

Acute Cholecystitis after Minimally Invasive Coronary Artery Bypass Grafting: A Report 2 Cases

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ABSTRACT

Acute cholecystitis following coronary artery bypass grafting (CABG), although rare, is a potentially life-threatening consequence of prolonged cardiopulmonary bypass (CPB) procedures. Minimally invasive direct coronary artery bypass (MIDCAB), performed without sternotomy and without CPB, is perhaps the least traumatic type of CABG procedure. Nevertheless, we present 2 cases of acute cholecystitis following MIDCAB, demonstrating that a MIDCAB does not eliminate the risk of gastrointestinal complications. Our experience with these cases points to the benefits of early and aggressive management in the treatment of acute cholecystitis after MIDCAB.

INTRODUCTION

Gastrointestinal (GI) complications following open heart surgery, although infrequent, can be lethal. The reported incidence of GI complications following cardiopulmonary bypass (CPB) ranges from 0.58% to 3.7% with a disproportionately high mortality rate of 15% to 67% [McSweeney 2004]. Alone, acute cholecystitis (AC) following open heart surgery has a reported incidence of only 0.3% [Rady 1998]. However, due to difficulty with early diagnosis, sepsis often ensues and AC is associated with a notoriously high mortality rate approaching 75% [Kouchoukos 2003]. Many studies have attributed GI complications to the adverse effects of prolonged CPB procedures.

In contrast to conventional coronary artery bypass grafting (CABG), minimally invasive direct coronary artery bypass (MIDCAB) is a relatively new technique that allows surgeons to gain access to the heart via a small incision while the heart is still beating. Although this procedure is minimally invasive, it is still considered major surgery with risk of serious compli-

cations. Here we present 2 cases of AC, which were successfully treated with surgery, following MIDCAB. We discuss the importance of early diagnosis and intervention.

CASE REPORTS

Case 1

A 73-year-old man with coronary artery disease was referred to us for CABG after an unsuccessful percutaneous coronary intervention. The patient had a history of hypertension, hyperlipidemia, alcoholic liver disease, gall stones, and peptic ulcer disease for which he was receiving routine follow-up care. A preoperative coronary angiography revealed total occlusion of the distal left anterior descending (LAD) artery, right coronary artery stenosis (50%), and a stent in the mid-left circumflex artery. Perioperative risk assessment with EuroSCORE estimated a 5.33% mortality rate. We performed a MIDCAB with a left greater saphenous vein graft from the left internal mammary artery to the LAD artery.

Shortly after the MIDCAB procedure, coagulopathy with excessive chest blood loss was noted, requiring massive transfusion. The patient suffered from perioperative myocardial injury and low cardiac output syndrome during the immediate postoperative period, requiring inotropic support. Approximately 13 hours postoperatively, the patient complained of nonspecific mid-epigastric discomfort. Physical examination revealed mild epigastric tenderness, periumbilical muscle guarding, hypoactive bowel sounds, and the absence of Murphy's sign. Serology showed leukocytosis and abnormal elevation of serum glutamic-oxaloacetic transaminase. Acute abdomen with possible hollow-organ perforation or ischemic bowel was suspected, with no definitive diagnosis. Approximately 25 hours postoperatively, peritoneal signs with rapid hemodynamic deterioration erupted and an emergent laparotomy was performed for a suspected perforated peptic ulcer. Intraoperative findings revealed a swollen gall bladder, bilious ascites, multiple gallstones, and no GI tract lesions. Cholecystostomy and cholecystolithotripsy were performed.

Case 2

A 69-year-old man with coronary artery disease and a history of hypertension was admitted for scheduled MIDCAB.

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The patient denied a history of any diseases involving the hepatobiliary system or the GI tract. Preoperative coronary angiography revealed 90% stenosis of the proximal LAD and 80% stenosis of the diagonal branch. Perioperative risk assessment with EuroSCORE estimated a 1.70% mortality rate. We performed a MIDCAB with a left greater saphenous vein graft from the left internal mammary artery to the LAD artery. The immediate postoperative course in the intensive care unit was uneventful with minimal drainage of chest blood, minimal transfusion, early extubation, and no evidence of perioperative myocardial injury or low cardiac output syndrome. Thirty-one hours after MIDCAB, the patient complained of nonspecific epigastric discomfort. Physical examination was positive for Murphy's sign and mild fever. Serology showed leukocytosis with predominantly segmented neutrophils and hyperbilirubinemia. Conservative management was advised and intravenous antibiotics were quickly administered. After one week of medical therapy, the patient received open cholecystectomy. Intraoperative findings revealed gall bladder empyema with gangrenous changes and subphrenic abscess. Cholecystectomy, choledochostomy, and open drainage of the subphrenic abscess were performed.

