PORTAL HYPERTENSION

Essay

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BY

SAMIH SAEED EL-KHOLY

(M.B., B.Ch., Cairo University).

SUPERVISED BY

Prof. Dr. **"MOHAMED SAMIR ABOU ZEID".**

Professor of General Surgery,

Ain Shams University.

Faculty of Medicine,

Ain Shams University.

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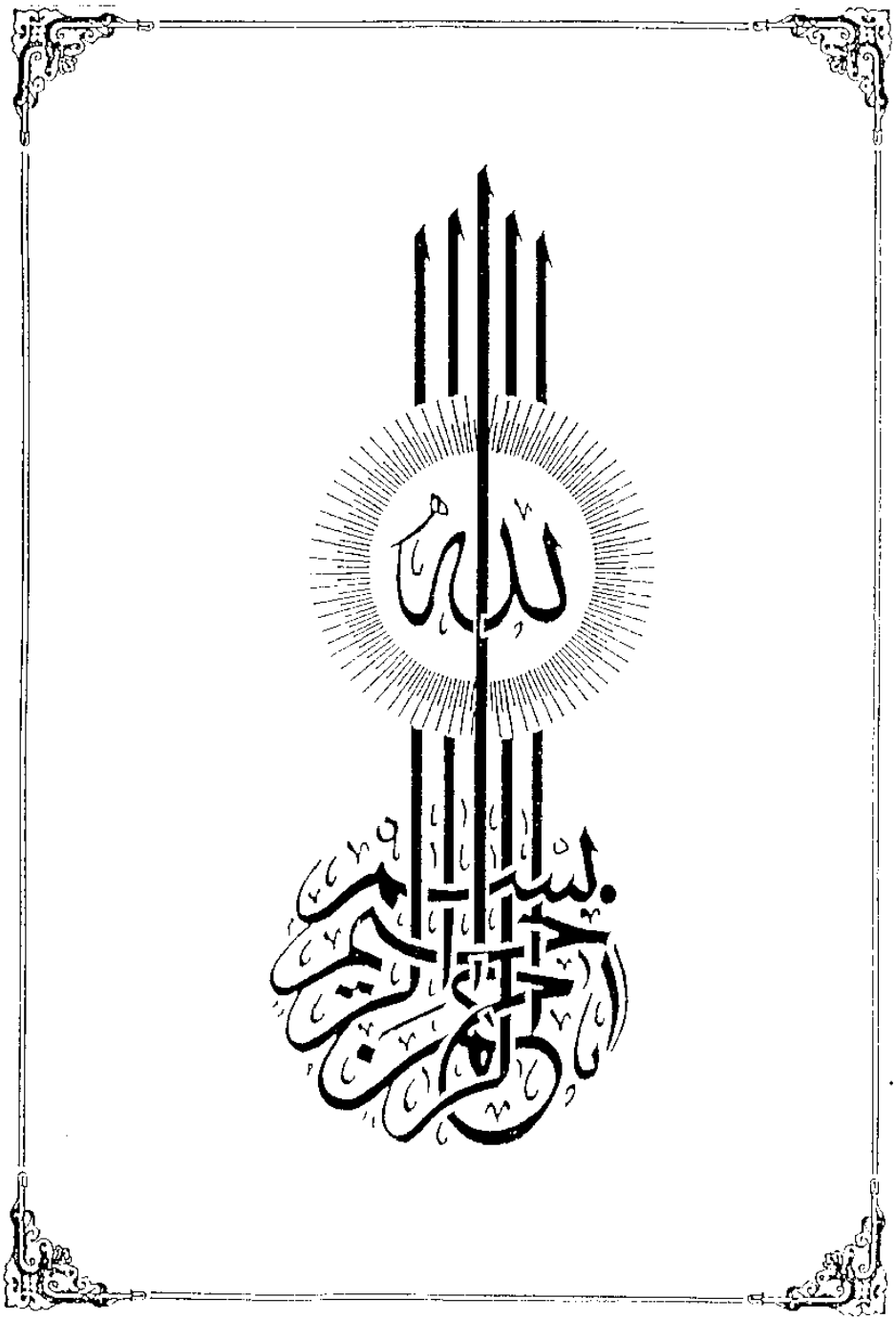
«ربنا لا تؤاخذنا إن نسينا او أخطأنا»

(صدق الله العظيم)



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INTRODUCTION

Portal hypertension with its complications is a serious surgical problem. Its incidence remains high because the major cause, cirrhosis of the liver, is prevalent and is increasing through out the world.

