EFFECTS OF SUBLINGUAL NIFEDIPINE ON PORTAL HAEMODYNAMICS

Thesis
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INTERNAL MEDICINE

By
Siham Zaki Aziz
M.B., B.Ch.

SUPERVISED BY

Prof. Dr. Soheir Sheir
Prof. of Internal Medicine
Ain Shams University

Prof. Dr. Mohamed Abd El-Rahman Moussa
Prof. of Internal Medicine
Ain Shams University

Dr. Suzan Hossny Faragallah
Ass. Prof. of Internal Medicine
Ain Shams University

Ain Shams University
Faculty of medicine
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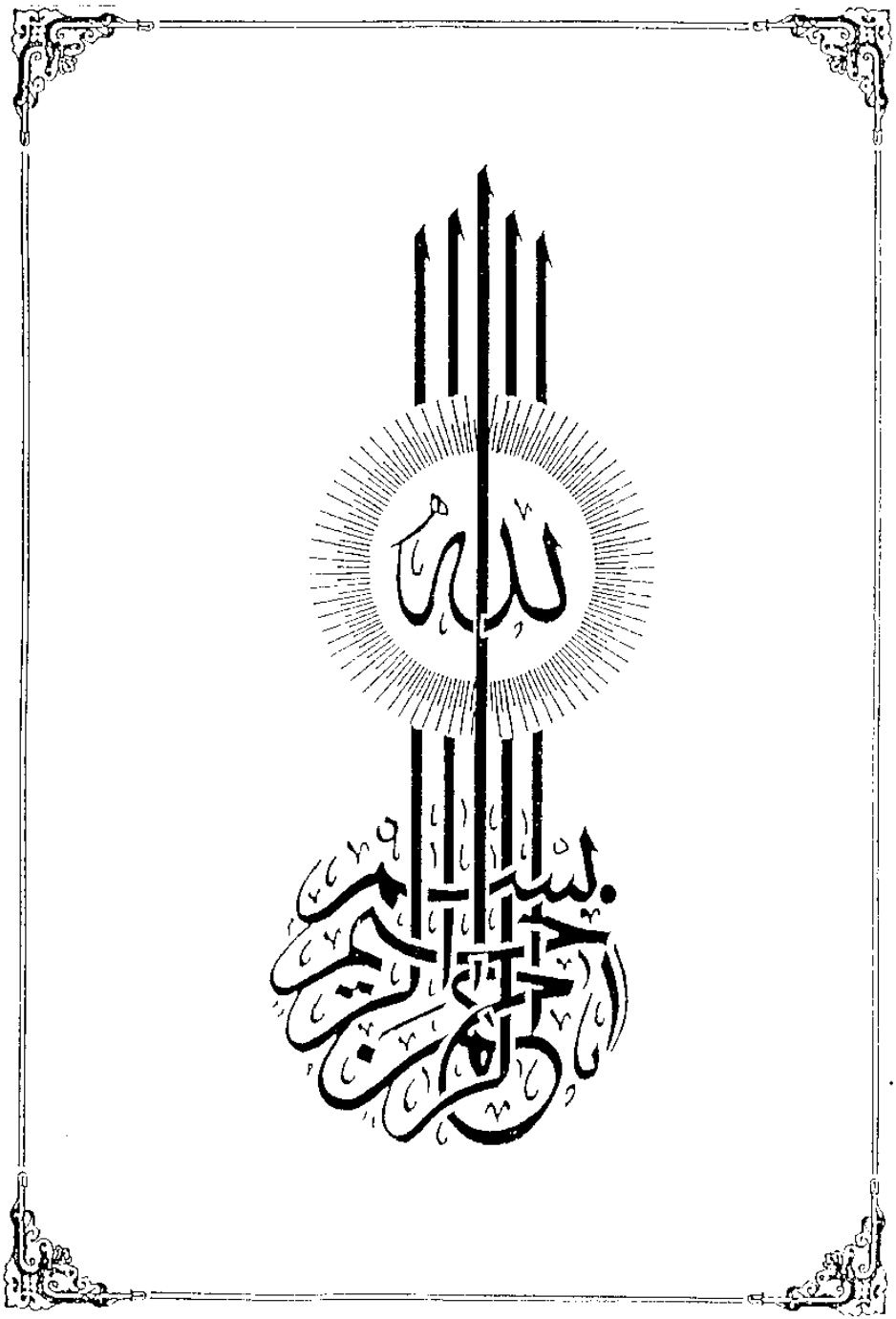

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INTRODUCTION AND AIM OF THE WORK

Introduction:

Disturbances in portal haemodynamics in patients with chronic liver disease are manifested clinically by pathological increase in portal venous pressure and by the formation of porto-systemic collaterals that divert portal blood to the systemic circulation by passing the liver ***(Bosch et al., 1989a)***.

