PORTOSYSTEMIC SHUNTS

ESSAY

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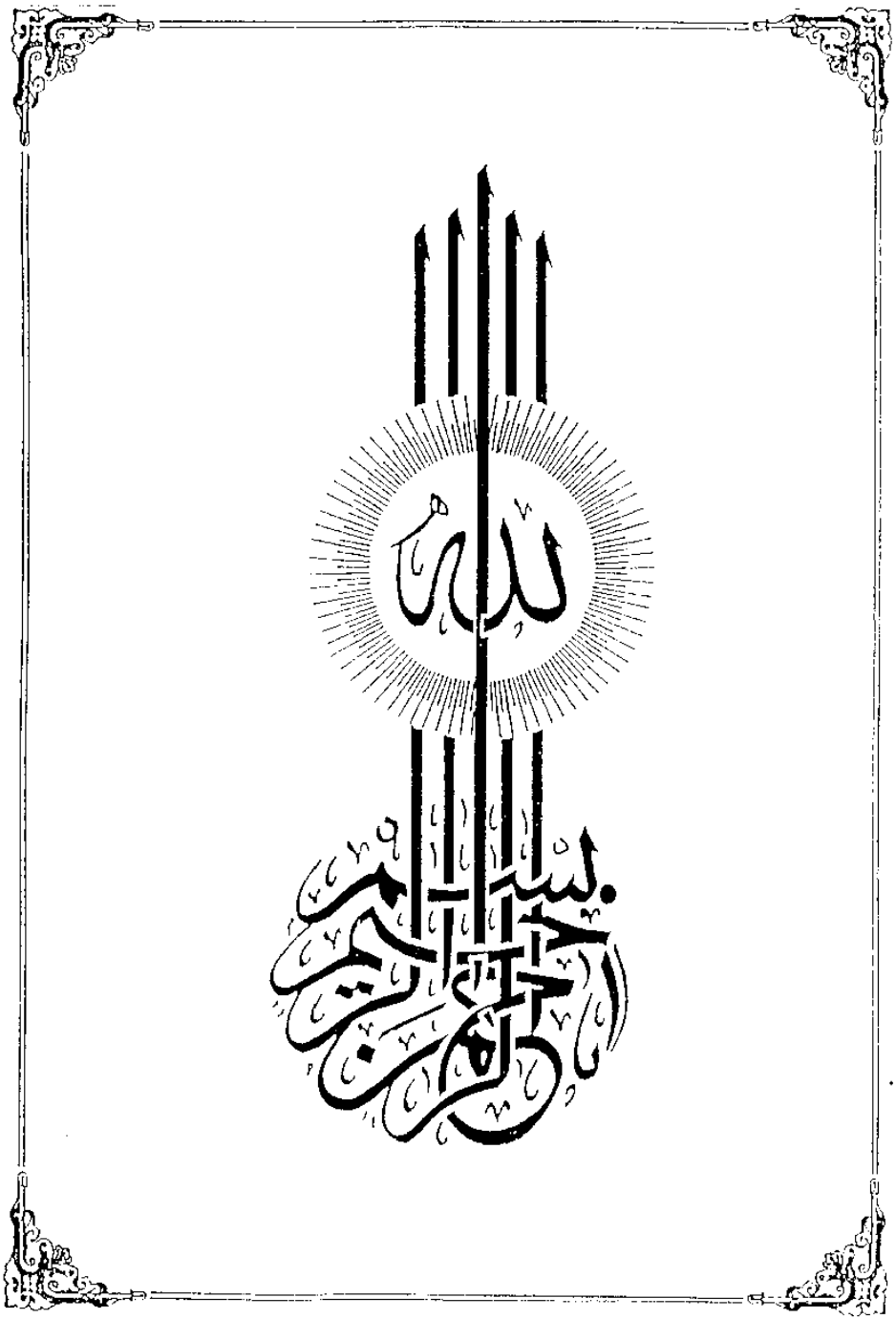

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I N T R O D U C T I O N

The management of a patient with oesophageal varices complicating portal hypertension remains unsatisfactory. The outcome of treatment for active bleeding is probably dependant upon the state of the liver function at the time of bleeding more than the treatment given. Conservative measures include oesophageal temponade or parentral pitressin and after these will stop an acute bleeding.

