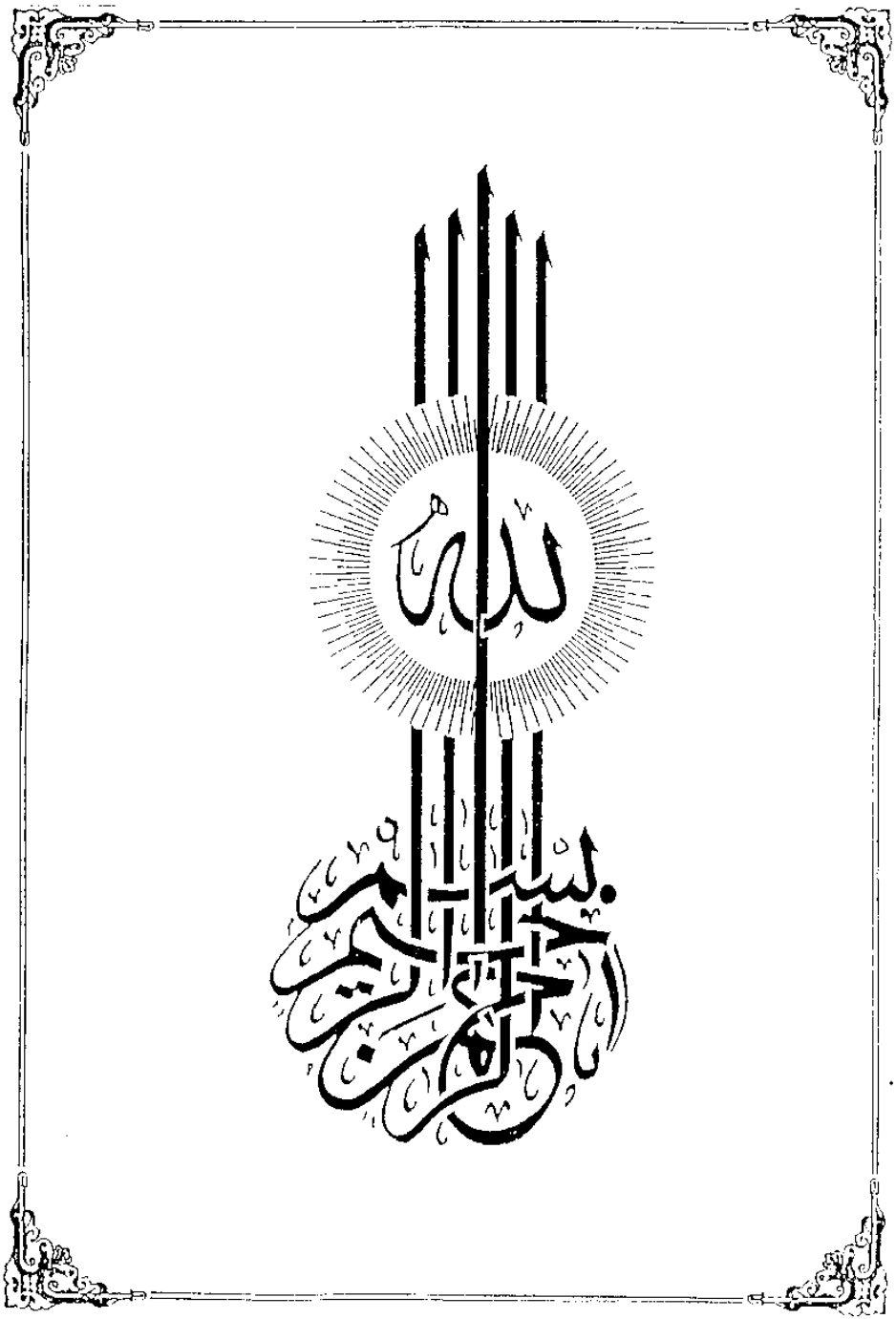

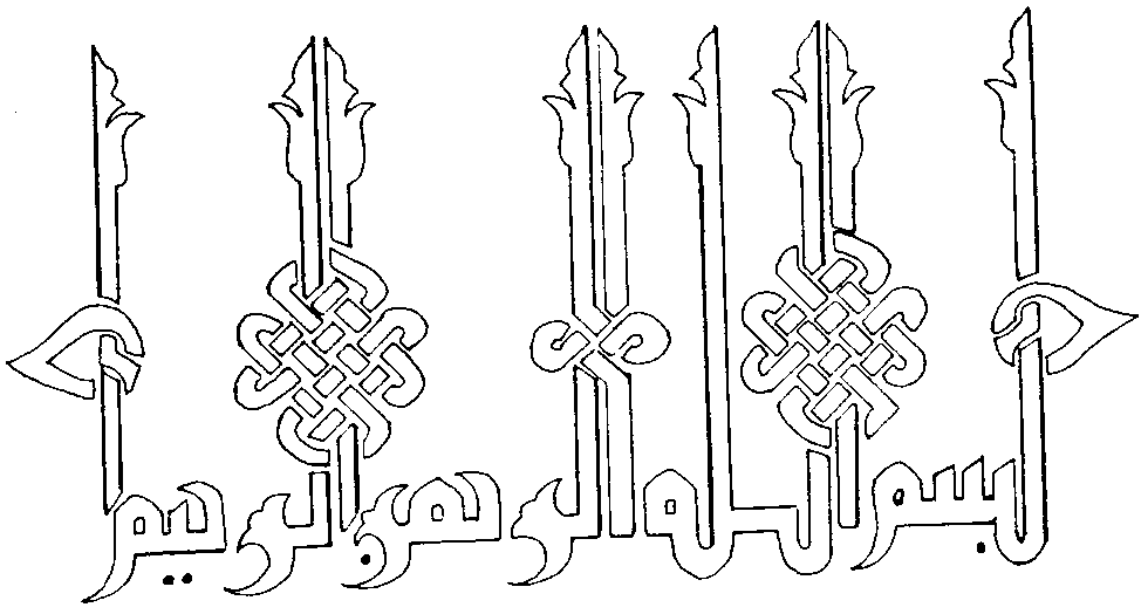

TO M Y MOTHER

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C O N T E N T S

INTRODUCTION

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Stroke is the most common devastating neurologic disease of adult in life and the most serious manifestation of hypertension and atherosclerosis. **(Dyken et al, 1984)** Although the incidence of stroke is declining, stroke continues to be the third leading cause of death. **(Whisnant, 1983)**

In many cases stroke is preceded by transient ischemic attacks (T.I.A). **(Genton et al, 1977)**

The most common cause of T.I.A. is thrombo-embolism in connection with cervical arteries atherosclerosis. **(Mohr et al, 1978)**

The decline in stroke incidance is not due to one single factor but due to many related factors, most of them are early recognition and treatment of risk factors and warning signs.**(Dyken et al, 1984)**

Also proper diagnosis leads to proper management. One of the most common diagnostic tool in stroke patients is neuroradiologic examination; computed tomography (CT) magnetic resonance imaging (MRI), duplex scanning (D.S) of the extracranial

[illegible] intracranial vessels(Gerstenbrand et al, 1985)

A new technique of angiography is intravenous digital subtraction angiography (IV-DSA) has been introduced in the last 5 years. With the use of IV-DSA, clinically diagnostic images of cervical arteries and their proximal intracranial segment were reported. (Christenson et al, 1980)

- **Clinical correlation of ischemic stroke:**

Cerebral ischemia may be subclinical or may give transient or perminant clinical signs and may be classified as follows :-

1- Subclinical ischemia and infarction,

2- Transient ischemic attacks (T.I.A),

3- Reversible ischemic neurological deficit (R.I.N.D),

4- Progressing stroke or stroke in evolution and

