THE EFFECT OF INJECTION SCLEROTHERAPY ON THE CARDIOVASCULAR SYSTEM

THESIS

Submited in Partial Fulfilment
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Tropical Medicine

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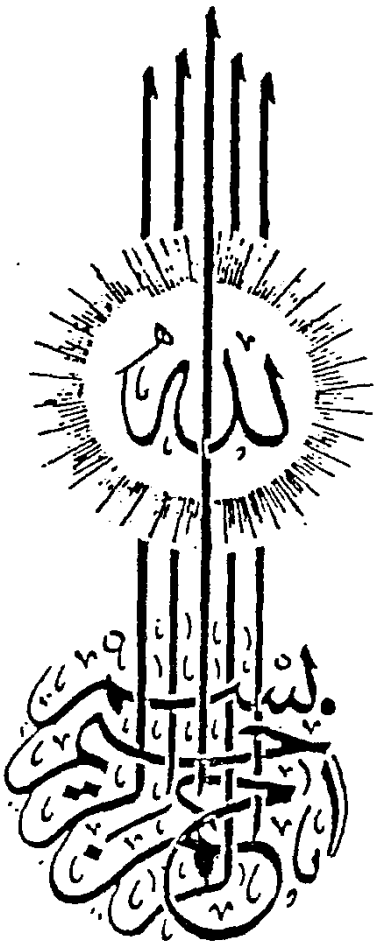

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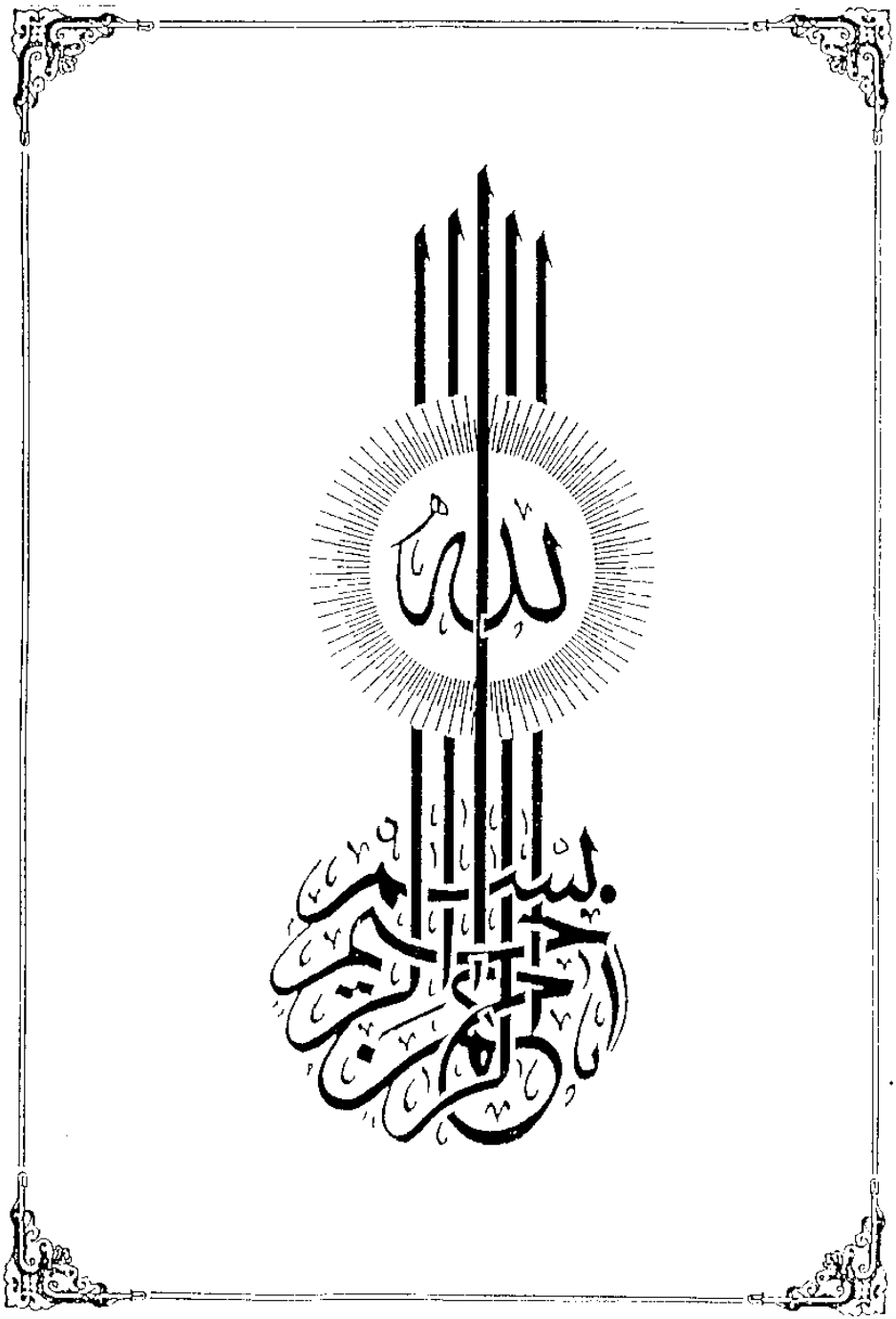

