A STUDY ON THE CORRELATION BETWEEN THE DIAMETER OF THE PORTAL VEIN (MEASURED BY BOTH ULTRASONOGRAPHY AND SPLENIC PORTOGRAPHY) AND THE CLINICAL PICTURE IN CASES OF PORTAL HYPERTENSION

THESIS

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BY

ZAKARIA YEHIA MOHRAN

M.B., B.Ch., M.S. (Tropical Medicine)

SUPERVIZED BY

Prof. Dr. M.A. MADWAR
Prof. Of Tropical Medicine
Ain Shams University

Prof. Dr. A. El-ZAYADI
Prof. Of Tropical Medicine
Ain Shams University

Dr. A. HASSAN
Asst. Prof. Of Radiology
Ain Shams University

FACULTY OF MEDICINE
AIN SHAMS UNIVERSITY
A.R.E.

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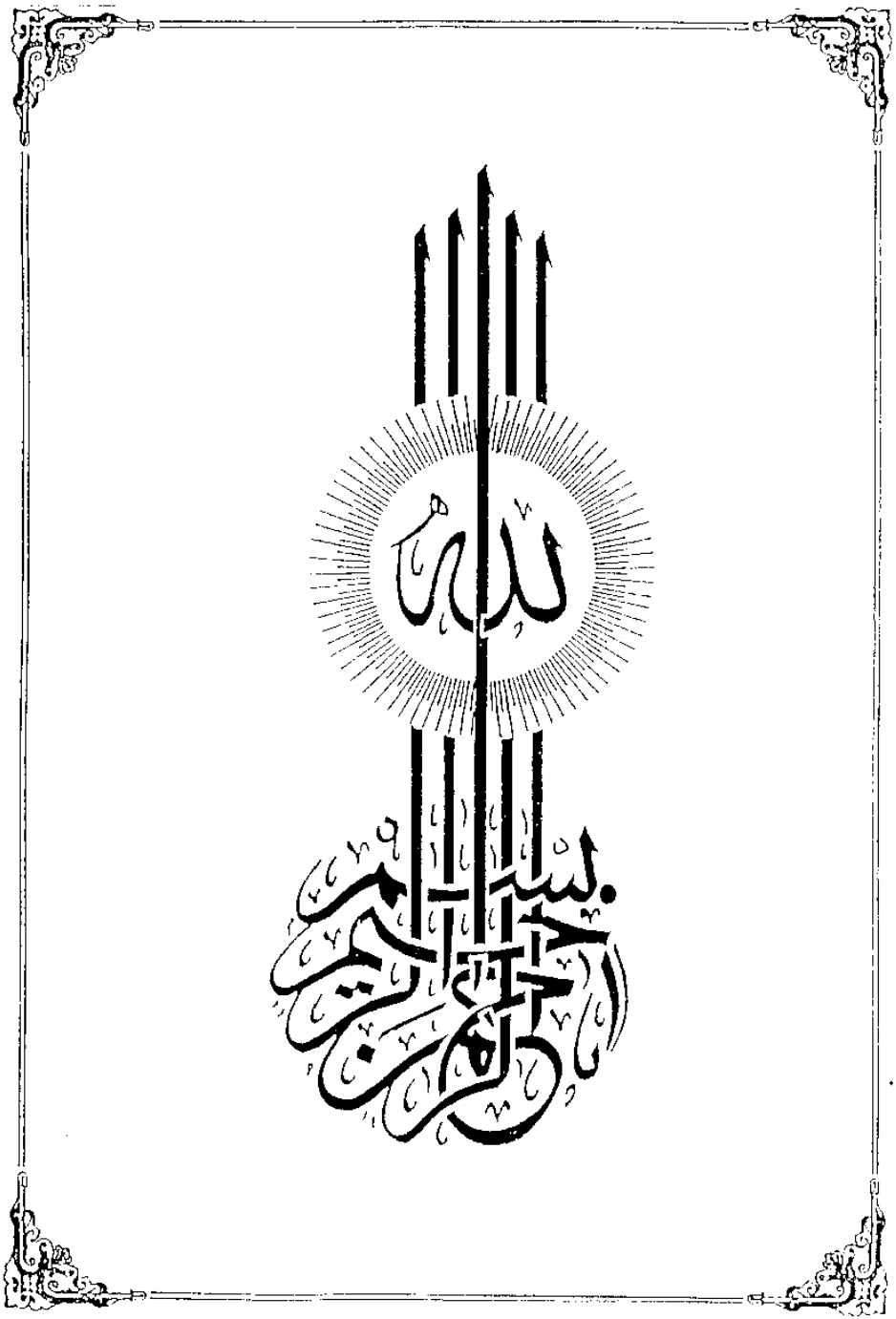

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INTRODUCTION

Portal hypertension is without doubt one of the most serious ailments (if not the most) present in our country. Many patients may suffer from schistosomiasis or have had a past attack of viral hepatitis and go on leading a normal life yet once portal hypertension develops (with its sequele of oesophageal varices and haemorrhage) the situation changes completely.

Many techniques have been used in the past years to diagnose and asses the severity of this condition and all of them had serious drawbacks.

The most important of these was the estimation of the intrasplenic pressure (Atkinson and Sherlock, 1954) followed by more sophisticated proceedures such as wedged hepatic venous pressure (Myers and Taylor, 1951) and the transhepatic measurement of the portal pressure (Okuda et al., 1974).

