Intraoperative Ultrasonography Evaluation of the Gallbladder in Morbidly Obese Patients

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Intraoperative ultrasound evaluation of the gallbladder was performed in 55 morbidly obese patients undergoing gastric bariatric surgery. Cholecystectomy was performed in the presence of any physical or ultrasonographic abnormality. Eighteen patients (33%) had cholecystectomy. Nine patients had palpable gallbladder disease confirmed by ultrasound. Nine patients had abnormalities detected by ultrasonography only. There was no false-negative ultrasonographic exam compared to physical exam. Pathologically, all specimens but one showed evidence of disease, thus there was a false-positive incidence of 1.8%. None of the 37 patients with normal physical and ultrasonographic examination have returned with gallbladder disease following the bariatric surgery. Intraoperative ultrasonography shows promise in detecting nonpalpable gallbladder disease and decreasing the incidence of delayed cholecystectomy.

THE INCIDENCE OF CHOLELITHIASIS in the adult population in the United States is approximately 10%. It is recognized that the morbidly obese patient has a much higher incidence of cholelithiasis, although its relationship to obesity is unclear. It has been suggested by Solochek that cholecystectomy is indicated in the presence of adhesions.[1] Some surgeons have even proposed that cholecystectomy be routinely performed at the time of gastric bariatric surgery in order to avoid having the patient return for cholecystectomy at a later date. This clinical study was undertaken to evaluate the use of intraoperative cholecystosonography in detecting inconspicuous cholelithiasis or cholesterolosis so that cholecystectomy can be performed at the time of bariatric surgery.

Patients and Methods

Since February 1982, all patients undergoing gastric bariatric surgery who had not had previous cholecystectomy had intraoperative cholecystosonography. Before the ultrasound was done, the gallbladder was palpated for stones, gallbladder thickening, and visually inspected for cholesterolosis. Following this, ultrasound was obtained utilizing a 5.0 MH_z, 1 to 4 cm short-focused real time transducer (Advanced Technology Lab, Bellevue, Washington). First, gel is placed on the scan head. Then, grasping the transducer scan head using a second sterile glove with the thumb over the scanning surface, the second glove is inverted over the transducer until the scan head is in the thumb of the glove. The cuff of the glove is held while a sterile camera drape (Tekna Med Corporation, Houston, Texas or Xomed Ultrascope Camera Drape, Jacksonville, Florida) is fed over the glove transducer, scan head, and its cable. The corner of the bag is removed so that only the sterile glove scanning surface and glove thumb is exposed. The surface of the glove thumb is wiped with a wet 4 × 4 to remove powder. The ceiling lights are turned off when the gallbladder is scanned and images recorded.

Ultrasound abnormalities were classified as large intraluminal shadowing density (LID), small (less than 3 mm) intraluminal nonshadowing density (SID), or density adherent to the gallbladder wall (DAG). If there was any physical or sonographic abnormality found, cholecystectomy was performed. All specimens were examined histopathologically for diagnosis.

Results

Fifty-five cholecystosonographies were performed without complication. Thirty-seven patients had normal ultrasounds and normal-appearing gallbladders that were not removed. None of these patients had developed cholelithiasis or cholecystitis after surgery over a 3-month to 2-year follow-up. Sixteen patients have been followed for greater than 1 year.

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TABLE 1. *Ultrasonography Findings*

	LID	SID	DAG	LID/SID	SID/DAG
Abnormal physical exam	6	—	2	1	—
Abnormal ultrasonography	—	2	5	—	2

LID–Large intraluminal (shadowing) density.
SID–Small intraluminal (nonshadowing) density.
* DAG–density adherent to gallbladder wall.

