Imaging appearance of Gamna Gandy bodies

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Aim

To disseminate the imaging characteristics of Gamna Gandy bodies (GGB) and their significance to the patient and patient management.

Fig. 2: Gamna Gandy bodies: Longitudinal ultrasound of splenomegaly with multiple echogenic foci.

References: Rodney Strahan
Methods and materials

Research conducted into the literature of Gamna Gandy bodies and investigation of the appearance in patients with portal hypertension from Schistosomiasis in Zambia.
Results

Gamna Gandy bodies (GGB) are siderotic nodules in the spleen which, in the correct clinical context, represent evidence of longstanding portal hypertension.

The pathophysiology of GGB is, a small parenchymal hemorrhage followed by scarring of the collagen and elastic fibres and deposition of iron and calcium\(^1\). Portal hypertension leads to splenomegaly with hyperplasia of the reticulo-endothelial cells which cover the sinusoids. Prolonged transit time of the blood and pressure increase, disintegration of cells, thus leading to foci of hemorrhage\(^2\).

Incidence of Gamna Gandy bodies varies from country to country. The literature quotes 9-12% of patients with portal hypertension in Western countries but greater than 84% of patients with portal hypertension from Schistosomiasis in endemic countries\(^3, 4, 5\).

MRI is the gold standard in detecting Gamna Gandy bodies. GGB appear as round foci with absence of signal in all sequences and no enhancement following contrast\(^3\). Fig. 1 on page 6

However, ultrasound is the method most frequently used to assess patients for suspected portal hypertension and especially in patients with hepatosplenic Schistosomiasis. On ultrasound GGB are seen as punctate, hyperechoic foci in the splenic parenchyma. Fig. 2 on page 6 Fig. 3 on page 7 Fig. 4 on page 8 Fig. 5 on page 9 There may or may not be acoustic shadowing, depending on the amount of calcification present. Most often there is no shadow.

Portal hypertension has also been reported to show hyperechoic vessel walls in the spleen Fig. 6 on page 10 Fig. 7 on page 11 and these often accompany GGB foci. Fig. 8 on page 12 They are sclerotic splenic vein walls secondary to portal hypertension\(^1\). These are differentiated best by a linear high resolution transducer and colour Doppler with flow in the vessels. Fig. 9 on page 13

The sensitivity of ultrasound in detecting Gamna Gandy bodies in the spleen is 95.2% with interobserver reproducibility of 96.7% in recent literature\(^5\). This recently reported better sensitivity can be attributable to technological advancements of ultrasound systems leading to improved image resolution. There may also be increased awareness of the entity of GGB in endemic countries.
There is an estimated 270 million infected people worldwide in 76 countries. Liver changes have been reported previously (RANZCR Perth 2010) and 10% present with severe forms of the disease. Therefore, approximately 27 million must have portal hypertension and 22 million (84%) (equivalent to the Australian population) would be expected to have GGB. With increasing migration and refugees, it is expected that we will have more patients with Gamna Gandy bodies presenting to Western health care systems and imaging departments.

GGB in the spleen have also been reported in conditions such as paroxysmal nocturnal hemoglobinuria, hemolytic anemia, sickle cell anemia, acquired hemochromatosis, leukemia, lymphoma and in blood transfusion patients \(^1\), \(^2\). However portal hypertension is the most common cause.

**Differential diagnoses:** Hyperechoic foci in the spleen may also be seen in sarcoid, tuberculosis and disseminated *P carini* infection \(^1\). These are usually distinguished from GGB by clinical history as well as imaging characteristics.

Sarcoid is very uncommon but sometimes the granuloma can calcify and mimic GGB on imaging. Respiratory tract changes would be expected as well.

Miliary tuberculosis usually present with hypoechoic lesions in the spleen but sometimes they show as solid focal lesions with hyperechoic areas which do not shadow. The patient would have a different clinical history to Schistosomiasis.

Multiple tiny reflective foci in the spleen have been reported in 2 patients with AIDS who were being treated for extra pulmonary *P carini* infection.

**Why is there an increased incidence of GGB in portal hypertension associated with Schistosomiasis, than other causes of portal hypertension?** Most Schistosomiasis infection of the liver occurs in malaria endemic areas. Splenomegaly caused by malaria may change the splenic architecture enough so that it is more susceptible to haemorrhage. Noting that fatal Plasmodium falciparum malaria has been reported to cause splenic architectural disorganization \(^6\). This is further supported by an observation in Zambia where 3 patients had GGB in an enlarged spleen but no ultrasound evidence of portal hypertension. Fig. 10 on page 14 Fig. 11 on page 15

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**Fig. 1**: T1 MRI showing foci of no signal in the spleen in a patient with cirrhosis and portal hypertension.

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**Fig. 2:** Gamma Gandy bodies: Longitudinal ultrasound of splenomegaly with multiple echogenic foci.

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**Fig. 3:** Gamna Gandy bodies: Transverse ultrasound of splenomegaly with multiple echogenic foci.

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Fig. 4: Gamna Gandy bodies: Longitudinal ultrasound video demonstrating innumerable echogenic foci. The patient has Schistosomiasis induced portal hypertension.

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Fig. 5: Gamna Gandy bodies: Transverse ultrasound demonstrating innumerable echogenic foci in an enlarged spleen. The patient has Schistosomiasis induced portal hypertension.

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Fig. 6: Echogenic vessels in splenomegaly.

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Fig. 7: Echogenic tracts in splenomegaly indicating vessels.

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Fig. 8: Video of GGB and echogenic vessels in splenomegaly.

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Fig. 9: Gamna Gandy bodies: Linear hi-resolution ultrasound demonstrating innumerable echogenic foci. Shadowing from the foci is better appreciated.

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Fig. 10: Normal portal vein measurement (8.3mm), excluding portal hypertension.

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Fig. 11: Splenomegaly with hyperechoic foci in a patient without portal hypertension.

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Detection of hyperechoic nonshadowing splenic lesions, in the presence of appropriate clinical history and/or periportal ultrasound changes in the liver, should lead to a diagnosis of Gamna Gandy bodies on ultrasound. This should spare the patient and health budget from unnecessary imaging, such as MRI, to further characterize these lesions.
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Research conducted in Zambia on Schistosomiasis imaging characteristics before and after treatment.