5- Completed Stroke.

(Gautier and Pullicino, 1985 and Gonzalez et al, 1986)

Neurologic deficits caused by either arterial stenosis or thrombus formation are transient or perminant.

A transient ischemic attacks (TIA) are episodes of temporary and focal cerebral dysfunction of vascular origin, rapid in onset, maximal symptoms in less than five minutes usually less than a minute, and variable in duration. Commonly lasting from 2 to 15 minutes but occasionally lasting as long as a day. **(Burrow and Toole, 1982)**

TIA may be due to :

1- Large extracranial or intracranial atherosclerosis with or without ulceratin. **(Quan et al, 1983)**

2- Cardiogenic emboli either platelet emboli, fragments of large thrombus or calcified material. **(Quan et al, 1983)**

3- Disease of small arterioles. **(Miller 1983)**

4- Haemodynamic dysfunction associated with extracranial or intracranial arterial stenosis or occlusion. **(Brice et al, 1964)**

T.I.A may involve the carotid or vertebrobasilar domines The most common presentation of the transient ischemic attacks in the carotid artery domine are.

- Unilateral blindness

- Motor paresis or hemiplegia
- Sensory deficit affecting one limb or hemihypothesia.
- Dysphasia
- Homonymous hemianopia
- Ipsilateral blindness and contralateral hemiparesis

While in the V.B domine are:

- Vertigo
- Diplopia
- Squint
- Dysarthria
- Dysphagia
- Cerebellar manifestation
- Hemiparesis, or quadriparesis
- Sensory manifestation
- Homonymous hemianopia
- Bilateral blindness
- Headache

(Gautier and Pullicino , 1985)

***Reversible ischemic neurologic deficit**(RIND), a neurological deficit related to focal cerebral ischemia persists for more than 24 hours but clear completely within days or few weeks.

(Gautier and pullicino, 1985)

* **Progressing Stroke**, or stroke inevolation, a gradually accumulating neurologic deficit occuring within a few hours to 48 hours.

