

# Contribution of Ultrasonography in the Diagnosis of Periportal Fibrosis Caused by Schistosomiasis

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## Abstract

**Background:** Periportal fibrosis is one of the major complications of schistosomiasis infection. Specific images of this infection revealed by ultrasonography allow the assessment of the different stages. Our purpose is to describe the ultrasonographic appearances of periportal fibrosis due to schistosomiasis infection. **Methods:** The study was retrospective descriptive in the Medical Imagery Centre of CHUJRA. **Results:** A total of 29 patients showed upper and/or lower digestive hemorrhage and a positive result in schistosomiasis serology. The median age was 41.2 years. Male gender dominated with 54.7%. In 78.3% of the cases, the patients were farmers in schistosomiasis-endemic areas. On ultrasonography, 81.3% were found to present Stage III periportal fibrosis, 11.5% presented Stage II, and 7.2% presented Stage I. There was no case of portal thrombosis. Splenomegaly was found in 83.2% of the cases and hepatomegaly in 48.9% of the cases. Porto-systemic shunt was detected in 80.7% of the cases and ascites in 72.3%. **Conclusion:** Ultrasonography examination represents an important role in the diagnosis of periportal fibrosis, in its staging process, and allows the assessment of porto-systemic, hepatic, and splenic alterations.

**Keywords:** Periportal fibrosis, schistosomiasis, splenomegaly, ultrasonography

## INTRODUCTION

Madagascar is a country known as a schistosomiasis-endemic area.<sup>[1]</sup> Periportal fibrosis is a chronic condition and one of the major complications of schistosomiasis infection,<sup>[2]</sup> which can be fortuitously discovered by abdominal ultrasound during systematic examinations and by digestive hemorrhage at its advanced stages, with portal high pressure. It is a frequently encountered disease in endemic areas. Our purpose, in this study, is to describe the hepatic alterations found by ultrasonography in schistosomiasis throughout 29 patients.

## PATIENTS AND METHODS

We realized a retrospective descriptive study in the Medical Imagery Centre of the University Hospital of Joseph Ravoahangy Andrianavalona (HJRA) in Antananarivo.

We included in this study all patients who had abdominal ultrasonography after they presented a digestive hemorrhage and other digestive symptoms; the ultrasonography showed periportal fibrosis and a positive result on schistosomiasis serology.

Our machine is an ultrasound manufactured by “SIEMENS;” the probes that we used were a high-frequency probe between with 2 and 5 MHz and a low-frequency probe with 10 MHz.

Ultrasound was performed with the latest generation of ultrasonography equipped with a Doppler system, with curve and linear multifrequencies probes. We, therefore, collected 29 cases of periportal fibrosis.

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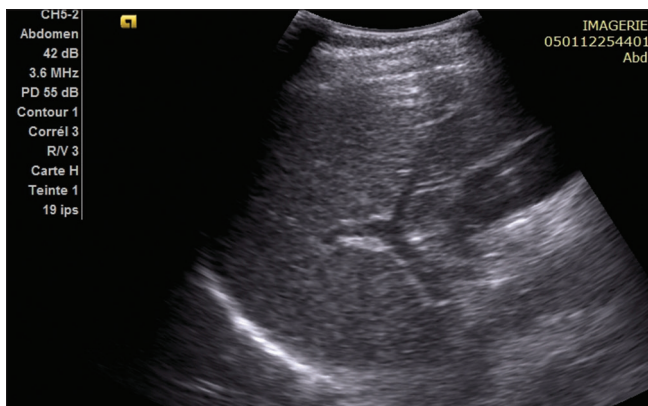
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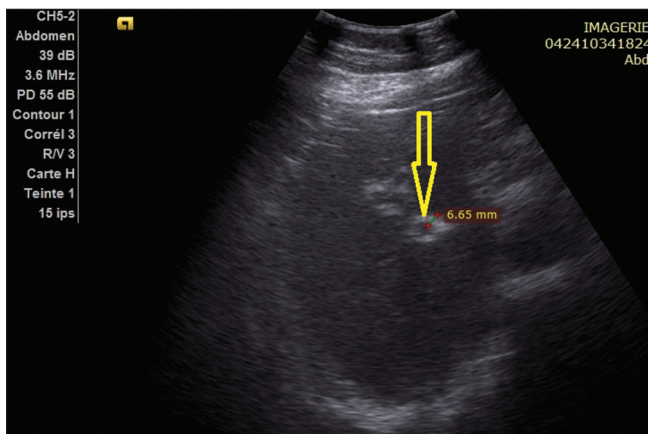
## RESULTS