Frequently however, bleeding recurs and more active treatment is required. The choice must be between sclerosis, compression, ligation of the varices or their feeding collaterals and portal decompression by portasystemic shunt or splenectomy and devascularization as in Bilharzial Egyptian Splenomegaly. Each method carries a significant mortality and morbidity At Present, the most promising techniques are sclerosis and Warren distal splenorenal shunt. (Hobbs 1979).

HISTORICAL CONSIDERATION

Oesophageal varices has been treated surgically by diversion of blood from the portal system, by interruption of the flow of blood to oesophageal varices, or by direct obliteration of the varices. At the begining of the twentieth century, portal diversion was achieved by omentopexy and, in few patients, by the creation of a portacaval shunt. The later operation was abandoned because of high mortality and morbidity rates, including shunt encephalopathy. In the 1940's, interest was renewed in the portocaval shunt. Impaired understanding of hepatic physiology and the establishment of precise criteria for selection of cases for surgery resulted in a low operative mortality rate. The operation was highly successful in the control of haemorrhage from oesophageal varices but was associated with an undesirable incidence of impairment of hepatic function. Currently, selective decompression of varices by the distal splenorenal shunt is under evaluation as a method of preventing variceal haemorrhage, while preserving hepatic function. Elimination of the threat of haemorrhage from varices by arterial ligation, sclerotherapy, or direct suture has been prescribed practiced for almost a century. The result remains one of temporary control with recurrent haemorrhage in the majority of cases.

Ascites was formely considered the dominant manifestation of portal hypertension. Currently, it is usually well controlled by diuretics. Surgery is reserved for the rare case of intractable ascites,often with hepatorenal syndrome. In such cases, a shunt is established between the peritoneal cavity and the systemic venous system, a procedure first performed early in this century. (Arthur J.Donovan World J. Surgery 8, 626, 1984).

ANATOMY OF PORTAL SYSTEM

The portal system includes all veins which carry blood from the abdominal part of the digestive tube, (with exception of the lower part of the anal canal). The spleen pancreas and gall bladder to the liver. From these viscera the blood is conveyed to the liver via the portal vein entering the liver at the porta hepatis dividing into two main branches one to each lobe. In the liver each vein ramifies into hepatic sinusoids from which blood is conveyed to the inferior vena cava by the hepatic veins. The portal system peculiar in that it ramifies into two capillary beds between the abdominal viscera and inferior vena cava. In the adults it is devoid of valves. Valves can be easily seen in the newborn infants, however, with increase age these valves become insufficient so that cusps no longer oppose. (Gilfillan 1950).

The Portal vein:

The portal vein is formed by the union of the superior mesenteric vein and the splenic vein just posterior to the neck of pancreas at the level of the second lumbar vertebra. It is rather an upward continuation of the superior mesenteric vein (Last, 1974).

In 15% of cases it is formed by the union of the superior mesenteric, splenic and inferior mesenteric veins. (Gilfillan, 1950). Its average anatomical length is 7.3 cm and its surgically accessible segment is 4.2cm and that latter occasionally reaching 7 cm. This includes the portion of the portal vein from just above the highest tributary to the junction of the right and left portal branches at the porta hepatis where surgical dissection can be undertaken without fear of haemorrhage the average diameter is 1.9 cm with range of 0.8 - 1.4 cm. The vein inclines slightly to the right as it passes upward behind the superior part of the duodenum, the bile duct and 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 extremity of the porta hepatis where it expands into the sinus venae portae and bifurcates into a shorter right trunk which appears as a direct extension of the parent vessel and a longer left one that springs from it at an angle of 90°. In the lesser omentum the portal vein is placed behind the bile duct and hepatic artery, the former being to the right of the latter. It is surrounded by 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, before doing so, it receives the cystic vein. The left branch

gives branches to the quadrate and caudate lobes and then enters the left lobe of the liver. As it does so, it is joined infront by the paraumbilical veins and by a fibrous cord named the ligamentum teres which represents the obliterated left umbilical vein. It is connected to the inferior vena cava by a second fibrous cord termed the ligamentum venosum which represents the obliterated ductus venosus and ascends in a fissure on the posterior aspect of the liver the small extrahepatic portion of the left branch from which the vessels to the quadrate and left lobe arises is a persistent portion of the left umbilical vein the tributaries of the portal vein are summarised as follows:

1. Splenic vein.
2. Superior mesenteric vein.
3. Left gastric vein.
4. Right gastric vein.
5. Paraumbilical veins.
6. Cystic veins.