ultrasonography. Another nine patients had abnormalities detected by ultrasonography only. Six patients had LID abnormalities, two patients had SID abnormalities, seven patients had DAG abnormalities, and three patients had combinations of the three (Table 1). Looking at the groups separately, seven patients with abnormal physical exams had LID abnormalities characteristic of palpable stones. Only two patients had DAG abnormalities, which on pathologic examination was cholesterolosis. There was no false-negative ultrasound exam compared to physical exam. Looking at the nine patients who had no physical evidence of disease, but demonstrated disease only by ultrasound examination, no LID abnormalities were found in this group. All patients had either SID (two), DAG (five), or both (two). All had a cholecystectomy. Two patients had small stones and six patients had cholesterolosis. One patient had a density adherent to the gallbladder (DAG), which was a papillary frond in the infundibulum by pathologic examination. There was no evidence of cholelithiasis in the specimen. Thus, there was one false-positive in 55 cases (1.8%).

Comments

Although the pathogenesis for cholelithiasis is unclear, there is a definite relationship to morbid obesity. The incidence of cholelithiasis in morbid obese patients undergoing gastric bariatric surgery at our institution is 38%.[2] This is similar to the findings of Madura et al.,[3] who reported 43% in jejunoileal bypass patients and Solochek,[1] who reported 46% in his gastric bariatric patients. Although most cholecystectomies occur before or at the time of bariatric surgery, the risk for later cholecystectomy is still real. Ninety-five of the first 477 patients undergoing gastric bariatric surgery at NCMH between August 1976 and August 1981 had had previous cholecystectomy (19.9%), and 73 patients (15.3%) had simultaneous cholecystectomy at the time of gastric bariatric surgery.[2] Of the remaining 309 patients still at risk for developing cholelithiasis, 13 (4.2%) later developed symptomatic cholelithiasis and underwent cholecystectomy from 6 to 29 months following the gastric bariatric operation. This incidence following surgery is probably low, considering the increasing difficulty in follow-up from time of surgery. For example, 81% of our patients had 1-year follow-up, whereas there was 57% follow-up at 2 years, 55% follow-up at 3 years, 35% at 4 years, and only 28% follow-up at 5 years.

A possible explanation for the postoperative cholecystectomy in these patients is that these stones were present but were missed at the time of gastric bariatric surgery. Therefore, beginning in February 1982, we began using intraoperative cholecystosonography to try to improve our diagnostic yield and decrease the need and incidence of postoperative cholecystectomy. In this series of 55 patients, nine patients had palpable gallbladder disease at the time of surgery (16.4%). This is almost identical to our earlier review of 15.3%. However, ultrasonography detected nine additional patients with abnormalities, not apparent on physical examination of the gallbladder at the time of bariatric surgery. Disease was confirmed histopathologically in eight of these patients. Only one patient had a false-positive ultrasound examination for an incidence of 1.8%.

Preoperative ultrasonography is difficult in the morbidly obese patients because of excessive fat, often making the examination unreliable. Ultrasonography at surgery places the transducer directly on the gallbladder minimizing the preoperative technical difficulties and improving the diagnostic yield. The examination adds approximately 10 minutes to the operative time and carries little, if any, risk. The false-positive rate of 1.8% is acceptably low. The benefits seem substantial by detecting small stones or cholesterolosis so that cholecystectomy can be performed and later surgery avoided. This is reinforced by the fact that none of the 37 patients with normal ultrasound and normal-appearing gallbladders have developed cholelithiasis or cholecystitis after surgery. Follow-up is still short, nonetheless, 16 patients have been followed for greater than 1 year.

We feel that all patients undergoing gastric bariatric surgery for morbid obesity should have careful physical and ultrasonography examination of their gallbladder at the time of surgery. We feel many patients developing cholelithiasis following gastric bariatric surgery probably had missed cholelithiasis or cholesterolosis at the time of their gastric bariatric operation. Palpation and inspection of the gallbladder should be supplemented with intraoperative cholecystosonography to provide maximum diagnostic yield. Cholecystosonography is a safe and accurate test with a false-positive rate of 1.8%. Routine cholecystectomy in the absence of physical or ultrasound abnormality should not be performed.

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