Bleeding from oesophageal or gastric varices is a major complication of portal hypertension that can be dramatic and frightening for the patient, carrying a mortality rate of up to 50% for those with cirrhosis. Portal pressure can be reduced by decreasing blood flow or vascular resistance or both, within the portal venous system ***(Bosch, 1985)***.

Up till now, medical treatment for portal hypertension has been aimed at reducing splanchnic blood flow, such as vasopressin***(Groszman D. et al., 1982 and Bosch D. et al. 1988)***, ß-blockers ***(Lebrec D. et al., 1982 and Lebrec D. et al., 1981)*** and somatostatin ***(Bosch et al., 1981 and Kravetz et al., 1984)***. However, the reduction in hepatic blood flow seen with these drugs may further impair liver function ***(Barbare et al., 1984 and Vanbuuren HR, 1982)***.

In contrast, the introduction of vasodilators such as Isosorbide 5 mononitrate and calcium channel blockers ***(Kong C.W. et al., 1986)*** can reduce portal pressure without changing both hepatic perfusion ***(Iwao T et al., 1991a and Iwao et al., 1991)*** and liver function. Thus, vasodilatory therapy would be more useful in the treatment of portal hypertension.

Aim of the work:

The aim of this work is to evaluate the acute effects of sublingual nifedipine in portal haemodynamics in patients with portal hypertension as measured by Doppler ultrasonography.

REVIEW OF
LITERATURE

ANATOMY OF PORTAL CIRCULATION

The portal system includes all veins that carry blood from the abdominal part of the alimentary tract, the spleen, pancreas and gall bladder. The portal vein enters the liver at the porta hepatis in two main branches one to each lobe and it is without valves in its larger channels ***(Douglass et al., 1950)***.

The portal vein is formed by the union of the superior mesenteric vein and the splenic vein just anterior to the head of the pancreas at about the level of the second lumbar vertebra. It extends slightly to the right of the mid line for a distance of 5.5-8 cm to the porta hepatis. The portal vein has a segmental intra-hepatic distribution accompanying the hepatic artery.

The superior mesenteric vein is formed by tributaries from the small intestine, right part of the colon and head of pancreas and irregularly from the stomach via the right gastroepiploic vein ***(Sherlock, 1993)***.

The splenic vein (5-15 channels) originate at the splenic hilum and join near the tail of the pancreas with the short gastric vessels form the main splenic vein.

This proceeds in a transverse direction in the body and head of the pancreas. It receives numerous tributaries from the head of the pancreas, and the left gastro-epiploic vein enter it near the spleen. The inferior mesenteric vein, bringing blood from the left part of the colon and rectum usually enters its medial third.

Occasionally, however, it enters the junction of superior mesenteric and splenic veins.

Portal blood flow in man is about 1000-1200 ml/min. ***(Sherlock, 1993)***.

The hepatic artery supplies about 25% of the total liver blood flow but 50% of the oxygen, while the remaining 75% of the volume and the other half of the oxygen comes from the relatively deoxygenated, low-pressure portal vein supply.

Portal pressure is normally about 7 mmHg in man ***(Sherlock, 1993)***.

Collateral circulation:

When the portal circulation is obstructed, whether it be within or outside the liver, remarkable collateral circulation develops to carry portal blood into the systemic vein.