(Burrow and Toole, 1985)

* Progression of such a stroke is typically stepwise pattern. Approximately 20% of carotid system stroke and 40% of vertebrobasilar stroke. Evolve in this manner. Carotid strokes tend to complete their progression within 24 hours while those in posterior circulation often evolve over 2 to 3 days. Progressing stroke is a medical emergency.

(Easton et al, 1983)

* **Complete stroke** a focal neurologic disability that comes an abruptly and stabilizes.

(Buonanno and Toole 1981)

Angiography of ischemic stroke

Angiography in ischemic cerebro vascular disorders

The discovery of X.R beam by Roentgen in 1895 was rapidly followed by its diagnostic application to the nervous system. In 1927 Moniz performed the first cerebral angiography in a human patient. In 1939 **Robb and steinberg**reported on a method to visualize the heart and great vessels by intravenous injection of contrast media. However the photo subtraction technique was intdroduced in 1935 by Des plantes. For many years it has been felt that electronic imaging and subtraction could be a better job in the field of angiography. The availability of high performance analog to digital convertors enables this technique (digital subtraction angiography) to be put to clinical use(**christenson et al, 1980 & Provitch, 1986**)

Digital subtraction angiography system

Digital subtraction angiography is an image enhancement system designed to amplify low

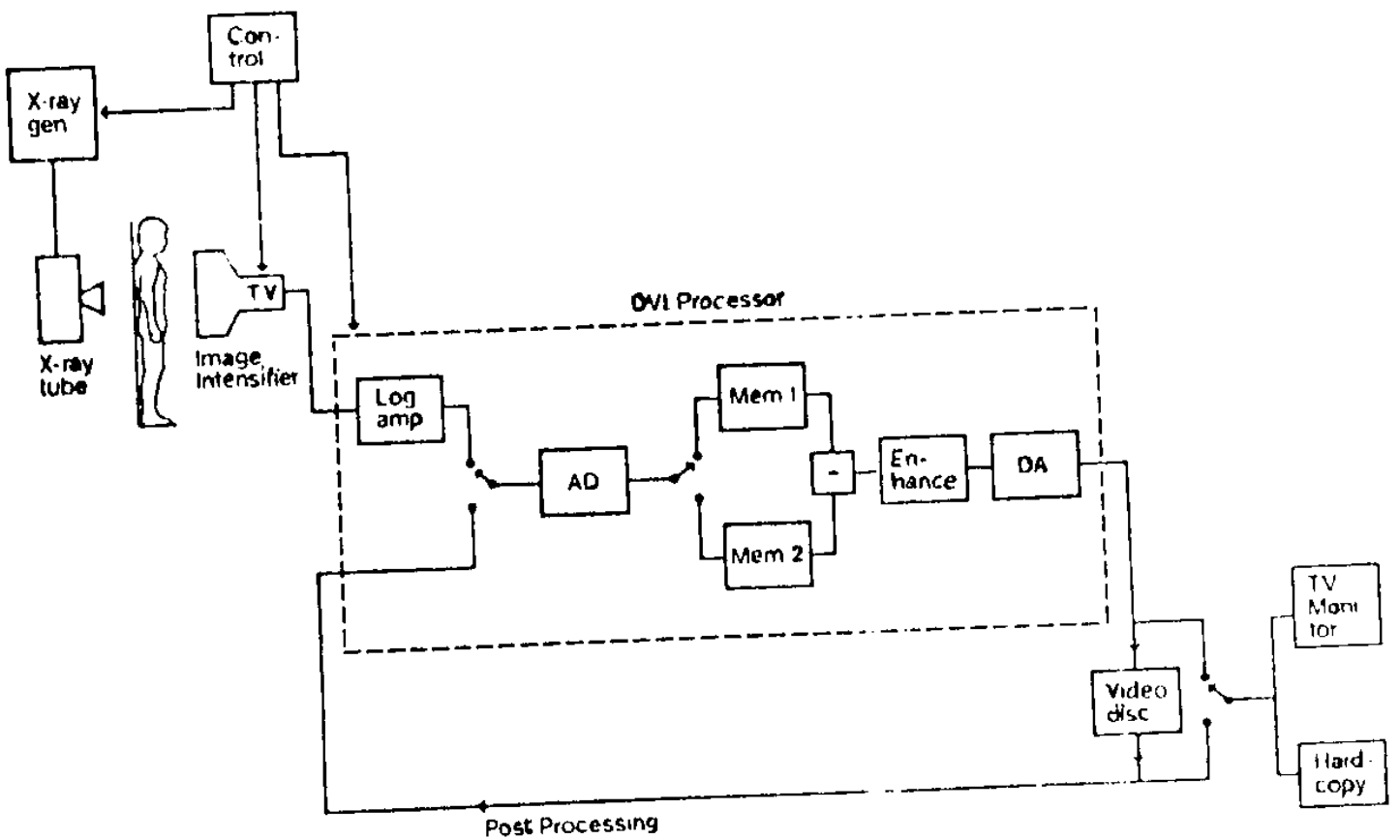

FIG. 2

Block diagram of DVSA.