Whereas alcoholic cirrhosis is the major cause of portal hypertension and bleeding varices in other parts of the world, schistosomiasis is primarily responsible for this serious disease in Egypt and other endemic areas. Literally millions of persons are threatened by fatal haemorrhage from varices related to schistosomiasis, in contrast to the tens of thousands who bleed from varices related to alcoholic cirrhosis.

The successful management of portal hypertension still present a most challenging and controversial problem. The dilema whether to operate, when and which operation remains unsolved.

A N A T O M Y

* PORTAL VENOUS SYSTEM.
* PORTAL COLLATERALS.
* ANATOMY OF THE OESOPHAGUS.
* ARCHITECTURE OF THE OESOPHAGUS.
* VENOUS DRAINAGE OF THE OESOPHAGUS.
* VENOUS ARCHITECTURE OF THE OESOPHAG-OGASTRIC TRANSITION SEGMENT (EGTS).

PORTAL VENOUS SYSTEM

The portal system includes all veins collecting blood from the abdominal part of the digestive tube(with the exception of the lower part of the anal canal) and from spleen, pancreas and gall bladder. From these viscera blood is conveyed into the liver by the portal vein. In the liver this vein ramifies like an artery and ends in capillary like vessels termed sinusoids, from which the blood is conveyed to the inferior vena cava by the hepatic veins (Silk and Williams, 1979).

The blood of the portal system therefore passes through two sets of exchange vessels, the capillaries of the digestive tube, the spleen, pancreas and gall bladder and sinusoids of the liver. (Reynolds, 1982).

In the adult the portal vein and its tributaries have no valves, in the foetus and for a short time after birth valves can be demonstrated in its tributaries, as a rule they atrophy and disappear but some may persist (Romanes, 1971).

The portal vein is about 8 Cm long and starts at the level of the second lumbar vertebra, from the junction of the superior mesentric and splenic vein, infront of the inferior vena cava and behind the neck of pancreas.

The vein inclines slightly to the right as it passes upwards behind the first part of the duodenum, the bile duct and the gastroduodenal artery and infront of the inferior vena cava, it then ascends in the right border of the lesser omentum infront of the epiploic foramen to reach the right end of the porta hepatis, where it divides into right and left stems, which accompany the corresponding branches of the hepatic artery into the substance of the liver. In the lesser omentum it is behind the bile duct and the hepatic artery, the former to the right of the later, it is surrounded by the hepatic plexus of nerves, and is accompanied by numerous lymph vessels and some lymph nodes. The right branch of the portal vein enters the right lobe of the liver, but before doing so generally receives the cystic vein (Williams et al., 1980).

However it is written by some authors that, the veins draining the gall bladder vary considerably those from its upper surface lies in the areolar tissue between the gall bladder and liver and usually run directly into the liver through the fossa for the gall bladder to join the hepatic vein. Those from the rest of the gall bladder join to form one or two cystic veins on its neck, and these commonely enter the liver, either directly or after joining with veins draining the hepatic ducts and

the upper part of the bile duct. Only rarely does a single or double cystic veins drain directly into the right branch of the portal vein. (Williams et al., 1980, Last, 1984).

In another view, the veins draining the gall bladder normally empty into the epicholedochal venous plexus which drain the common bile duct and not directly into the portal vein (Northover, and Terblanche 1982).

The left branch of the portal vein is longer but of smaller caliber than the right, gives branches to the caudate and quadrate lobe of the liver and then enters the left lobe. As it does so, it is joined infront by the paraumbilical veins and by a fibrous cord, the ligamentum teres, the remains of the obliterated left umbilical vein. It is connected to the inferior vena cava by a second fibrous cord, the ligamentum venosum, a vestige of the obliterated ductus venosus and ascends in the fissure on the posterior aspect of the liver. The small extrahepatic portion of the left branch from which the vessles to quadrate and left lobe arise, is a persistant part of the left umbilical vein. The tributaries of the portal vein are, splenic, superior mesentric, left gastric, right gastric, paraumbilical and cystic veins. (Williams et al., 1980).