1. Group I: where protective epithelium adjoins absorptive epithelium.

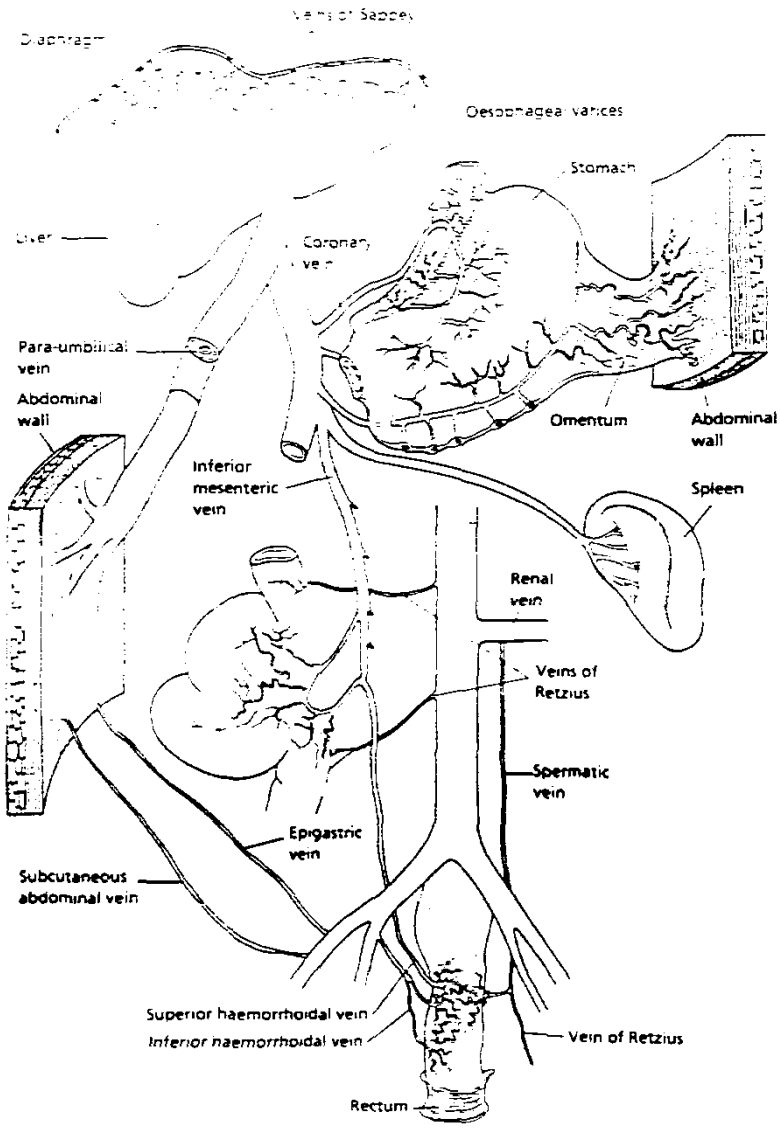
a. at the cardia of the stomach, where the left gastric vein, posterior gastric ***(Kimura et al., 1990)*** and short gastric veins of the portal system anastomose with the intercostal diaphragmo-oesophageal and azygos minor veins of the caval system. Deviation of blood into these channels leads to varicosities in the submucous layer of the lower end of oesophagus and fundus of the stomach.

b. At the anus, the superior haemorrhoidal vein of the portal system anastomose with the middle and inferior haemorrhoidal veins of the caval system. Deviation of blood into these channels may lead to rectal varices.

2. Group-II: In the falciform ligament through the paraumbilical vein, relics of the umbilical circulation of the fetus.

3. Group-III: where the abdominal organs are in contact with retro-peritoneal tissues or adherent to the abdominal wall. These collaterals include veins from the liver to the diaphragm, veins in the spleno-renal ligament and omentum and lumber veins.

4. Group-IV: portal venous blood is carried to the left renal vein. This may be through blood entering directly from the splenic vein, or via diaphragmatic, pancreatic, left adrenal or gastric veins.



The sites of the portal-systemic collateral circulation in cirrhosis of the liver

Effects:

When the liver is cut-off from portal blood by the development of the collateral circulation, it depends more and more on blood from hepatic artery. It shrinks and show impaired capacity to regenerate. This might be due to lack of hepatotropic factors, including insulin ~~and glucagon~~, which are of pancreatic origin.

Collaterals usually imply portal hypertension, although occasionally if the collateral circulation is very extensive portal pressure may fall. Conversely, portal hypertension of short duration can exist without a demonstrable collateral circulation.

A large portal-systemic shunt may lead to hepatic encephalopathy, septicaemias due to intestinal organisms and other circulatory and metabolic effects ***(Sherlock, 1993)***.