

## CHOLESTEROLIS AND ADENOMYOMATOSIS OF GALL BLADDER – AN ULTRASOUND DIAGNOSIS

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**Abstract:** The strawberry gall bladder or cholesterosis is the non inflammatory condition of the gall bladder and is the result of accumulation of lipids in the mucosa of the gallbladder wall. The hyperplastic changes in th gall bladder wall may occur in the absence of the gall stones or inflammatory infiltrates when the condition is known as adenomyomatosis. These conditions may be detected incidentally and may or may not be clinically significant. The ultrasound features of these conditions are characteristic and may aid in management as well.

**Keywords:** Cholesterosis, adenomyomatosis, gallbladder.

### INTRODUCTION

Cholesterosis and adenomyomatosis of the gallbladder are usually clinically silent and often detected incidentally at cholecystectomy. Cholesterosis is characterized by mucosal villous hyperplasia with excessive accumulation of cholesterol esters within epithelial macrophages. It is rarely associated with biliary symptoms or idiopathic pancreatitis and cannot be detected by ultrasonography in all cases but when detected it has characteristic features. Adenomyomatosis is described as an acquired, hyperplastic lesion of the gallbladder characterized by excessive proliferation of surface epithelium with invaginations in to a thickened muscularis propria. Ultrasonography may reveal a thickened gallbladder wall with intramural diverticula. Adenomyomatosis may portend a higher risk of gallbladder malignancy. Most cases of cholesterosis and adenomyomatosis identified by imaging require no specific treatment.

### CASE REPORT

**Case I :** A 45 year old female complaining of non specific right hypochondrial pain was referred for suspected cholelithiasis. Clinical examination and other laboratory investigation were unremarkable. Past history revealed similar attacks of pain twice in the last 2-3 months, her previous ultrasound abdomen examination done 3 months ago, was normal. During the present admission, an ultrasound examination of the whole abdomen with linear and curvilinear probes revealed a well distended gall bladder with normal thickness of wall. However, multiple tiny echogenic nodules of 2-3 mm are seen at the mucosal surface of the gallbladder wall distributed along the anterior wall of the body and fundus of the gallbladder. V-shaped reverberation artefact could be seen arising from many of these nodules (Figure 1a & b) other abdominal structure had normal appearance; there was however no evidence of any gall stone in the lumen Based on the above findings, the diagnosis of cholesterosis of gallbladder was made.

**Case-II:** Another patient 50 years old male with history of vague upper abdominal discomfort was suspected to have cholelithiasis.

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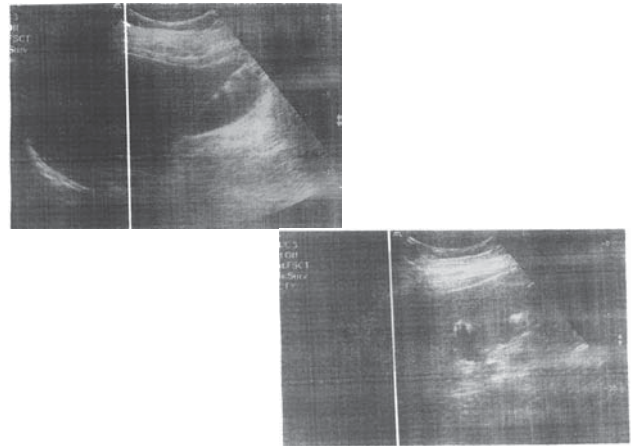


Fig.1 a&b Longitudinal and transverse us scan of the gallbladder reveal multiple echogenic focus attached to the mucosal surface of the normal thickness gallbladder wall with a reverberation artefat suggestive of cholesterosis.

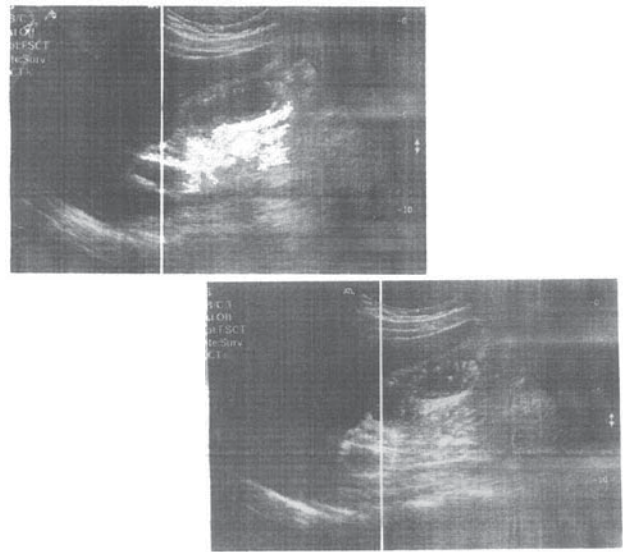


Figure 2: A & B Longitudinal and oblique US scan of the gallbladder reveal thickened gallbladder wall with multiple echogenic focus within the wall and lumen with a reverberation artefact suggestive of adenomyomatosis.