We found more men (54%) than women; the sex ratio was 1.1. Patients' ages varied between 22 and 65 years with a median of 41.2 years and a peak between 31 and 45 years. Farmers represented 78.3% of all patients; holidaymakers traveling from endemic areas represented 10.4%. Warning signs were dominated by 76%. Upper, lower, or mixed digestive hemorrhage, such as melena and hematemesis, was observed. No ulcer disease was a finding, with a rate of 61.6% followed by splenomegaly (25.7%) and an alteration of the general status (12.7%).

On ultrasonography, we do not find a normal examination about the periportal [Figure 1]; we found that 81.3% of the patients presented Stage III periportal fibrosis [Figure 2] followed by Stage II fibrosis [Figure 3] (11.5%) and Stage I fibrosis (7.2%) [Figure 4]. Other associated signs were dominated by splenomegaly (83.8%) [Figure 5], 13.5% of which were heterogeneous with multiple hypoechoic nodular lesions, followed by porto-systemic shunt (80.7%) and ascites. None of patients had portal thrombosis. We had not a case of obesity in the patient who. In our study, our patients did not do a computed tomography scan or Institute of Risk Management examination.



**Figure 1:** Ultrasound examination, showing in longitudinal reconstruction, the wall portal without hyperechoic thickening, Stage 0, normal

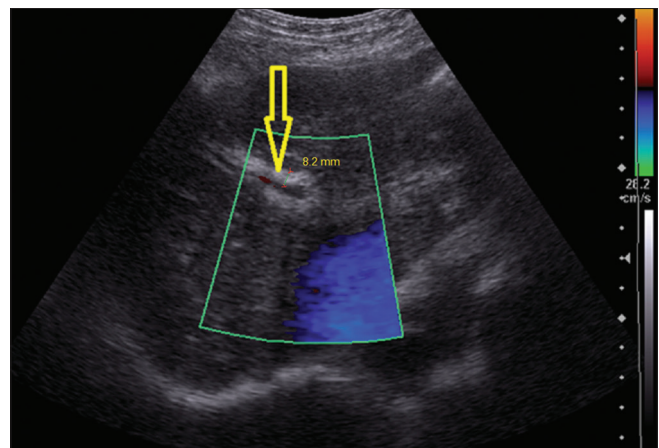


**Figure 3:** Ultrasound examination, showing in longitudinal reconstruction, hyperechoic thickening in band parallel of the port trunk, Stage 2

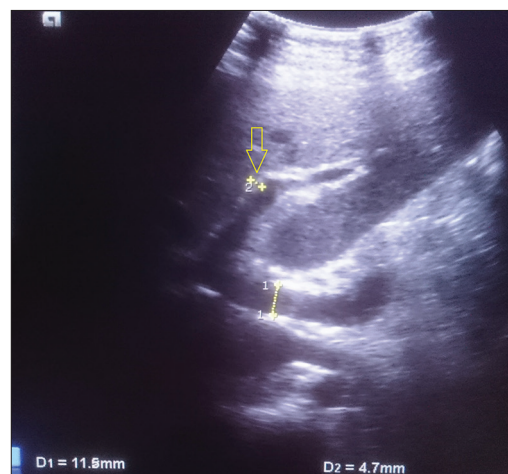
## DISCUSSION

Periportal fibrosis is a chronic disease, late-stage complication of schistosomiasis infection, discovered by Symmers. It is due to the presence of schistosoma eggs in portal venules, resulting in an embolization and an inflammatory reaction of the portal areas.<sup>[3]</sup> Periportal fibrosis leads to portal hypertension, which makes it a serious disease.<sup>[4]</sup> Ultrasonography is a specific diagnostic tool for this pathology. The high-frequency superficial probe allows its characterization. It reveals a strip-shaped hypoechoic periportal thickening drawing pipe-stem and rail images which allows following their distribution.

