Simultaneous Coronary Artery Bypass Grafting And Abdominal Operation: Report Of Two Cases

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Citation

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Abstract

Simultaneous coronary artery bypass grafting and noncardiac surgery is an accepted concept aimed at reducing morbidity and to free patients from different diseases at a single anesthetic setting. Reported here-in, are two cases of coronary artery bypass grafting and hepatobiliary surgery, performed at the same anesthetic setting. The first case involved a male patient with a history of ischemic heart disease diagnosed with hepatocholedocholithiasis and the second involved a female patient with a history of cholelithiasis and diagnosed with ischemic heart disease presented with acute cholecystitis while awaiting coronary revascularization surgery. Coronary revascularization was recommended for both patients before any major abdominal surgery. After thourough evaluation both patients subsequently underwent successful simultaneous coronary artery bypass grafting and hepatobiliary surgery. Such simultaneous procedure is feasible, practicable and may help prevent patients with surgically correctable coronary artery disease considered high risk, from developing preventable complications from concomitant benign diseases or progression of concomitant malignant diseases.

INTRODUCTION

Simultaneous operations are surgical procedures performed at the same anesthetic setting on two or more anatomic sites for different unrelated diseases ([1,2]). The main purpose of such procedures is to save patients from undergoing major operations at different anesthetic settings while freeing them from multiple diseases simultaneously and providing a long-lasting cure. Patients undergoing abdominal operations with prior history of Ischemic Heart Diseases (IHD) continue to face significant morbidity and mortality as a result of the cardiac risk ([3]). Therefore, stabilization of the cardiac problem either medically, percutaneously or surgically, is often recommended before any major abdominal operation. Advancements in surgical techniques, intensive care unit (ICU) facilities and anesthesiological support have made surgical correction of coronary artery disease and other noncardiac operations to be performed under the same anesthetic setting. Two cases of simultaneous coronary artery bypass grafting (CABG) and abdominal surgery are presented here-in.

CASE REPORT-1

A 52 year-old male patient was referred to our center with long standing complaints of right upper quandrant pain, nausea, intermittent vomitting and worsening jaundice. He described previous attacks of abdominal pain and fever which were treated with antibiotics on outpatient basis. Previous medical history included a three-year history of stable angina pectoris and ongoing heavy cigarette smoking (20 packet/year). Initial complete blood count and blood chemistry revealed white blood cell of 13.7 x 10^9/L, hemoglobin of 14 g/dL, alanine aminotransferase (ALT) of 57 U/L, aspartate aminotransferase (AST) of 49 U/L, gamma-gluteryltransferase (GGT) of 279 U/L and alkaline phosphatase (ALP) of 381 U/L, total bilirubin of 4.57 mg/dL with a direct component of 3.3 mg/dL. Levels of tumor markers including serum alpha-feto-protein (AFP), carcinoembryonic antigen (CEA) and carbohydrate antigen (CA) 19-9 were normal. Abdominal ultrasound and sebsequent abdominal computed tomography showed stones in the left intraheptic biliary pathways with dependent left intrahepatic biliary system dilatations (Fig 1).

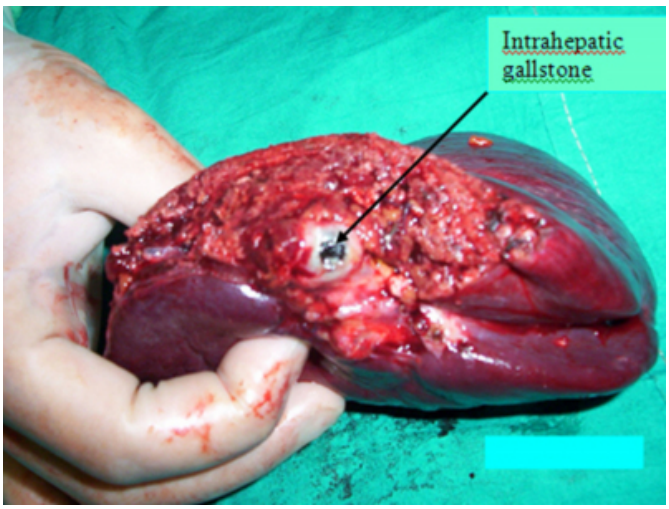
Figure 1

Figure 1: A computed tomography scan showing stones in left lobe of the liver.