Clinical examination and laboratory investigations of the patient were unremarkable. The past history of the patient was also unremarkable. The patient did not have any previous ultrasound examination of the abdomen.

The ultrasound examination of the whole abdomen in the above patient revealed partially distended gallbladder with thickened walls (7-8 mm) Multiple tiny, echogenic nodules were seen within the wall of the gallbladder. Some of these nodules demonstrated reverberation artifacts. The lumen of the gallbladder also revealed few tiny echogenic foci floating in the bile (Fig. 2a & b). However, no evidence of echogenic focus with distal acoustic shadowing suggestive of the gallstone was seen in the lumen. Rest of the abdominal structures was within normal appearances. Based on the above features, the diagnosis of the adenomyomatosis of the gallbladder was suggested.

Both the above patients underwent surgery after thorough explanation of the condition of the patient and the ultrasound diagnosis was confirmed both surgically and histopathologically in both the cases. Both these patients were asymptomatic in the postoperative and a follow up period of one year.

## DISCUSSION

The *strawberry gall bladder* or *cholesterolosis* is the noninflammatory condition of the gall bladder and is the result of accumulation of lipids in the mucosa of the gall bladder wall. The resulting surface nodules are usually less than 1 mm diameter and hence beyond the scope of recognition by ultrasonography. However, larger (2 mm or greater) polypoidal excrescences forming cholesterol polyps sometimes develop and these can be detected as small reflective foci attached to the wall of the gall bladder. They may be single or multiple and usually do not cast acoustic shadows and will not move with changes in the patient's posture.<sup>2,3</sup> Cholesterol stones develop in about half of the patients.<sup>3</sup> Cholecystography demonstrates contrast medium filling defects attached to the gall bladder wall. However, ultra sonography is superior to cholecystography in detecting cholesterolosis<sup>4</sup>. The etiology of the cholesterolosis is not fully understood although it is suggested that the mucosal changes might arise simply because of the increased uptake of the cholesterol from bile containing extra cholesterol<sup>5</sup>.

While cholecystectomy is unlikely to benefit patients with vague dyspepsia, it is likely to help patients in whom the history suggests biliary colic, or when there are associated gallstones.<sup>5,6</sup> In one study 7 of patients with cholesterolosis unassociated with biliary lithiasis and presenting with recurrent attacks of acute pancreatitis, complete improvement was observed after cholecystectomy. The postulated mechanism was temporary impaction of cholesterol polyps at the sphincter of Odi. The study suggested that patients with recurrent attacks of acute pancreatitis and negative etiological investigation must be considered as at high risk of having gall bladder cholesterolosis and that they could benefit

from cholecystectomy<sup>7</sup>.

Large (>10 mm) cholesterol polyps can be differentiated from polypoidal gall bladder carcinoma by endoscopic ultrasound.<sup>8</sup> Cholesterol polyps show aggregates of the echogenic spots.

The hyperplastic changes in the gall bladder wall may occur in the absence of the gallstones or inflammatory infiltrates when the condition is known as adenomyomatosis<sup>6</sup>. It is also known as cholecystitis glandularis proliferans<sup>3</sup>. Excessive intraluminal pressure has been suggested as the etiology.

The US features are characteristic and include diffuse or segmental thickening of the gall bladder wall, with intraluminal diverticula, which may be anechoic or echogenic for within the thickened gall bladder wall. Segmental and eccentric wall thickening may produce midcavity strictures, and the high amplitude periluminal foci due to aggregates of the solid bile elements in the RAS giving a typical diamond ring appearance on TS of the gallbladder<sup>9</sup>.

The clinical significance of the adenomyomatosis of the gallbladder is controversial, since it may be found in asymptomatic individuals. However, a significant number of patients with adenomyomatosis improve after cholecystectomy, especially if the symptoms were more suggestive of biliary colic than of vague dyspepsia, or if gallstones are found in association with adenomyomatosis<sup>6</sup>.

Intraluminal diverticula (Rokitansky-Aschoff sinuses or RAS) that contain bile are most likely responsible for the anechoic areas whereas biliary sludge or gallstones within the diverticula are most likely responsible for the echogenic foci<sup>10</sup>. These sinuses are difficult to be seen in the distended gallbladder, but are often seen well in a contracted gallbladder<sup>3</sup>.

Not infrequently, a V-shaped reverberation artefact is seen to emanate from the small cholesterol stones that are lodged within the sinuses<sup>11</sup>. This artefact results from the sound reverberating between or within cholesterol crystals and may be similar in appearance to cock tail artefact that occurs when there is air in the gallbladder wall. With air, however, the reverberation artefact is usually longer and the patient is acutely ill.

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