CASE REPORT JSLS

Acute Cholecystitis and Severe Ischemic Cardiac Disease: Is Laparoscopy Indicated?

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ABSTRACT

Background and Objectives: Laparoscopy in patients with poor cardiac function has been the subject of controversy and is considered by many surgeons a relative contraindication.

Methods: We report the case of a patient who presented with acute cholecystitis and choledocholithiasis concurrent with unstable angina. Our experience in laparoscopic management of patients with calculous biliary disease and severe coronary artery disease is examined.

Results: The patient was managed by coronary angioplasty and stenting immediately followed by laparoscopic cholecystectomy and common bile duct exploration under close invasive hemodynamic monitoring and low-pressure pneumoperitoneum. Between 1996 and 2001, 39 patients with coronary artery disease and an ASA class of III or IV underwent laparoscopic cholecystectomy. Eight of these patients (20.5%) had common bile duct stones necessitating laparoscopic common bile duct exploration. No conversions were necessary, and no major morbidity or mortalities occurred.

Conclusions: Laparoscopic cholecystectomy and common bile duct exploration can be safely performed in patients with severe ischemic cardiac disease under close hemodynamic monitoring and a low-pressure pneumoperitoneum (10 to 12 mm Hg).

Key Words: Laparoscopy, Acute cholecystitis, Ischemic cardiac disease.

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INTRODUCTION

Laparoscopy in patients with poor cardiac function has been the subject of controversy and is considered by many surgeons a relative contraindication. The management of patients developing acute cholecystitis following or concurrent with myocardial infarction or unstable angina is particularly challenging. We report here the case of a patient who presented with this scenario and briefly review our experience and management strategies in patients with severe ischemic cardiomyopathy presenting with biliary calculous disease.

CASE REPORT

The patient is a 72-year-old man who presented with right upper quadrant pain radiating to his back. He had experienced multiple similar episodes in the past, but had no fever, chills, nausea, or vomiting. He is a smoker, but has no history of alcohol abuse. He has a history of systemic hypertension and coronary artery disease with prior coronary angioplasty and stenting. On further questioning, we noted a current worsening of unstable angina pectoris despite a nitroglycerin patch that he had recently been prescribed. In addition, he is on furosemide and quinapril.

On physical examination, the patient was afebrile and anicteric. His abdomen was tender in the right upper quadrant with localized guarding and a Murphy sign was present. He had no overt signs of heart failure.

Blood workup showed a white blood cell count of 10 400 U/L, and abnormal liver function tests with total bilirubin 1.6 mg/dL, aspartate aminotransferase (AST) 208 IU/L, alanine aminotransferase (ALT) 254 IU/L and alkaline phosphatase 191 IU/L. The remainder of his laboratory results including amylase and lipase were normal. Ultrasonography showed cholelithiasis with a thickened gallbladder wall; the common bile duct was of normal diameter. The electrocardiogram showed ST segment and T wave abnormalities consistent with anterolateral ischemia.

The patient was taken directly for a coronary angiogram that revealed severely depressed left ventricular systolic

function with an ejection fraction in the range of 20% and severe single-vessel coronary artery disease involving a 90% and 80% sequential mid right coronary artery stenosis; these lesions were angioplastied and stented. After consultation with the gastroenterologist, we decided to proceed the following day with laparoscopy. An arterial line and a pulmonary artery catheter were placed to maintain optimal hemodynamics. Pneumoperitoneum was maintained at a low pressure of 12 mm Hg. An intraoperative cholangiogram was performed and revealed obstruction of the distal common bile duct with multiple filling defects and no flow of contrast in the duodenum. A laparoscopic common bile duct exploration via choledocotomy was performed followed by cholecystectomy. Operative time was 105 minutes, and estimated blood loss was 50 cc. The patient tolerated the surgery very well and was transferred to the surgical intensive care unit extubated and in stable condition.

The patient was maintained postoperatively on intravenous hydralazine, enalapril, digoxin, nitroglycerin, milrinone, and furosemide to ensure optimal filling pressure and cardiac output. He was weaned off the milrinone drip by postoperative day 2 at which time the pulmonary artery catheter was removed. At 48 hours postoperatively, a heparin drip was started in view of the stent placement, and the patient was later placed on clopidrogel (Plavix). A clear liquid diet was started on the second postoperative day, and the patient was advanced to a low-fat low-sodium diet the following day, at which point the T-tube was clamped then the drain removed. The liver function tests steadily returned to normal values. Prior to discharge, an electrophysiologic study with ventricular stimulation was performed followed by implantation of a cardioverter-defibrillator in view of the severe ischemic cardiomyopathy with the increased risk of sudden death.

DISCUSSION

In an epidemiologic study examining the relative risk for hospital admission for acute cholecystitis after admission for myocardial infarction using a statewide hospital discharge database and sequence symmetry analysis, it was noted that hospitalization for myocardial infarction may increase the risk of subsequent hospitalization for acute cholecystitis.[1] In addition, acute cholecystitis may cause a clinical picture similar to that of cardiac ischemia with a syndrome of abdominal fullness, nausea, diaphoresis, chest pain, as well as angina pectoris, arrhythmias, or nonspecific ST-T wave changes on the electrocardiogram.[2,3] A vagally mediated cardiobiliary reflex is the presumed cause of these changes.[3] In patients with known coronary artery disease who present with acute cholecystitis and epigastric or chest pain or a "questionable" electrocardiogram, the diagnosis of coronary ischemia has to be promptly ruled out with further testing, including stress testing and cardiac catheterization if needed, before proceeding with cholecystectomy; however, surgeons must keep in mind that undue delay in treatment may result in both cardiac and septic complications.

