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DUPLEX HEMODINAMIC EVALUATION OF HEPATOSPLENIC MANSONI SCHISTOSOMIASIS

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Conventional ultrasonography highly contributes to a non invasive diagnosis of HS schistosomiasis (Cerri et al., 1984). The introduction of Dopple allowed new advances in the knowledge of the portal dinamics of this disease (Taylor et al. 1985; Moriyasu et al., 1986). The aim of this paper was to analize the hemodinamic behavior of the portal vessels, considering caliper, maximum flow speed, direction of flow and preferential disposition of the collateral vessels.

Thirty two patients with schistosomiasis mansoni with confirmed hepatosplenic form (HSSM), were analyzed. Fourteen patients with the intestinal form, have been analyzed as a control group.

The results demonstrated that the maximum speed of the portal vein in the two groups has not been significantly diferent.

Nevertheless, the diameter of the PV in the hepatosplenic group has been larger. The splenic vein presented speed and caliper larger than the superior mesenteric vein. The hepatic artery has been detected in only 40% of the cases. The hepatic veins presented normal caliper and spectral pattern.

The duplex proved to be an useful technich complementar and non-invasive, in the study of HSSM.

Key words: schistosomiasis mansoni – duplex

The hepatosplenic form of mansoni schistosomiasis, a parasitic disease, is characterized clinically by portal hypertension, splenomegaly and hypersplenism.

Total blood flow in the liver remains within normal limits in most patients but the mechanism is controversial.

Contrast injected, during autopsy, into the portal system demonstrated a rich capillary network around the portal branches. However, in clinical studies other investigators found that in *Schistosoma mansoni* infection, there is an hepatic arterial dminishment rather than proliferation of capillaries. A reduced arterial blood flow is compatible with an increased portal blood flow, thus maintaning the hepatic flow (Mies et al., 1980). Thus there is no complete agreement between clinical and post-mortem studies.

The puppose of this paper is a comparative study between the hepatosplenic and intestinal form of schistosomiasis in some aspects like: maximum portal velocity, detection of hepatic arterial flow, collateral distribution, and the parameters of the doppler (direction of flow, flow pattern, thrombosis).

MATERIALS AND METHODS

Thirty two patients with hepatosplenic form of schistosomiasis mansoni were studied with doppler duplex and were compared with the intestinal form of the same disease, composed by 14 patients. The age of these patients range from 15 to 56 years (medium = 34 years).

The analysis of the portal system consisted in evaluating the following factors: (a) transversal diameters in standardized parts of the portal vein and its bifurcation, splenic vein,

TABLE I

Sonographic results

	Hepatosplenic form of mansoni schistosomiasis	Intestinal form of mansoni schistosomiasis
Periportal thickening	100%	0
Enlarged splen (L > 12 cm)	90%	7%
Enlarged left lobe liver (> 14 cm)	93%	83%
Reduced right lobe (< 14 cm)	93%	8%
Enlarged portal vein (> 12 cm)	68%	0
Gallbladder thickening	81%	0
Collaterals vein	78%	0
Siderotic splenic nodules	12%	0
STAGE According to the WHO Classification	I/II	0
Hepatic artery visualisation ($p < 0,001$)	40%	94%

superior mesenteric vein and hepatic artery; (b) direction of the blood flow; (c) signs of thrombosis; (d) maximum velocity of the portal vessels; (e) pattern of the flow; (f) identification of collateral circulation.

We used the World Health Organization classification to graduate the extension of portal hypertension due to liver pathology. The variables studied were: periportal thickening, enlarged spleen, enlarged left lobe, reduced right lobe, enlarged portal vein diameter, gallbladder thickening and collaterals veins.

The machine used was a Toshiba 250, and an Aloka 650, composed of a convex array electronic transducer and pulsed Doppler flowmeter. The B-mode was a linear array 3.75 mhz electronic transducer. The angle formed by the ultrasonic bean and the blood flow direction was around 60 degrees. The means of the maximum velocity of PV, RPV, LPV, SV, SMV, the diameter and the angles in every vessel between the two groups were compared with the profile analysis. The significance level used was 0.05. The variables PF, RL, LL, spleen, gallbladder thickening, PV were analyzed with the linear correlation coefficient and the significance level was also 0.05.

RESULTS

Table I summarizes our sonographic results. According to the World Health Organization proposal for staging of *S. mansoni* infections, the hepatosplenic group studied was classifield as degree I/II. The intestinal form showed high frequency (83%) of enlarged left lobe, but the others parameters were normal (Table I).

The linear correlation coeficients were statistical significant among the following comparisons, periportal thickening and diminished right lobe, periportal thickening and gallbladder thickening, periportal thickening and collaterals veins, diminished right lobe and gallbladder thickening, as it shows in Table II.

TABLE II

The linear correlation coeficients of degree of fibrosis, collaterals veins, gallbladder thickening and reduce right lobe in 26 to 32 patients (vide each cell)

	Diminished right lobe	Gallbladder thickening	Collaterals veins
Periportal thickening	R = 0,46 P = 0,007 N = 32	R = 0,55 P = 0,0009 N = 32	R = 0,55 P = 0,003 N = 26
Diminished right lobe	–	R = 0,44 P = 0,01 N = 32	–

The qualitative doppler analysis determined visualization of hepatic artery in 40% of the hepatosplenic group and 94% in intestinal group (Table I).

Table III shows the maximum velocity results and these were no significant difference between the two groups, according to the profile analysis.

TABLE III

Maximum velocity results

Sites		No. cases	Mean maximum velocity cm/s	STD DEV
Portal vein	SMSH	28	23,5	5,8
	Control	14	26,8	9,2
Right portal vein	SMSH	28	18,7	7,0
	Control	14	22,3	5,4
Left portal vein	SMSH	28	15,7	5,2
	Control	14	14,5	8,5
Splenic vein	SMSH	27	20,4	7,5
	Control	14	21,8	7,7
Superior mesenteric vein	SMSH	27	22,8	9,2
	Control	14	20,8	7,8

$p = 0,1978 (> 0,05)$

CONCLUSION

Duplex system is useful in the evaluation of the hemodynamics of Mansoni schistosomiasis portal hypertension.

In contrast with the situation of cirrosis (Zolli et al., 1986) we found that the velocity of the portal vein blood flow is increased in schistosomiotic patients with portal hypertension. The maximum velocity was normal (mean = 23,5 cm/s) in relation to intestinal group, but as the portal diameter is enlarged, we could assume this conclusion.

These results are in agreement with Ohnishi's paper (1989) in an idiopathic portal hypertensive population which have similar disorder (distinct from liver cirrhosis) that are also characterized clinically by portal hypertension and splenomegaly.

The portal blood flow is increased in massive splenomegaly because of an enlarged spleen requires a greater blood supply which in turn increases portal hypertension due to a presinusoidal block.

We found a venous pattern in vessels within the fibrotic bands, on contrary of the post-mortem results, which has considered that and increase in arterial supply would compensate the diminished portal blood flow due to portal hypertension.

The doppler investigation in portal hypertension is an useful tool to analyze the extension of the disease mainly in qualitative aspects. We have to continue searching since there are some limitations in fluxometry analysis.

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