1) Splenic vein:

It is of large size but not tortuous like the artery. It commences from five or six tributaries which return the blood from the spleen. It traverses the

lienorenal ligament accompanying splenic artery at the tail of pancreas. It then passes to the right, with a downwards inclination across the posterior abdominal wall, lying at a lower level than the splenic artery and grooving the upper part of the posterior surface of the body of the pancreas to which it is connected by numerous short tributaries from the gland. In its course it crosses the anterior surface of the left kidney and its hilus (or the lower pole of the left suprarenal gland) and it is separated from the left sympathetic trunk and crus of diaphragm by the left renal vessels. The superior mesenteric artery and the left renal vein lie between it and the abdominal aorta. It ends behind the neck of pancrease where it unites at a right angle with the superior mesenteric vein to form the portal vein.

Tributaries:

The splenic vein receives the short gastric veins the left gastroepiploic vein, the pancreatic veins and the inferior mesenteric vein which terminates in its medial third in most of the cases.

a. Short gastric veins:

Four or five in number, they drain the fundus and left part of the greater curvature of the stomach and pass between the two layers of the gastrosplenic ligament.

b. Left gastro epiploic vein:

It receives branches from both surfaces of the stomach and from the greater omentum. It runs from right to left along the greater curvature of the stomach between the anterior two layers of the greater omentum.

c. The pancreatic veins:

They are small from 3-13 vessels, which drain the body and the tail of pancreas . As their course is extremely short, great care must be taken during mobilization of the spleen to avoid injury to the pancreas or splenic vein (Last, 1974).

d. the inferior mesenteric vein:

It returns blood from the rectum and from the sigmoid and descending part of the colon. It begins in the rectum

as a superior rectal vein which has its origin in the rectal plexus and through this plexus communicates with the middle and inferior rectal veins.

2. Superior mesenteric vein:

It is formed from tributaries from the small intestine, colon, head of pancreas and irregularly from the stomach via the right gastroepiploic vein. It begins in the right iliac fossa by the union of the veins which drain the terminal portion of the ileum, the caecum and vermiform appendix. It ascends between the two layers of the mesentery on the right side of the superior mesenteric artery and in its upward course passes infront of the right ureter, inferior vena cava, the horizontal part of the duodenum and the uncinate process of the pancreas. Behind the neck of the pancreas it unites within the splenic vein to form the portal vein.

Tributaries:

The superior mesenteric vein receives the veins which correspond to the branches of superior mesenteric artery the the jejunal, the ileocolic, the right colic and

middle colic veins. It is also joined by the right gastroepiploic and pancreaticoduodenal veins. (Last 1974).

3. The left gastric vein:

It derives tributaries from both surfaces of the stomach. It runs upwards along the lesser curvature of the stomach between the two layers of the lesser omentum to the oesophageal veins. It then turns, backward and passes down wards and to the right behind the lesser sac of peritoneum and ends in the portal vein at the upper border of the superior part of the duodenum.

4. The right gastric vein:

It is of small size, it runs from left to right along the pyloric portion of the lesser curvature of the stomach, between the two layers of the lesser omentum and ends in the portal vein. It is joined by prepyloric vein which ascends infront of the pylorus and usually marks the site of the pyloric opening.

5. The paraumbilical veins:

These establish an anastomosis between the veins of the abdominal wall and the portal vein. They are found in the ligamentum teres of the liver.

6. Cystic veins:

The veins draining the gall bladder vary considerably these from its upper surface lie in the areolar tissue between the gallbladder and liver and usually run directly into the liver through the fossa. For the gall bladder to join hepatic veins. Those from other part of the gall bladder join to form one or two cystic veins on the neck of the gall bladder, and those commonly enter the liver either or often joining with veins draining the hepatic ducts and upper part of the bile duct. Only rarely does a single or double cystic vein drain into the right branch of the portal vein (Last 1974).