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C O N T E N T S

INTRODUCTION

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Oesophageal varices constitutes one of the serious sequalae of portal hypertension as bleeding oesophageal varices represents a real threatening for the life of many patients in Egypt. The importance of bleeding from oesophageal varices in bilharzial patients lies in the fact that it accounts for a much higher proportion of the total cases of upper gastrointestinal bleeding in Egypt 50-70% than abroad 23-32% (Hussein and Rifaat, 1964).

Endoscopic injection sclerotherapy had gained wide acceptance for the treatment of variceal haemorrhage, specially as other forms of therapy have yielded disappointing results regarding rebleeding rate and survival (Thatcher et al., 1986).

A number of complications were reported with injection sclerotherapy. Reported complications include transient pyrexia, oesophageal ulceration and stricture, rebleeding, pleural effusion, mediastinitis, retrosternal pain and tachycardia (Hughes et al., 1982 and Thatcher et al., 1986).

The heart lies within the pericardium, in the mediastinum, in direct relation with the lower part of the oesophagus. So, it is possible that injection sclerotherapy may affect the heart and pericardium.

Hughes et al. (1982), reported tachycardia as a complication of sclerotherapy, while bradyarrhythmia and acute respiratory failure was reported in one patient by Monroe et al., in 1983. Also Imperiali et al., (1986), reported that two patients died of acute cardiorespiratory failure after injection sclerosis using polidocanol.

Echocardiography has significantly contributed to non-invasive assessment of the anatomy and function of the heart. It is safe, simple and reliable mean to evaluate valves and chambers of the heart, so that definitive diagnosis may be made without catheterization. (Abbasi, 1981).

The aim of this work is to study the effect of injection sclerotherapy on the cardiovascular system.

ANATOMY OF THE MEDIASTINUM

Mediastinum is the thick mass of tissue which occupies the middle of the thoracic cavity and lies between the two lungs. It contains the heart and great blood vessels, the oesophagus, the trachea and its bifurcation, the thoracic duct, the phrenic and vagus nerves. It is a very mobile area (last, 1973).

Divisions of The Mediastinum:

The mediastinum is subdivided by an imaginary plane which passes antero-posteriorly from the sternal angle to the lower border of the fourth thoracic vertebral body. The part superior to this is the superior mediastinum, the part inferior to this plane is further subdivided into; (1) the middle mediastinum which consists of the pericardial sac and its contents; (2) the anterior mediastinum between the middle mediastinum and the sternum; (3) the posterior mediastinum between the pericardium and diaphragm anteriorly and the vertebral column posteriorly (Romanes, 1968).

The Superior Mediastinum: is the part which lies above the pericardium. It lies between the manubrium in front, the upper four thoracic vertebrae behind, the thoracic inlet above and a plane between the sternal angle and the lower border of the fourth thoracic vertebral body (El-Rakhawy, 1976).

The structures found in the superior mediastinum can be grouped

into three groups; (1) Retrosternal structures, that lie directly behind the manubrium (the right and left innominate veins, upper half of the superior vena cava and thymus gland); (2) intermediate structures that lie between the retrosternal and prevertebral structures (the arch of the aorta and its three branchs, the two vagus nerves and the two phrenic nerves); (3) prevertebral structures which lie in front of the upper four thoracic vertebrea (The oesophagus the lower half of the trachea, the thoracic duct and the left recurrent laryngeal nerve) (El-Rakhawy, 1976).

The Anterior Mediastinum: is the narrow space in front of the pericardium, between the pericardium and the sternum. It has no contents except some fat and lymph nodes. (El-Rakhawy, 1976).

