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Ultrasound Changes of Gall Bladder Wall Pathology : A Sonographic - Pathological Correlation

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Abstract

Changes taking place within walls of pathologic gall bladder were sonographically evaluated and analysed on pathological basis. These changes were considered to be valuable signs in discriminating and grading gall bladder disease.

Introduction

ALTHOUGH the ultrasound role in the diagnosis of gall bladder wall pathology remains controversial, still several studies were concerned with sonographic changes of gall bladder wall in patients with cholecystitis and adenomyomatosis.

To verify the pathological basis of these changes the authors analysed examinations and pathological changes of gall bladder wall in patients, clinically diagnosed as cholecystitis.

Material and Methods

Twenty patients were contributed in this study referred for abdominal ultrasound examination before surgery.

At time of examination each patient had appropriate chinical evidence of inflammation of the gall bladder even patients complaining from acute inflammation on top of chronic were classified.

Seventeen patients presented with different phases of cholecystitis, 3 patients presented with adenomyomatosis; (all patients were associated with chronic cholecystitis).

The interval between the ultrasound examination and surgery was less than 5 days in all cases.

Ultrasound scans were analysed for the presence of the following :

(a) An echo reduced layer within the hyperechoic wall of gall bladder.

(b) Indistinctness of the wall or a low echogenic ring along its inner aspect.

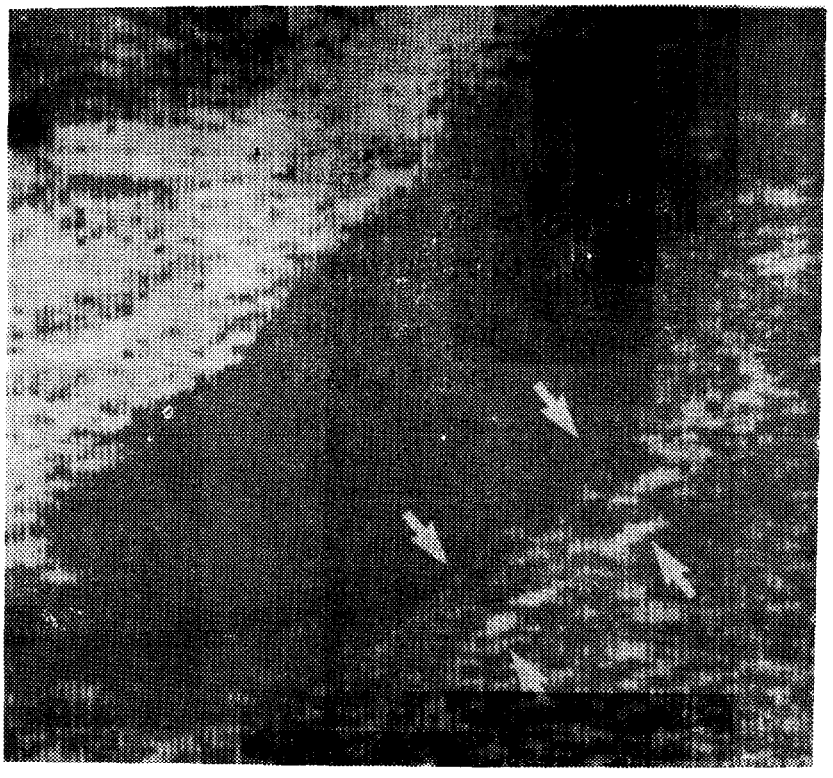

Fig. 1. (A) Ultrasound shows two hypoechoic layers in the thickened walls of gall bladder (between arrows).