In addition, the common bile duct was markedly dilated (17 mm) and gallstones were noted at the proximal part. No stone or mass was observed in the gallbladder or at the periampullary region, respectively. Left lateral sectionectomy and common bile duct exploration was considered to be the definitive treatment for the patient. Preoperative cardiovascular evaluation included electrocardiogram which revealed ST segement changes and a subsequent exercise test which was interpreted as positive for anteroseptal ischemia. An angiography was then performed which showed a 90% and 99% occlusion of the left anterior descending (LAD) and the right coronary arteries (RCA) respectively. The severity of the coronary artery disease was considered to be high risk for the planned abdominal surgery. Therefore, surgical revascularization of the coronary arteries was recommended before the hepatobiliary surgery. However, because of the urgency of the hepatobiliary disease simultaneous CABG and hepatic resection was decided. First the cardiac team , using a mid-sternotomy incision, prepared the left internal mammary artery (LIMA) and radial artery (RA) conduits for anastomosis. Before cardiopulmonary bypass (CPB), the patient was heparinized with a dose of 200 iu/kg followed by an additional dose of 50 iu/kg, achieving an activated clotting time (ACT) of 425 s. A mild hypothermia was induced and maintained at 32ºC. Next, LIMA-LAD and RA-RCA anastomosis were constructed. After completion of the anastomoses and termination of CPB, 300 mg of protamin was administered followed by an additional dose of 20 mg to achieve a normal ACT value of 140 s. Following this, the general surgery team extended down the sternotomy incision as mid-line abdominal incision. After mobilizing the left hepatic lobe and hilar disection to isolate the choledocus, left lateral sectionectomy (fig 2), cholecystectomy, common bile duct exploration with stone extraction and choledochoduodenostomy were subsequently performed.

Figure 2

Figure 2: Resected left lateral segment of the liver showing black gallstone.



Total operation time was 5 hours and 25 minutes. The patient was monitored postoperatively for 6 days in the intensive care unit (ICU). His postoperative course was uneventful and was subsequently discharged 12 days after the operation. He is currently doing well with no recurrent cholangitis and is cardiologically stable.

CASE REPORT-2

A 77 year-old female patient with a 10- year history of cholelithiasis was diagnosed with unstable angina pectoris and subsequently underwent coronary angiography, which showed an 85% occlusion of the proximal LAD with an ejection fraction of 30%. She was then scheduled for coronary by-pass operation. While awaiting the cardiac operation, she developed severe right upper quadrant pain and fever. Complete blood count and blood chemistry showed leukocytosis (14.6 x 10^9/L) with normal liver function test values. An abdominal ultrasound revealed a hydropic, thick-walled gallbladder with pericholecystic fluid and multiple gallstones (fig 3).

Figure 3

Figure 3: Hepatobiliary ultrasound showing multiple gallstones and pericholecystic fluid.

A diagnosis of acute calculous cholecystitis was made. However, because of her high cardiac risk (including old age, history unstable angina pectoris and severe stenosis of LAD) for an emergency cholecystectomy, percutaneous cholecystostomy was placed in addition to antibiotic therapy to stabilize her condition. Four weeks later she underwent laparascopic cholecystectomy followed by CABG (LIMA-LAD anastomosis) simultaneously. First, pneumoperitonium using CO2 gas was formed with the aid of veress needle and intraabdominal pressure maintained at 8 mmHg. Next, a 30º laparoscope was inserted through a 10 mm laparoscope port placed in the infraumbilical region. After placement of three other trocar ports, the cholecystostomy drainage catheter was removed and the gallbladder was dissected and removed through the epigastric port. Next, the cardiac team performed the CABG through a mid-sternotomy incision. Heparinization and temperature control was similar to case report -1 above. After been monitored for a day at the ICU, she was transfered to the surgical ward. Two days after surgery, the patient developed atrial fibrillation which responded to medical therapy. She was subsequently discharged on postoperative day seven and is currently doing well.

DISCUSSION

Patients scheduled for noncardiac surgery generally undergo preoperative cardiovascular evaluation aimed at identifying and quantifying cardiac risk factors and adopting measures to reduce or eliminate those risks. The American college of Cardiology (ACC) and American Heart Association (AHA) guidelines provide a stepwise strategy for preoperative cardiac evaluation based on assessment of urgency of the noncardiac surgery, prior coronary evaluation and treatment, clinical risk factors, functional capacity and surgery-specific risk factors ([4]). These guidelines help to establish structured management protocols to assess, diagnose and treat patients with ischemic heart disease preoperatively and to decrease postoperative morbidity and mortality. Currently, the only options for reducing perioperative cardiovascular risk in patients with IHD undergoing noncardiac surgery are coronary revascularization or medical therapies.