DISCUSSION

To date, the only published retrospective study of AC after cardiovascular surgery is that by Rady et al, in which a number of perioperative predictors of AC were identified, including inadequate preoperative oxygen transport, length of time on CPB, postoperative bacteremia, and cardiac arrhythmia [Rady 1998]. Indeed, most previous studies have emphasized prolonged CPB and its contributions to GI complications after cardiovascular surgery. However, a recent study conducted by Musleh et al comparing GI complications following on-pump (with CPB) and off-pump (without CPB) CABG failed to support this conclusion. In this study, the incidence of postoperative GI complications following on-pump CABG and off-pump CABG were 1.2% and 1.6% respectively, with no significant advantage using the off-pump procedure [Musleh 2003]. Thus, the authors concluded that a "low-flow" state due to perioperative hypotension, hypovolemia, vasoconstrictor use, postoperative arrhythmia, hemorrhage, or pre-existing vascular disease is a major factor contributing to postoperative GI complications in both on-pump and off-pump procedures [Musleh 2003].

The first case reported here reveals the importance of obtaining an early definitive diagnosis. Due to the lack of a high index of clinical suspicion for AC confounded by the initial clinical impression of a perforated peptic ulcer or ischemic bowel, a definitive diagnosis of AC became apparent only after the incidental intraoperative finding of bile extravasation during laparotomy. Although a favorable outcome was achieved following a relatively delayed cholecystostomy drainage, an earlier preoperative diagnosis might have prevented the need for an emergent laparotomy. This case illustrates that clinical manifestations offer little clue of the underlying gall bladder inflammation in progress. Fur-

thermore, abnormal serology can be interpreted as being a reflection of systemic inflammatory response syndrome, common after all cardiac surgery. However, a retrospective review reveals that the tell-tale signs of high susceptibility for postcardiac GI complications were present in this case. Indeed, prolonged operative time, perioperative inotropic support, low cardiac output syndrome, underlying cholelithiasis, and a history of peptic ulcer disease are all possible risk factors for GI complications after cardiac surgery. With early suspicion of AC, cholecystectomy could have been performed without the presence of biliary peritonitis and hemodynamic deterioration.

The second case reflects the importance of early cholecystectomy. By convention, the management of acute acalculous cholecystitis in the critically ill mandates emergent cholecystectomy once the diagnosis is highly suspected since the clinical course is usually more fulminant than that of acute calculous cholecystitis and more frequently progresses to gangrene, empyema, or perforation [Ahrendt 2004]. On the contrary, patients who undergo CABG are at a high operative risk with early cholecystectomy. In case 2, cholecystitis was diagnosed early after the onset of clinical manifestations, and intravenous antibiotics were provided without delay. Due to the possibility of inducing new hemodynamic instability postoperatively and of causing procedural-related bleeding, we chose conservative management over early cholecystectomy or percutaneous transhepatic cholecystostomy. However, urgent cholecystectomy was later performed due to persistent leukocytosis, fever, and epigastric discomfort. Intraoperative findings of gall bladder empyema with gangrenous changes and a subphrenic abscess indicated a possible catastrophic consequence if surgical intervention was further delayed.

CONCLUSION

These 2 cases, although rare, signify the possibility that AC may erupt following MIDCAB despite the avoidance of CPB. Due to the various confounding factors present in an immediate post-CABG setting, the diagnosis of AC is often difficult and delayed. Thus, a high index of suspicion is crucial for quick and accurate diagnosis, especially if the patient presents with perioperative risk factors for a "low flow" state. Although the ideal treatment option is still debatable, early diagnosis followed by rapid intervention remains the key to patient survival. Emergent exploratory laparotomy is warranted in situations of a surgical abdomen and hemodynamic instability (persistent right upper quadrant tenderness, peritonitis, sepsis) with or without a definitive diagnosis of AC. In the case of an early definitive diagnosis of AC with stable hemodynamics, earlier surgical intervention is ideal to minimize severe complications. Initial conservative management followed by delayed cholecystectomy may be a practical alternative treatment strategy for AC in the critically ill. However, due to the difficulty in differentiating between patients with complicated and uncomplicated AC and the high incidence of complicated cholecystitis during the post-CABG setting, earlier surgical intervention may be appropriate in patients with AC after MIDCAB.

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