Introduction

Hepatorenal syndrome (HRS) is the most frequent life threatening complication of advanced liver failure and cirrhosis. HRS results from a functional renal failure due to circulatory disturbances in patients with advanced liver disease and portal hypertension. Reduction in the effective circulating blood volume and hence hypoperfusion of the kidney is the basic underlying common pathogenic mechanism for the development of hepatorenal syndrome***(Rajekar and Chawla, 2011).***

Approximately 50% of the cirrhotic patients with ascites developed some type of functional renal failure during the follow-up period; renal failure was associated with worse prognosis. Efforts should be made to prevent renal failure in cirrhotic patients with ascites ***(Montoliu et al., 2010).***

In patients with liver cirrhosis, there is correlation between the renovascular impedance measured by using color flow and pulsed wave Doppler ultrasonography(US) and the portal pressure measured by using the hepatic venous pressure gradient (HVPG) ***(Berzigotti et al.,2006).***

The primary clinical advantages of using power Doppler US compared with conventional color Doppler imaging include better morphologic appreciation of atherosclerotic changes in the renal artery wall, allowing improved diagnostic performance especially in hemodynamically non significant plaques; ability to differentiate between subocclusive renal artery stenosis and occlusion; increased confidence in the diagnosis of renal vein thrombosis and in the assessment of caval tumor thrombus; and better appreciation of renal cortical perfusion defects. In addition, because of its greater sensitivity to perivascular artifact, power Doppler US has the potential to increase the detection rate for intrarenal arteriovenous fistulas ***(Cosgrove and Lassau, 2010)***.

Renal arterial resistance can be easily assessed by measuring the pulsatility index or resistive index with real-time color Doppler ultrasonography.

Pulsatility index and resistive index are estimated from blood flow velocity waveform analysis and are widely accepted as indicators of vascular resistance. The measurement of renal arterial resistance has been found to be useful in organic and/or functional renal diseases. Several studies of chronic liver disease have shown that renal arterial resistance is increased in cirrhotic patients with ascites is related to the severity of

cirrhosis and to renal blood flow for predicting progression into the hepatorenal syndrome; and is available as a prognostic factor ***(Koda et al.,2000).***

In patients with cirrhosis, hepatorenal syndrome and tense ascites, intra-abdominal pressure (IAP) may contribute to renal dysfunction. Reduction of IAP following paracentesis and albumin substitution may improve creatinine clearance, probably by improving renal blood flow as reflected by decreasing resistive index (RI) in Doppler ultrasound. ***(Umgelter et al., 2009).***

A current major effort is directed at evaluating methodologies characterized by no or low invasiveness to be employed as clinical discriminators in patients populations potentially requiring invasive assessment. This appears particularly relevant in patients with compensated cirrhosis, where the only reference standard is the measurement of portal pressure by (HVPG).

Ultrasound Color Duplex Doppler is a non-invasive technique which allows the study of splanchnic organs and vessels. At the present state of technological development,it has a complementary role in the diagnosis of advanced fibrosis/cirrhosis and represent the preferred screening methodology for the examination of patients with suspected portal hypertension *(**Vizzutti. et al.,2008).***