The Middle Mediastinum: is the part which lies between the anterior mediastinum and sternum anteriorly, the posterior mediastinum posteriorly, a plane passing between the sternal angle and the disc between fourth and fifth thoracic vertebrae above, and the diaphragm below. It contains the heart, ascending aorta, the pulmonary trunk, the lower half of the superior vena cava, the upper part of the inferior vena cava, and very small parts of the pulmonary veins, All these structures lie inside the pericardium. It also contains the phrenic nerves outside the pericardium, one on each side (El-Rakhawy, 1976).

The Posterior Mediastinum: is the space which lies between the

pericardium and the vertical part of the diaphragm in front and the last eight thoracic vertebrae behind. The posterior mediastinum appears as a downwards continuation of the posterior part of the superior mediastinum. Structures found in the posterior mediastinum can be divided into longitudinal structures and transverse structures. The longitudinal structures are the oesophagus, the descending aorta, the azygos and hemiazygos veins and the thoracic duct. The transverse structures are the posterior intercostal arteries and certain posterior intercostal veins (El-Rakhawy 1976).

ANATOMY OF THE OESOPHAGUS

The oesophagus is a muscular tube extends from the cricoid cartilage at the level of the sixth cervical vertebra to the cardiac orifice of the stomach at the level of the tenth thoracic vertebra and the left seventh costal cartilage. It is 10 inches (25cm) long (Last, 1973) .

The oesophagus has three parts; cervical, thoracic and abdominal. The cervical part is about 2 inches (5cm) in length and lies in the lower part of the neck. The thoracic part lies partly in the superior and partly in the posterior mediastinum. The abdominal part is very short and joins the stomach immediately (El-Rakhawy 1976).

The cervical portion of the oesophagus lying in front of the prevertebral fascia, inclines slightly to the left of the midline, but the oesophagus enters the thoracic inlet in the midline in front of the body of the first thoracic vertebra. Passing downwards through the superior mediastinum it is slightly to the left of the midline behind the left bronchus. The oesophagus all this time is in contact with the vertevral bodies, now inclines forword with a concavity more marked than that of the vertebral column, passes in front of the descending thoracic aorta, in contact with the pericardium, and pierces the diaphragm one inch to the left of the midline, opposite the body of the tenth thoracic vertebra. The abdominal part of the oesophagus varies in length according to the tone of its muscle and the degree of

distension of the stomach. It averages about half an inch (Last,1973).

The oesophagus is closely related to the base of the heart. Which is formed by the two atria, mainly the left atrium. The heart lies in front of the lower part of the oesophagus, being separated from it only by the pericardium (El-Rakhawy, 1976).

Blood Supply of The Oesophagus:

The upper oesophagus, from the cricoid cartilage down to the level of the arch of the aorta in the superior mediastinum, is supplied by the inferior thyroid arteries, the middle portion by oesophageal branches from the descending thoracic aorta, and the lower part by the oesophageal branches of the left gastric artery. Venous return from the upper part is to the branchiocephalic veins, from the middle part is to the azygos veins, and from the lower part is by oesphageal tributaries of the left gastric vein, which empties into the portal vein. Thus, an anastomosis exists in the lower part of the oesophagus, between portal and systemic venous systems. In cases of portal obstruction or portal hypertension, varicositis of these veins occur, and their rupture may give rise to serious or fatal hemorrhage (Last, 1973).

PORTAL HYPERTENSION

Normal Portal Pressure:

A variety of values were reported by many authors. The range varies slightly from one author to another. Tystrup et al. (1962), reported that the portal venous pressure is about 9 mm.Hg., but Sherlock (1985), stated that in normal man, the portal pressure is about 7 mm. Hg. Ganong (1977), said that the portal venous pressure is normally 10 mm.Hg. in man, and hepatic venous pressure is approximately 5 mm. Hg. However, most authors agree that portal venous pressure should not exceed 10 mm.Hg. (Davies, 1977). The normal wedged hepatic pressure is 5-6 mm. Hg. (Sherlock, 1985).

Aetiology and Classification:

Portal hypertension usually results from chronic liver diseases mainly cirrhosis. A variety of conditions may lead to the development of portal hypertension in the absence of cirrhosis. In the majority of cases increased resistance to flow at the level of portal vein, sinusoids or hepatic vein is the major contributing factor to the elevated portal pressure, although increased flow may be a contributing factor in certain instances (Sherlock, 1983).

Sherlock (1974) , classified portal hypertension into two broad groups; presinusoidal and intra-hepatic. Both groups had an elevated intra-splenic pressure but the intra-hepatic group had an elevated wedged hepatic venous pressure as well. Presinusoidal portal