

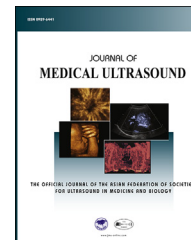


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Original article

A Standardized Ultrasound Scoring System for Preoperative Prediction of Difficult Laparoscopic Cholecystectomy[☆]

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KEYWORDS

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Preoperative
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Open
cholecystectomy

Abstract *Purpose:* Laparoscopic cholecystectomy (LC) has become the treatment of choice for cholelithiasis. Still some patients required conversion to open cholecystectomy (OC). Our aim was to develop a standardized Ultrasound based scoring system for preoperative prediction of difficult LC.

Methods and materials: Ultrasound findings of 300 patients who underwent LC were reviewed retrospectively. Four parameters (time taken, biliary leakage, duct or arterial injury, and conversion) were analyzed to classify LC as easy or difficult. The following ultrasound findings were analyzed: GB wall thickness, pericholecystic collection, distended GB, impacted stones, multiple stones, CBD diameter and liver size. Out of seven parameters, four were statistically significant in our study. A score of 2 was assigned for the presence of each significant finding and a score of 1 was assigned for the remaining parameters to a total score of 11. A cut-off value of 5 was taken to predict easy and difficult LC.

Results: 66 out of 83 cases of difficult LC and 199 out of 217 cases of easy LC were correctly predicted on the basis of scoring system. A score of >5 had sensitivity 80.7% and specificity 91.7% for correctly identifying difficult LC. Prediction came true in 78.8% difficult and 92.6% easy cases. US findings of GB wall thickness, distended GB, impacted stones and dilated CBD were found statistically significant.

Conflicts of interest: None.

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Conclusion: This indigenous scoring system is effective in predicting conversion risk of LC to OC. Patients having high risk may be informed and scheduled appropriately and decision to convert to OC in case of anticipated difficulty may be taken earlier.

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Introduction

Laparoscopic cholecystectomy (LC) has gained widespread acceptance as the procedure of choice for management of symptomatic gallbladder (GB) disease [1–3]. Its advantages are well documented like its minimal invasive nature, decreased postoperative pain, better cosmesis, shorter hospitalization, and early recovery [4]. However up to 15% of patients need conversion to open cholecystectomy (OC) for various reasons [5,6]. The degree of difficulty during LC and possibility of conversion is almost impossible to predict clinically.

It would be useful for both patients and surgeons to have some reliable predictive factors. At present there is no ultrasound based scoring system available to predict degree of difficulty during LC and possible conversion. Our aim was to develop a standardized ultrasound based scoring system, which can predict difficulty during LC as well as allow selection of patients who may need conversion to OC.

Materials and methods

Preoperative data of 300 patients who underwent LC between January 2008 and March 2011 by a single experienced surgeon were reviewed retrospectively. All the patients with symptomatic GB stone disease were eligible for entry into our study. We did not include patients where LC was done as emergency surgery or where reason for conversion to OC was equipment failure, anesthetic complications or presence of other co-morbidities. Patients with incomplete data were also excluded from the study. Study was approved by institutional review board.

Sonography was performed by 2 radiologists, using Toshiba NemioXG ultrasound scanner equipped with 3.5-MHz and 5-MHz curved array transducer. After fasting, patients were examined in the supine and the left lateral decubitus positions. The following 7 sonographic findings were analyzed: the thickness of the GB wall, the transverse diameter of the GB, presence of the pericholecystic collection, the number and mobility of stones in the GB, the diameter of the common bile duct (CBD), and the size of the liver (Figs. 1 and 2). A GB stone was considered to be present when a well define intraluminal echogenic lesion with posterior acoustic shadowing was seen in multiple planes. GB wall thickness was calculated by measuring the maximum thickness of the anterior wall adjacent to the liver. A wall thickness equal to or more than 4 mm was evaluated as thick. Diagnosis of a distended GB was made when the organ measured more than 5 cm in transverse diameter. The presence of a fluid collection in the GB fossa

was meticulously recorded. The number of stones was grouped as single or multiple. Stone mobility was assessed by scanning the patient in different positions and if the gallstones moved, they were considered mobile. The largest diameter of the CBD was measured, and it was considered dilated when maximum diameter was greater than 6 mm. A Liver was considered enlarged when its span was greater than 15.5 cm. After sonographic analysis, score of 2 was assigned for presence of each significant finding and a score of 1 was assigned for remaining parameters to a total score of 11 (Table 1). A cut-off value of 5 was taken to

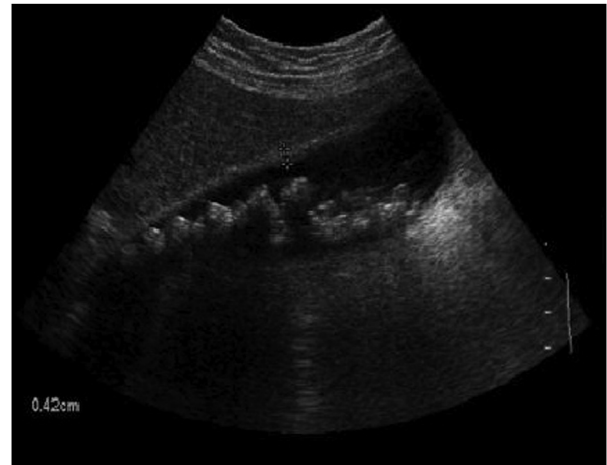


Figure 1 Longitudinal section of gallbladder region reveals multiple stones within gallbladder lumen with thickened (4.2 mm) gallbladder wall.

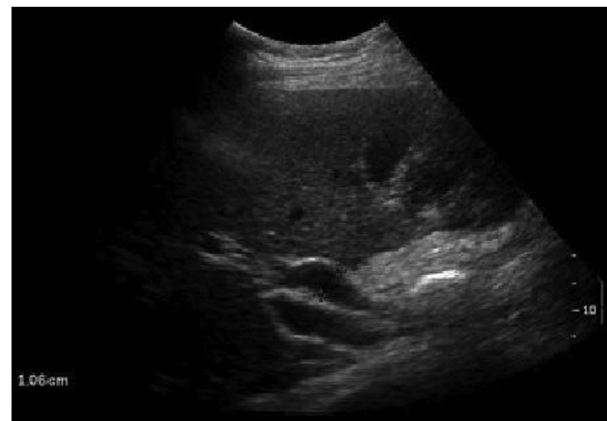


Figure 2 Longitudinal section of common bile duct reveals presence of a dilated duct (10.6 mm).

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