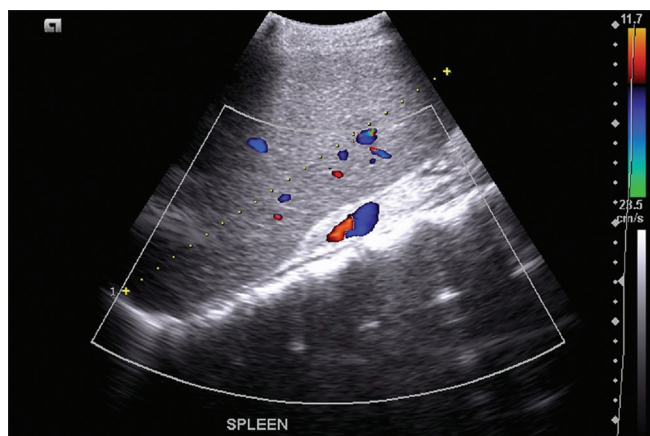
The thickness of this periportal low echogenicity allows the staging from Grade 0: normal, Grade 1: low parietal thickness between 3 and 5 mm and affecting at least two branches of the portal vein, with small alteration of the main portal vein; Grade 2: 6–7 mm parietal thickening of at



**Figure 2:** Ultrasound examination, showing in longitudinal reconstruction, hyperechoic thickening; in band parallel of the port trunk and the color signal in the lumen of the vessel in Doppler determine an permeability, Stage 3



**Figure 4:** Ultrasound examination, showing in longitudinal reconstruction, hyperechoic thickening in band parallel of the port trunk Stage 1 (yellow arrow)



**Figure 5:** Ultrasound examination, showing in longitudinal reconstruction, a homogeneous splenomegaly

least two branches of the portal vein, essentially peripheral with little or no thickening of the portal vein wall but with mild constriction of the portal vein, gallbladder walls are thickened; Grade 3: moderate or severe thickening of portal vein branches with narrowing of the central lumen. Vein thickening is irregular, appearing mostly at the portal vein bifurcation and extending toward the liver periphery. Parietal thickening of the portal vein is between 8 and 10 mm; the veins were regular. Gallbladder walls are thickened.<sup>[4,5]</sup> The limits of ultrasonography in the exploration of these fibrosis are obese morphotype, at the first stage of the disease and untrained operators.

We found more men than women with a sex ratio of 1.1 and they were mainly farmers from schistosomiasis-endemic areas in the eastern region of Madagascar.<sup>[6]</sup> They till cultivate the land so that they are permanently in contact with *Schistosoma*-infested water, as other professions such as fishing on freshwater. Women and girls would be exposed to this infection due to home chores using infested water.<sup>[7]</sup>

The median age in our study was 41.2 years. This can be explained by the fact that this disease has a chronic evolution. Schistosomiasis can occur early though periportal fibrosis can be revealed from the age of 8 years for child.<sup>[8]</sup>

Patients came or have been referred in our referral hospital because they showed up portal hypertension complications, such as upper and lower digestive hemorrhage and splenomegaly. These symptoms testify the late diagnosis of the disease and its chronic evolution.

On ultrasonography, Stage III periportal fibrosis was the most identified, confirming the late diagnosis. This stage appears as periportal hypoechoic bands thicker than 7 mm.<sup>[5]</sup>

Splenomegaly was frequent. It is part of portal hypertension signs with ascites and portosystemic shunts.<sup>[9]</sup>

The differentiate ultrasound finding among schistosomiasis infection and other chronic liver, such the cirrhosis is about

the liver parenchyma, is heterogeneity, nodular, and the wall thinking may be absent.<sup>[10]</sup> About the correlations between sonographic findings and pathology or other image findings. some authors reported difference between ultrasound and magnetic resonance imaging (MRI) features in the evaluation of schistosomal liver involvement<sup>[11]</sup> and found a moderate agreement between ultrasound and MRI,<sup>[12]</sup> and MRI was superior to ultrasound in the assessment of liver and spleen sizes, vascular dilation, collateral vessels, and periportal thickening.<sup>[12]</sup>

## CONCLUSION

Periportal fibrosis is a serious entity especially for the Grade 3. This pathology must be thinking one of the causes of digestives hemorrhage in schistosomiasis-endemic areas. Ultrasonography represents an important place in their detection classification, research the complication such the portal hypertension, and follow-ups. This pathology requires a multidisciplinary care.

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## Conflicts of interest

There are no conflicts of interest.

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