Anatomy of Portal Collaterals: The diversion of the blood flow from the portal system through anastomotic veins is a natural response to increase pressure and stasis. (Reynolds, 1982).

The portal collaterals are of two types, hepatofugal and hepatopetal collaterals.

The hepatofugal collaterals ("portal - systemic anastomoses or communications") develop when the liver blood flow is impaired. They are classified into three main groups. The first group comprises veins located in the gastrointestinal tract at the junction of absorbing and protective epithelium. At the cardia of the stomach there is a plexus of veins that shunts blood from the left gastric (Coronary) and short gastric veins, through the oesphageal plexus, the azygos vein and finally into the superior vena cava. The left gastric vein also communicates with the superior vena cava by means of diaphragmatic and internal mammary veins. Dilatation of these plexuses leads to varicosities in the subepithelial layer of the lower oesophagus and upper part of the stomach (Spence, 1984). At the anus the superior haemorrhoidal veins, tributaries of the inferior mesentric vein, anastomose the middle and inferior haemorrhoidal veins which drain into the inferior vena cava. The second group includes veins located at the site of obliterated foetal circulation. The

paraumbilical veins and rarely remenants of the umbilical vein connect the left branch of the portal vein with the subcutaneous abdominal, epigastric and internal mammary veins in the region of the umbilicus. These collateral anastomoses also lead to varicosities that form the "caput medusae" other collaterals can also become evident at the thoraco-abdominal wall. The third group includes veins located in the areas where gastrointestinal tract and its appendages are retroperitoneal developmentally or become adherant to the abdominal wall in pathologic conditions these include, the veins of Retzius, from the duodenum, small intestine, colon, omentum, spleen and pancreas the veins in adhesions formed between the digestive tract and parietes and the porto-renal anastomoses where the portal venous blood is diverted to the left renal vein through collaterals entering from pancreas, spleen and descending colon as a plexus or directly from the splenic vein (Beker, 1976).

The hepatopetal collateral circulation develop when the portal vein is obstructed but liver blood flow is unimpeded, blood bypass the blockage and reach the liver by mean of "porto-portal anastomosis". The later consists of deep cystic veins, epiploic veins of lesser omentum and hepatocolic and hepatorenal ligaments, veins of the portahepatis, veins of the suspensory ligament of the

liver and diaphragmatic and paraumbilical veins, some of these may function as porta-systemic collaterals. The collateral circulation is usually sufficient to overcome the portal block so that a combination of hepatofugal and hepatopetal collaterals may occur in the same patient (Beker, 1976).

Anatomy of the Oesophagus: The oesophagus is a muscular canal, about 25 Cm in length, extending from the pharynx at the level of the lower border of the cricoid cartilage, opposite the sixth cervical vertebra. Then it descends along the front of the vertebral column, pierces the diaphragm opposite the tenth thoracic vertebra where it ends at the cardiac orfice of the stomach at the level of the eleventh thoracic vertebra (Davis, 1979).

Architecture of the Oesophagus: The oesophageal wall is composed of the following layers, mucosa, submucosa, musculosa and adventitia.

The mucous membrane of the oesophagus is thick, smooth and reddish in colour above but paler below. It has longitudenally arranged folds. The mucosa is composed of three layers, epithelium, lamina propria (a layer of connective tissue underneath the epithelium) and muscularis mucosa.

The submcosa is a connective layer which loosely connect the mucosa and muscular coat. It contains the main vascular, lymphatic and nerve plexuses.

Musculosa is composed of an outer longitudinal and an inner circular muscle layers. The muscle fibres are striated in the upper third, smooth in the lower third and mixed in the middle third.

The adventitia consists of loose connective tissue containing elastic fibers, adipose tissue, blood vessles and nerves (Bloom and Fawcett, 1975).

Venous Drainage of the Oesophagus: The detailed venous anatomy of the lower part of the oesophagus has been little studied. Kegaries in 1934 studied eight normal specimens and found three or four longitudinal venous trunks with few cross-anastomoses. The next major contribution was that of Butler in 1951 who described intrinsic veins consisting of subepithelial and submucosal plexus, venae comitants along the vagi and finally extrinsic veins. MaCbeth in 1955 confirmed Butler's finding and emphasized the importance of the subepithelial veins in variceal bleeding and this finding was the pathological basis of his injection sclerotherapy. (Spence, 1984).