INTRODUCTION AND AIM OF THE WORK

Portal Hypertension is defined as increase of the pressure in the portal venous system above 10-12 mm Hg. Normal value depends on the mode of measurement, but is generally around 7mmHg (5 – 10 mm Hg). ***(Blum et. al.,1995)***. The increase in either flow or resistance results in an increase in portal pressure. ***(Sherlock and Dooley, 1997)***.
Causes of portal hypertension may be classified into prehepatic , hepatic and posthepatic causes ***(Taylor et. al. ,1995, Rumack et. al.,1998)***.

The most valuable application of duplex sonography in the abdomen is the diagnosis of vascular disorders of the liver ***(Zwiebel,2000)***. Duplex and color Doppler sonography studies allow non-invasive visualization of the portal vein. Vien diameter, flow velocity, flow direction, presence or absence of thrombosis and portosystemic collaterals can be visualized. ***(schmassmann et, al.,1993)***. As in portal hypertension the following is confirmed by color duplex study :-
- An increase in **cross – sectional area** of the portal vein. ***(Moriyasu et. al. 1986b)***
- Portal venous **flow velocity** is significantly reduced ***(Ohnishi et. al., 1985a; Zoli et al., 1986 ; Schmassmann et al., 1993)***.
-Portal vein **flow volume** is well maintained ***(Moriyasu et. al.,1984 and 1986a,c)***
-Portal vein blood **flow direction** may be reversed (i.e hepatofugal) or it may remain orthograde (i.e hepatopetal). Occasionally it may show partial reversal (e.g orthograde flow on the left branch and retrograde on the right branch and portal trunk). ***(Ackroyd et. al., 1986)***.

In addition, Duplex ultrasound should always be used to confirm **portal vein patency**. Duplex can document the presence of thrombus and can also reveal whether it is occlusive or not ***(Koslin et. al., 1992a)***. **Portal vein thrombosis** eliminates the venous flow signal normally obtained from the lumen of the portal vein ***(Parvey et. al.,1994)***. In about one third of patients after portal vein thrombosis, **Cavernous transformation of the portal vein** occurs ***(Keuzlarin et al.,1984)***. Cavernous transfomation of portal vein is defined as formation of venous collaterals within or around a previously thrombosed portal vein ***(De Gaetano et al., 1996)***. Color duplex demonstrates Cavernous transformation of portal vein as multiple tubular channels (sponge – like) in the porta hepatis showing portal venous flow surrounding an abnormal echogenic cord representing the occluded portal vein . Color duplex shows the vascular origin of the dilated structure in the porta hepatis ***(Raby et al.,1988)***.

Color Duplex is also valuable in **assessment of collaterals** , as three types of collaterals were observed :

Portosystemic collaterals, In portal hypertension, blood that normally passes through the liver is directed to the systemic venous circulation through multiple collateral pathways. Using color Doppler flowmetry, it is quiet easy to detect the portosystemic collateral pathways; The coronary vein, gastroosophageal, splenorenal and paraumbilical collaterals are visualized if present ***(Van Leeuwen,1990).***

Portoportal collaterals served as communication between extra – hepatic portal circulation and intra – hepatic portal veins (pericholecystic venous channels).

Portohepatic collaterals are seen in the form of reversed flow directed towards cavernous transformation in the left lobe ***(De Gaetano et al.,1996)***

Aim of the work is to study the role of color Doppler ultrasonography in assessment of haemodynamic consequences in portal hypertension including portal vein diameter, flow velocity, flow volume, flow direction, portal vein patency and thrombosis, cavernous transformation of portal vein and assessment of collaterals.