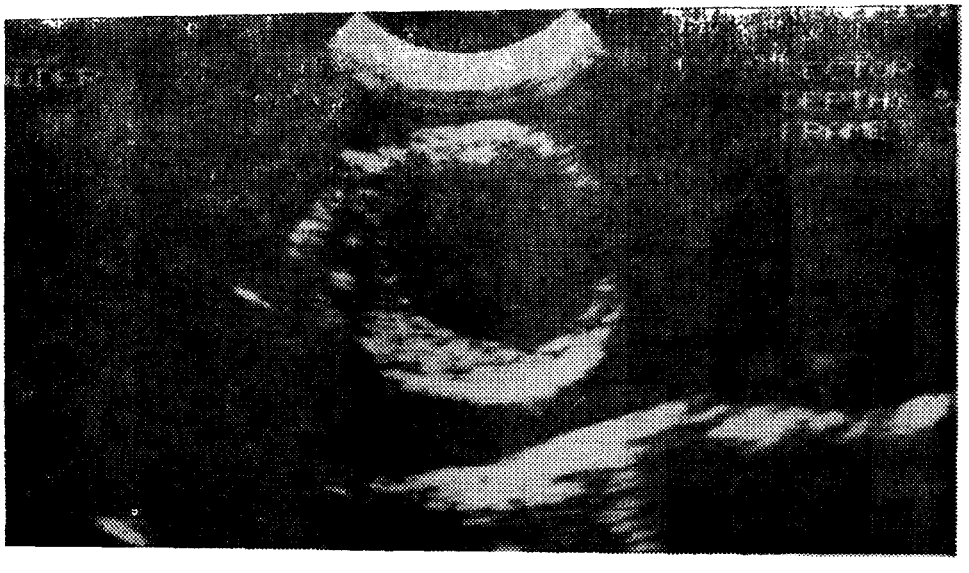

Fig. 1. (B) A low power micro-graph of gall bladder wall reveals inflammatory cell infiltrations resemebling hypoechoic layers and fibrosis (F) corresponding to hyperechoic layers, mucosal sloughing (arrows).

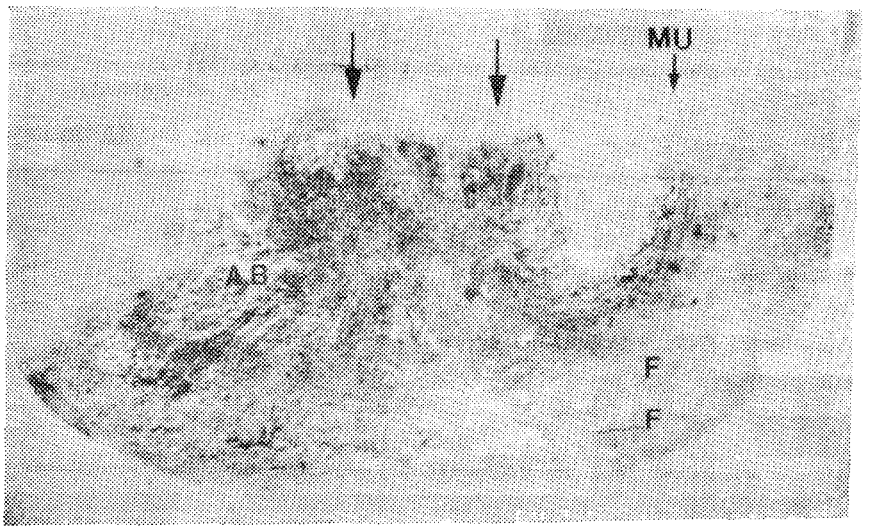

Fig. 2. (A) Ultrasound trans scan eccentric wall thickening, ring distribution of echogenic foci arround the true lumen.

