

# ACCURACY OF SURGEON-PERFORMED ABDOMINAL ULTRASOUND FOR GALLSTONES

Sajjad Ahmad, Arshad Zafar, Mukhtar Ahmad, Aamir Ghafoor, Ehtisham Malik,

Adnan Ali, Umair Ahmed Saleem Qazi

Department Of Surgery, Ayub Medical College & Teaching Hospital, Abbottabad,

**Background:** Gallstone disease is common in Pakistan. It is primarily diagnosed by ultrasonography, which is traditionally done by radiologists. If surgeons could perform ultrasonography, it would enable early diagnosis in one-stop clinic. This study was done to evaluate the accuracy of surgeon-performed abdominal ultrasonography to detect gallstones. **Methods:** This study was carried out at Surgical A and Surgical C units of Ayub Teaching Hospital, Abbottabad from July, 2000 to December, 2002. One hundred forty two patients with signs and symptoms of gallstone disease who had ultrasonography performed by a surgeon, trained in ultrasonography were exclusively studied. These patients were referred for further scanning by the radiologists who were unaware of the surgeon's interpretation. The results of surgeon and radiologist performed ultrasonography were compared. **Results:** The interpretation of surgeon-performed ultrasonography was correct in 100 patients and incorrect in 42 patients. There were 100 True Positive, 41 True Negative, One False Negative and Zero False Positive scans yielding 99% Sensitivity, 100% Specificity and 99.3% Accuracy. Sensitivity of surgeon-performed ultrasonography in detecting gallstones compared to operative findings was 100%. **Conclusions:** Abdominal ultrasonography performed by an ultrasonography trained surgeon can detect gallstones as accurately as by a radiologist.

**Key Words:** ultrasonography, cholelithiasis, surgeon, diagnosis

## INTRODUCTION

Gallstone disease is the most common acquired abnormality of the biliary system.<sup>1</sup> Even experienced surgeons cannot make a confident clinical diagnosis of gallstones in patients with classical biliary symptoms and signs. A definite diagnosis requires documentation of gallstones by ultrasound, which is now a universally accepted primary imaging modality in the diagnosis of gallstones.<sup>2</sup> It is not possible for the radiology department to do immediate ultrasound of outpatients because of increasing workloads. If a surgeon could perform and interpret ultrasound, it would enable a rapid diagnosis of gallstones in one-stop clinic and improve decision making. This study was done to evaluate the accuracy of abdominal ultrasound performed by a surgeon for detection of gallstones.

## MATERIAL AND METHODS

This study was carried out at Surgical 'A' and 'C' Units of Ayub Teaching Hospital, Abbottabad, Pakistan from July 2000 to December 2002. Patients (n=142) with symptoms and signs suggestive of biliary disease, who gave written consent for gallbladder ultrasound performed by an ultrasonography trained surgeon, exclusively, were studied. The surgeon has done a short course in abdominal ultrasound. The ultrasound was performed using Toshiba SSA-

320A real-time ultrasound scanner with 3-5 MHz convex transducer. The patients were fasting for 6 hours before scanning. Stones were identified as echogenic foci casting acoustic shadowing. Hyperechoic mobile foci, too small to cast shadowing were considered sludge or microlithiasis. The surgeon's reports were considered positive if gallstones were detected and negative if stones were not detected. The accuracy was assessed by referring these patients for further independent scanning by experienced radiologists who were blinded from the surgeon's interpretation. A principal investigator compared the surgeon's reports with the radiologists' reports, the later being considered the correct interpretation. Concordant reports were classified as True positive (an abnormal scan interpreted as abnormal) and True negative (a normal scan interpreted as normal) while discordant reports were classified as False positive (a normal scan interpreted as abnormal) or False negative (an abnormal scan interpreted as normal). The sensitivity, specificity and accuracy were calculated. The sensitivity of an investigation is the proportion of positive tests in all patients with proven disease. The specificity is the proportion of negative tests in all patients proven to be disease-free. The accuracy is the ratio of correct results (true positive and true negative) to the total number of tests. All the patients with positive findings of gallstones had cholecystectomy. Sensitivity of ultrasound in detecting gallstones was again calculated using true positive those patients with gallstones confirmed at subsequent cholecystectomy.

## RESULTS

There were 130 female and 12 male patients. The ages ranged from 30 to 65 years. The surgeon-performed ultrasound was positive in 100 patients and negative in 42 patients. The radiologist-performed ultrasound was positive in 101 patients and negative in 41 patients. There were 100 True Positive, 41 True negative, one False Negative and zero False Positive scans yielding 99% sensitivity, 100% specificity and 99.3% accuracy. Surgeon-performed ultrasound in detecting gallstones correlated with operative findings of gallstones in 100 patients with 100% sensitivity.

## DISCUSSION

Ultrasonography is a vital component of modern surgical armamentarium used in the diagnosis of many abdominal diseases<sup>3</sup>. History and physical examination alone no longer meet the surgeons' need in the diagnosis of abdominal diseases. If a surgeon can perform and interpret ultrasound himself, it augments the physical examination. This enables a rapid diagnosis of gallstones at initial assessment which otherwise would require several visits for a definite diagnosis based on ultrasound. In this way appreciable savings can be made in patients' waiting times and expenditure if ultrasound facilities are provided in surgical outpatients. Recent portable scanners can easily be taken to the patients at any time instead of patients visiting the radiology department. This will reduce the workloads of the radiology department.

Although abdominal ultrasonography is a skilled radiological technique, the basic principles can be readily learnt by a surgeon.<sup>4</sup> Ultrasonography by surgeons is rapidly gaining acceptance as an effective and accurate first-line investigation in trauma, breast, thyroid, gastrointestinal tract, vascular and urological diseases.<sup>5,6</sup> Moreover the role of surgeons in performing ultrasound is growing all over the world because of the advances in intraoperative, endoscopic and laparoscopic ultrasonography.<sup>7</sup> These results of surgeon-performed ultrasound for detection of gallstones are good and comparable with results

published in literature. In a study by Fang et al, surgeon-performed gallbladder ultrasound examination agreed with the radiologist ultrasound findings in 92% cases.<sup>8</sup>

There was only one false negative scan in this study. This scan was misinterpreted because patient was very obese and had a contracted thick-walled gallbladder with no bile. No patient was inaccurately diagnosed as having gallstones.

The results of this study indicate that ultrasound performed by a trained surgeon can detect gallstones as accurately as by a radiologist. The surgeons can be trained in ultrasound by arranging comprehensive programmes in local radiology departments. The American College of Surgeons and the National Ultrasound Faculty have developed "Ultrasound for Surgeons: The Basic Course" for surgeons and surgical residents on CD-ROM<sup>9</sup>. The objective of the course is to provide the practicing surgeon and surgical resident with a basic core of education and training in ultrasound imaging as a foundation for specific clinical applications.

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**Address for Correspondence:**

**Dr. Sajjad Ahmad**, Surgical 'A' Unit, Ayub Medical College and Teaching Hospital, Abbottabad, Pakistan.

**Email:** [drsajjadraja@hotmail.com](mailto:drsajjadraja@hotmail.com)