Coronary revascularization should be guided by patients cardiac condition (unstable angina, left main coronary artery disease, decreased left ventricular function, LAD disease), the risk of the coronary intervention and the potential consequencies of delaying the noncardiac surgery for recovery after the intervention. Coronary revascularization can be done surgically (CABG) or percutaneously [percutaneous coronary intervention (PCI)]. Studies have shown that patients who had coronary revascularization before major surgery did better postoperatively and perioperative mortality rate was twice as high in patients who were treated medically than those managed surgically ([5,6,7]). PCI stenting seems to provide a shorter period of recovery (compared with CABG) allowed for patients to undergo noncardiac surgery. However, major surgery performed shortly after PCI stenting is reported to be associated with major bleeding episodes and myocardial infarctus ([8,9]). Therefore, it is recommended that elective and semi-elective surgeries be delayed for at least 4-6 weeks following PCI stenting to allow complete endothelization and completion of full-course antiplatelet therapy. Randomized control trials comparing CABG and PCI and meta-analysis comparing recent trials have shown that CABG is superior over PCI in terms of restenosis requiring re-revascularization and long term survival ([10,11,12]).

Staged operations can lead to increase in complications and dissemination or progression of synchronous diseases ([2,13]). Serious complications resulting from concomitant benign or malignant diseases, for which surgery might be the only treatment option, can occur during the recovery period after coronary revascularization interventions. In addition, because patients are exposed to multiple doses of anesthetic agents at different times in staged operations, general anesthetic risks are expected to be higher compared with single-staged procedures. Simultaneous operation offers the opportunity to cure synchronous cardiac and noncardiac

diseases requiring surgical treatment, thereby reducing mobidity, mortality and possibly reducing cost ([14]).

Advancements in surgical techniques, intensive care units (ICU) facilities and anesthesiological support have made surgical correction of multiple diseases (both benign and malignant) at different anatomic regions to be performed under the same anesthetic setting with comparable mordity and mortality rates. Previous reports on simlutaneous operations were mostly performed on malignant patients with ischemic and valvular heart diseases ([1,2,3]). Similar approach have been adopted in patients having major vascular or benign gastrointestinal diseases with synchronous ischemic and valvular heart diseases ([15,16]). Davydov et al, reported a significant increase of palliative surgery in the staged as against simultaneous operations for concomitant malignant and coronary heart diseases. They suggested that simultaneous operation for concomitant cancer and severe heart disease may become operations of choice which will increase resectability, radicalism and functional operability for these problematic patients who otherwise are doomed to palliation and symptomatic treatment ([2]).

In the first case, the patient had severe multivessel coronary artery disease (90% LAD and 99% RCA occlusion) which was considered very high cardiac risk for the hepatobiliary surgery. Hepatic resection for hepatholithiasis have been shown to be associated with higher therapeutic success rate, lower risk of recurrence and removes possible underlying occult cholangiocellular carcinoma or biliary strictures, compared with endoscopic and percutaneous methods ([17,18]). Hence, left lateral sectionectomy with common bile duct exploration and choledochoduodenostomy was considered the most appropriate treatment option. This operation can be carried out in a staged fasion; first, surgical correction of the patients cardiac disease followed by the planned hepatobiliary procedure. However, the risk of recurrent cholangitis is real and highly probable in the setting of hepatholithiasis and as one cannot predict the timing of such an attack, it could equally occur during the recovery interval which could further complicate the bypass operation and possibly result in increased morbidity.

The second case illustrates an example of complication resulting from a benign disease whose surgical correction was postpond because of coronary artery disease. The cardiac risk for this patient was equally considered excessive for an emmergency chlocystectomy. A similar arguement can be made here, as it is for the first patient, in terms of such complication occuring in the recovery phase of CABG. A more severe complication for which emergency surgery could be the only treatment option, such as generalized peritonitis secondary to perforated cholecystitis, could occur, although there is no data to predict the exact likehood of such occurence. Under such condition the mordity and mortality rates could be much higher.

It is important to emphasize that there was no clinical obligation for the CABG and the hepatobiliary surgery to be performed simultaneous in both patients. However, taken into consideration the advantages of simultaneously performed operations outlined above and the possibilty of foreseable complications occuring in staged operations, it is our believe that this approach provides an opportunity for both cardiac and noncardiac diseases to be cured at one anesthetic setting which would prevent exacerbation or pregression of both benign or malignant diseases and also save patients from undergoing much more riskier operations. Factors such as the type, technique and duration of the abdominal procedure and the likelihood of cross contamination are important and critical when considering simultaneous CABG and noncardiac surgery.

In conclusion, simultaneous coronary artery revascularization and abdominal surgery should be considered for patients scheduled for major abdominal and other noncardiac surgeries with known or newly diagnosed IHD considered a high risk. However, careful assessment of each individual case by the respective surgical disciplines is required taking into consideration other comorbid situtaions of the patient. Further studies and experience are needed to adopt concrete criteria for selection of patients and cases suitable for simultaneous operation.

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