The idea behind this work began to crystallize after seeing countless patients suffering from portal hypertension who bled spontaneously or after some proceedure. With the dawning era of non-invasive techniques, it was very tempting to try to utilize such techniques in cases of portal hypertension. Accordingly, and with this concept in the back of my mind, this work had three objectives:

1- To try to measure the diameter of the portal vein using an invasive technique (splenic portography) and a non-invasive one (ultrasonography) and compare both techniques.

2- To try to correlate the diameter of the vein with the clinical picture in general and with bleeding in particular.

3- To try to establish certain criteria by ultrasonography which could be used in the diagnosis or exclusion of portal hypertension.

Review of Literature

CHAPTER ONE

AN INTRODUCTION TO THE PORTAL VENOUS SYSTEM

Anatomy of the Portal Venous System:

The portal system is a system of veins which drains blood from the abdominal part of the alimentary tract, the spleen, the pancreas and the gall bladder. The main veins which are responsible for the formation of this system are the portal vein, the splenic vein, the superior and inferior mesentric veins (Sherlock, 1981).

Although there are anatomical variations in the various branches of the portal system, the portal vein itself usually begins at the level of the second lumbar vertebra (posterior to the head of the pancreas) at the union of the splenic and the superior mesenteric veins. It then ascends behind the bile duct and the hepatic artery where it receives a variable number of small veins. It ends at the porta hepatis by dividing into two branches, one to each of the corresponding lobes of the liver. The right branch is usually joined by the cystic vein before its entrance into the liver. The left branch gives branches to the caudate and quadrate lobes and is

also connected to a fibrous cord, the ligamentum teres, which is a remenant of the obliterated left umbilical vein (it runs in the free border of the falciform ligament) (Last, 1973).

The small paraumbilical veins run together with the ligamentum teres and connect the portal vein with the veins around the umbilicus. These may become prominent in cases of portal hypertension. A second fibrous cord, the ligamentum venosum, is a vestige of the obliterated ductus venosus and connects the inferior vena cava with the left portal vein (Davies and Coupland, 1969).

The length of the portal vein ranges from 6 to 8 cms, its diameter is about 1.2 cms and it has no valves (Reynolds, 1969).

The splenic vein begins by five or six tributaries issuing from the spleen. Such tributaries are then joined by the short gastric vessels to form a single vessel. It then descends to the right (across the posterior abdominal wall) where it receives numerous short tributaries from the pancreas. It usually receives the inferior mesentric

vein at a right angle to form the portal vein (Warwick and Williams, 1975).

The superior mesenteric vein is very variable, having from ten to twenty-five tributaries. It collects blood from the small intestine, the caecum, the descending and tranverse parts of the colon. It usually begins in the right iliac fossa by the union of its numerous tributaries and ascends in the mesentery until the neck of the pancreas to meet the splenic vein (Gardner et al., 1975).

The inferior mesenteric vein drains blood from the rectum, the sigmoid and the descending parts of the colon. Starting as the superior rectal vein in the rectum it continues upwards and ends in the medial third of the splenic vein but may sometimes enter the junction of the splenic and superior mesenteric veins. (Romanes, 1969).

THE PORTAL BLOOD FLOW:

The normal portal blood flow is about 1200 ml/ minute and work done on experimental animals has shown that this flow is streamlined rather than turbulent (although some crossing of the blood stream does occur) (Richardson and Withrington, 1981).

Cavernous Transformation of the Portal Vein:

This occurs when the vein is transformed into a mass of spongy cavernous tissue. While admitting the possibility of a congenital origin for this transformation yet many authors now consider this as being usually secondary to portal vein thrombosis. Although the time required for this change is usually a year or longer yet sooner or later portal hypertension develops and is recorded in these cases (Jones,1966).

Anomalies of The Portal Vein:

Anomalies of the portal vein are rare but have been reported and may result in portal hypertension which can be fatal.

Snavely and Breakell (1954) reported the case of a 13 year old patient presenting with an enlarged spleen, elevated intrasplenic pressure and severe haematemesis which turned out to be fatal. The post-mortem showed two separate portal veins with marked narrowing at the points of junction of the splenic and the superior mesenteric veins to the portal vein.

A prepancreatic portal vein (lying anterior to the pancreas) associated with biliary atresia was found in a patient with portal hypertension and jaundice since birth. Another case of stenosis of the portal vein with cavernous transformation (which ended in fatal bleeding from oesophageal varices) was also commented on by the same authors (Renner and Child, 1963).

Other rare anomalies of the portal vein include agenesis of the vein, a bifid vein, valves present in the vein and direct drainage into the inferior vena cava (Rousselot and Burchell, 1969).

THE PORTAL PRESSURE

The Normal Portal Pressure:

The normal portal pressure in man is about 7 mm. mercury (Sherlock, 1981) and most authors agree that it should not exceed 10 mm. mercury (Davies, 1977). Mousa and El-Garem in 1959 measured the intrasplenic pressure in more than fourty patients and stated that the upper normal level was 20 cm. saline and that pressures above this were considered as cases of portal hypertension (pH).

Measurement of the Portal Pressure:

Introductory note;

The history of the different methods utilized in the estimation of the portal pressure dates back to the work of two groups; namely Rousselot in 1936 and Thompson et al. (1937). These two groups were able to cannulate the splenic vein thus enabling them to measure the splenic vein pressure.

Since that time many workers have studied the portal pressure with or without visualization of the portal system (Atkinson and Sherlock, 1954, Mousa et al., 1964 and Reynolds, 1969).