The management of patients presenting with acute cholecystitis immediately following or concurrent with myocardial ischemia is very challenging. Anticoagulation or thrombolytic therapy for myocardial infarction (MI) increases the risk of surgical and postoperative bleeding. Delaying surgical intervention for 6 months when the risk of recurrent MI has returned to that of the normal population puts the patient at risk for septic as well as other complications of gallstone disease. Proceeding to early coronary angiography allows the immediate assessment of the coronary artery anatomy and potentially performing an angioplasty. Cholecystectomy can then follow angioplasty. It is important to start anticoagulation in these patients as soon as deemed safe postoperatively because holding anticoagulation for longer periods puts patients at risk for recurrent MI or stent thrombosis. In cases where the anatomy is not conducive to angioplasty, such as in triple-vessel disease, simultaneous cholecystectomy, and coronary artery bypass grafting, can be performed and has been previously reported.[4] In patients with severely depressed cardiac function secondary to ischemic cardiomyopathy, the intraaortic balloon pump (IABP) has been used successfully to significantly improve cardiac performance so that patients can undergo definitive cholecystectomy (Personal communication with Franklin ME Jr.)[5] We believe a definitive biliary procedure following coronary reperfusion is a good alternative to cholecystostomy that has been recommended in high-risk surgical patients.[6] Cholecystostomy drains, although occasionally useful in some critically ill ventilator-dependant septic patients, are associated with their own morbidity, have a mortality ranging from 5% to 36%,[7] miss common bile duct stones and ascending cholangitis, are difficult to manage in outpatients with tube occlusion and recurrent symptoms, and usually require readmission for cholecystectomy.

The next issue becomes the approach to cholecystectomy. Laparoscopy has traditionally been relatively contraindicated in patients with severe cardiac disease and cardiac failure in view of its effect on decreasing venous return and significant dropping of left ventricular stroke work, cardiac index, and stroke volume. In addition, releasing pneumoperitoneum may lead to a sudden increase in venous blood return and subsequent congestive heart failure and acute pulmonary edema. Studies[8] have shown, however, that laparoscopy may be safely performed in patients with compromised cardiac functions under close hemodynamic monitoring using intra- and postoperative pulmonary artery catheters. Transesophageal echocardiography (TEE) did not prove useful for intraoperative monitoring. Carroll BJ et al[9] reported their experience with 13 patients with severe cardiac dysfunction undergoing laparoscopic cholecystectomy with appropriate hemodynamic monitoring and adequate perioperative support of cardiac function. Although the authors had only 9 successfully completed laparoscopic cholecystectomy procedures and 1 death within 30 days of surgery, they felt that laparoscopic cholecystectomy can be performed safely for acute cholecystitis in patients with severe cardiac disease. When compared with historical controls, it appears to be safer than open cholecystectomy.

A multicenter, prospective, randomized trial[10] comparing two-stage vs one-stage management of patients with gallstone disease and ductal calculi demonstrated equivalent success rates and patient morbidity for the 2 management options but a significantly shorter hospital stay with the one-stage laparoscopic treatment and concluded that in fit patients (American Society of Anesthesiologists' [ASA] class I and II), one-stage laparoscopic treatment is the better option, and preoperative endoscopic stone extraction should be confined to poor-risk patients, ie, those with cholangitis or severe pancreatitis. In our own experience with laparoscopic common bile duct exploration by choledochotomy,[11,12] 223 patients have now undergone such a procedure with a 96% success rate in technically clearing the common bile duct. We apply this one-stage approach to less fit patients (ASA III and IV) and feel that these patients would potentially benefit more from a lesser number of interventions, an earlier resumption of anticoagulation, and a shorter hospital stay. Our experience with this approach has been extremely encouraging, and the case report presented here only illustrates one of these scenarios. In reviewing our prospectively maintained database, we identified 39 patients between 1996 and 2001 with coronary artery disease and an ASA class of III or IV who have undergone laparoscopic cholecystectomy. No conversions were necessary, and no major morbidity or mortalities occurred. Eight of these patients (20.5%) had common bile duct stones necessitating laparoscopic common bile duct exploration through a transcystic approach in 2 of them and a choledochotomy in 6. The presence of common bile duct stones was unsuspected in one of these patients based on preoperative ultrasound and liver function tests.

CONCLUSION

Laparoscopic cholecystectomy can be performed safely in patients with severe ischemic cardiac disease under close hemodynamic monitoring and a low-pressure pneumoperitoneum (10 to 12 mm Hg). This applies as well to patients with unstable angina, following coronary angioplasty. In patients with common bile duct stones and in experienced hands, a laparoscopic common bile duct exploration can be performed in that same setting as a one-stage procedure.

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