
Scintigraphic Evaluation of Postoperative Complications of Laparoscopic Cholecystectomy

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Laparoscopic cholecystectomy is gaining popularity as an alternative to standard open cholecystectomy. At our institution, approximately 400 laparoscopic cholecystectomies have been performed since May 1989. The frequency of major postoperative complications has been approximately 1.5% (6 out of 400 cases). The most common complications have been biliary tree injury, bile leak, and retained stone. We present three patients who developed postoperative complications that were properly diagnosed on ^{99m}Tc -DISIDA cholescintigraphy. Our report indicates that ^{99m}Tc -DISIDA scintigraphy facilitates the rapid and precise diagnosis of bile leaks in patients with abdominal pain and/or hyperbilirubinemia following laparoscopic cholecystectomy.

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Laparoscopic cholecystectomy, as an alternative to standard open cholecystectomy, has the advantage of decreased morbidity and mortality and shortened hospital stay (1). At our institution, approximately 400 laparoscopic cholecystectomies have been performed (by RW) since May 1989. We present three patients who developed postoperative complications diagnosed on ^{99m}Tc -DISIDA cholescintigraphy.

CASE REPORT

Case 1

AM is a 40-yr-old female who complained of recurrent right upper quadrant abdominal pain for 1 yr and underwent an elective laparoscopic cholecystectomy. Her hospital course was uneventful and she was discharged on the third postoperative day (POD). On the fifth POD, the patient was readmitted complaining of severe abdominal and right shoulder pain. She was found on examination to have scleral icterus and a total bilirubin of 3.7 mg/dl (normal, 0.2–1.2 mg/dl). An ultrasonogram (US) showed a moderate amount of free fluid in the pelvis and surrounding the liver. Initially ^{99m}Tc -DISIDA scintigraphy revealed an abnormal focus of tracer localization along the inferior aspect of the right lobe of the liver. Over the first hour postinjection this tracer

collection gradually extended toward the lateral hepatic border (Fig. 1). The patient underwent laparotomy and was found to have a transected common bile duct. She underwent Roux-en-y hepaticojejunostomy and had a stent placed. The patient recovered and was discharged in good health 8 days after laparotomy.

Case 2

The second patient, RR, is a 59-yr-old female referred for DISIDA imaging when she presented with right shoulder and abdominal pain and hyperbilirubinemia on the second POD following elective laparoscopic cholecystectomy. The DISIDA study demonstrated persistent pooling of radiotracer in the gallbladder fossa beginning approximately 10 min postinjection and eventually extending along the right inferolateral portion of the peritoneal cavity during the first hour postinjection; findings consistent with a biliary leak (Fig. 2AB). The patient underwent laparotomy confirming a bile leak from the cystic duct stump. She did well after reoperation and was discharged 6 days later.

Case 3

Patient AL is a 37-yr-old white male with recurrent right upper quadrant abdominal pain who underwent elective laparoscopic cholecystectomy for chronic cholecystitis. The diagnosis was supported by a preoperative US which demonstrated multiple stones in the gallbladder. A DISIDA scan done at another institution reportedly revealed nonvisualization of the gallbladder consistent with acute obstruction of the cystic duct. On the second POD, he complained of nausea. Abnormal liver function tests including an elevated total bilirubin of 7.9 mg/dl were obtained. US of the abdomen revealed dilatation of the distal common and central intrahepatic ducts. A DISIDA scan revealed increased early tracer retention in the cardiovascular pool and persistent retention in the hepatic parenchyma persisting up to 11 hr postinjection. The common bile duct and small intestine were not visualized up to 1 hr postinjection. The scan was interpreted as “suggestive of severe cholestasis and/or complete common bile duct obstruction.” The patient underwent endoscopic retrograde cholangiopancreatogram (ERCP). A papillotomy with extraction of a common bile duct stone was performed. The patient recovered uneventfully and was discharged 3 days after ERCP.