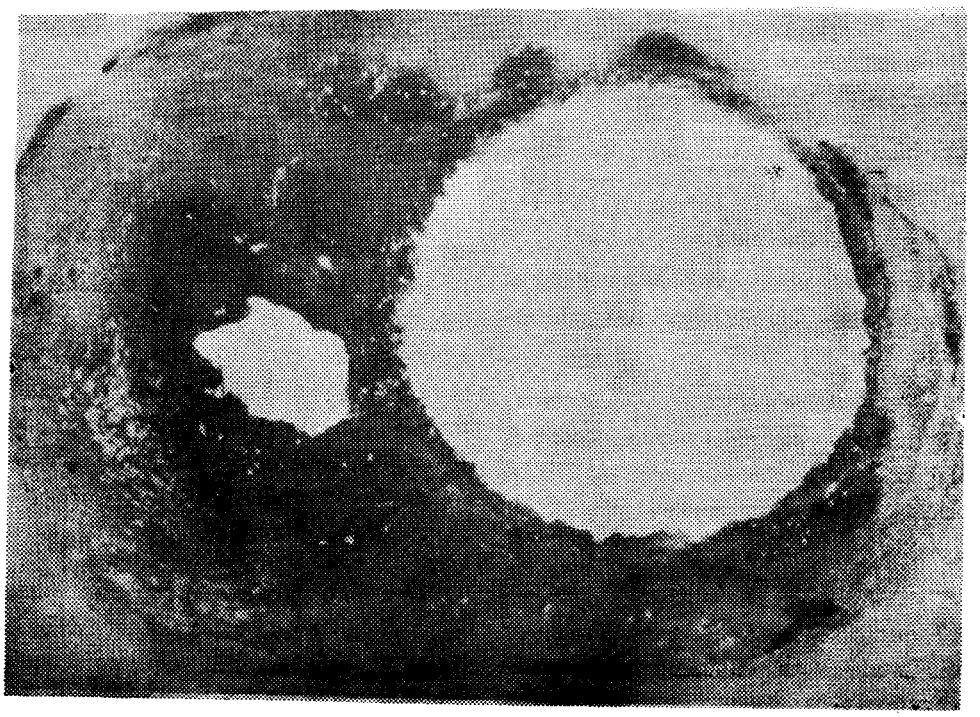

Fig. 2. (B) Macroscopic specimen showing bile aggregation arround the true lumen and within the false lumen.

Table (1) : Ultrasonic Parameters in Relation to Number of Patients with Gall Bladder Pathology.

	No. of Patients		
	(Acute Ch)	(Chronic Ch)	(Adenomyomatosis)
1. Echo reduced layer within hyperechoic wall	3	10	—
2. Indistinctness or low echogenic ring	—	2	—
3. 1 + 2	—	2	—
4. High amplitude foci within thickened wall gall bladder	—	—	3
Total	3	14	3

(c) Alteration of the overall wall echogenicity with reference to hepatic echogenicity.

(d) Highly echogenic periluminal foci within the thickened gall bladder wall (diamond ring in cross-sectional Fig. 2a) cholecystitis + adenmoyomatosis.

On histological examination, the following was recorded :

(a) Integrity of the mucosa.

(b) Presence of subserosal oedema, haemorrhage and inflammatory cell infiltration.

(c) Muscular hypertrophy.

(d) High echogenic foci correspond to aggregates of solid bile elements within aschoff - rokitansky sinuses (Fig. 2b).

Results

17 out of 20 patients were presented in this study with cholecystitis, 3 cases were acute, 14 cases were chronic (8 cases were associated with calculi).

3 more cases were presenting with adenomyomatosis, from which one case was associated with features of chronic cholecystitis.

Age range from 16 years to 48 years mean of 32 years.

50 cases were females (78.1%). 14 were males (21.8%).

Echo reduced layer was observed in all 3 cases with acute cholecystitis and 10 cases out of 14 with chronic cholecystitis. This layer proved to represent a number of entities, including oedema, hoemorrhage and inflammatory cell infiltration in the subserosal (Perimuscular) layer in acute cholecystitis and moderate to severe muscular hypertrophy in chronic cholecystitis.

An indistinctness along the inner aspect of gall baldder was observed in 6 patients from 14 with chronic conditions representing sloughed mucosa and obilteration or loss of mucosal folds.

Presence of high amplitude foci within thickened gall bladder wall, arranged around the lumen of gall bladder, producing striking diamond ring appearance, corresponding rokitansky sinuses (Fig. 2, A-B).

Discussion

Correlation between sonographic and pathological findings had been achieved in 20 cases.

Pathological change of the gall bladder in acute cholecystitis is presented by thickened walls of gall bladder caused by spreading of tissue elements and filling of these spaces by oedema fluid, blood and inflammatory cells[1] these inflammatory changes are most severe in the subserosal layer. Mucosa may be either shed or missing in some areas.

In chronic cholecystitis, the muscular layer may be greatly hypertrophied, epithelium is usually intact but mucosal folds may be obliterated or absent in advanced stages.

Numerous studies described the ultrasound thickening of gall bladder wall as a sign of cholecystitis[2,3].

Further more gall bladder walls may be thickened by diseases other than cholecystitis i.e. hypoalbuminaemia[4] cardiac or renal failiure[5].

An echo reduced layer in the gall bladder wall in acute cholecystitis and development of pericholecystitic abscess have been documented[6].

In our study lack of echoes in the gall bladder wall was attributed to inflammatory changes, blood, cellular infiltration, oedema predominantly affecting subserosal (perimuscular) loose connective tissue spaces.

Schnieder et al. stated that indistinctness of inner margin of gall bladder has been regarded as a sign of acute cholecystitis. In our series this sign correspond to sloughed mucosa or obliteration of mucosal folds at pathological specimens.

Three more cases in this series are sonographically presented with high amplitude, periluminal foci which were constant and prominent feature not in the gall bladder wall which correspond to aggregates of solid bile elements within aschoffrokitansky sinuses.

We suggest that the appearance of bright amplitude foci in a periluminal arrangement is specific for adenomyomatosis.

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