DISCUSSION

The incidence of injuries to the biliary tree after open cholecystectomy has been reported to be between 0.1 and 0.7% (about 1 out of 500 cases) (2). Peters et al. have reported an overall morbidity rate of 8% for laparoscopic cholecystectomy with no deaths in a series of 100 patients.

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FIGURE 1. DISIDA scan of patient AM at 60 min demonstrating tracer activity in the right perihepatic space.

In their series of patients, the major complications were, one bile duct injury (1%), two bile leaks (2%), one retained stone (1%), and two wound infections (2%) (1). Since May 1989, approximately 400 laparoscopic cholecystectomies have been performed at our institution. There have been no deaths, and the frequency of major postoperative complications (i.e., requiring reoperation) was approximately 1.5% (6 out of 400 cases). No wound infections nor iatrogenic injuries to structures outside the hepatobiliary tract were encountered. Eight patients were referred for DISIDA scans after laparoscopic cholecystectomy to rule out bile leak or common bile duct (CBD) obstruction complicating the postoperative course. Of these, there have been six positive and two negative studies [one biliary tree injury (0.25%), three bile leaks (0.75%), and two retained stone/CBD obstructions (0.5%)]. The two patients with

negative studies presented with nausea, vomiting, and/or nonspecific abdominal pain. They developed gastric ileus, required nasogastric decompression for 24 hr with resolution, recovered rapidly and were discharged. A complication observed in one case, which did not require cholescintigraphic examination, was due to postoperative bleeding and was not included in this report. Compared to the traditional open cholecystectomy, certain complications, such as biliary tract injury and dislodged cystic duct surgical clips are more common after laparoscopic cholecystectomy (1,3). With one exception, those patients who developed postoperative complications requiring surgery were discharged within 4–6 days after reoperation. The exception was patient AM, whose common bile duct was transected and had a more prolonged hospital course.

The symptomatic post-endoscopic cholecystectomy patient presents a diagnostic dilemma. One must rule out bile leak, injury to the biliary tree, and retained calculi. Ultrasonography and hepatobiliary ^{99m}Tc -DISIDA scintigraphy are safe, noninvasive methods we have found useful in these patients. US can demonstrate the presence and location of fluid collections but cannot determine the nature of the fluid (4,5). The DISIDA scan is better able to demonstrate the presence of bile in such collections when tracer is seen outside the biliary tree (2). This advantage of the DISIDA scan over US has been reported in patients with bile leaks after open cholecystectomy and trauma (6–8). Our report indicates that the ^{99m}Tc -DISIDA cholescintigram allows rapid and accurate diagnosis of bile leaks and was superior to US in this regard. We consider the DISIDA scan to be the diagnostic procedure of choice in patients with abdominal pain and/or hyperbilirubinemia following laparoscopic cholecystectomy.

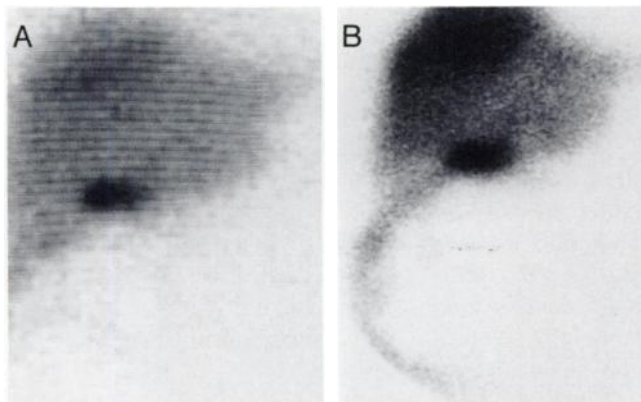


FIGURE 2. (A) DISIDA scan of patient RR at 30 min postinjection with a focus of tracer localization in the gallbladder fossa. (B) The 60-min image demonstrates persistent activity in the gallbladder fossa and now also along the inferolateral portion of the peritoneal cavity.

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