

Coronary artery bypass grafting in inflammatory bowel disease: two case reports

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ABSTRACT

The administration of coronary artery bypass grafting for coronary artery disease with inflammatory bowel disease has been rarely reported. Patients with inflammatory bowel disease have an increased risk for thrombotic events. Also, inflammatory bowel disease is seen in the protein-losing enteropathy and development of heparin resistance is associated with a deficiency of antithrombin III. In this article, we present two cases with ulcerative colitis and Crohn's disease who underwent off-pump coronary artery bypass grafting.

Keywords: Beating heart; Crohn's disease; inflammatory bowel disease; ulcerative colitis.

Inflammatory bowel disease (IBD) is an inflammatory condition which predominately affects the gastrointestinal tract; however it can also affect any organ outside the gastrointestinal system.^[1] Crohn's disease (CD) and ulcerative colitis (UC) are the two major forms of IBD. Clinically, IBD is characterized by multiple relapses and remissions with an unknown etiology. However, several evidences suggest that gut tissue injury is the result of an abnormal immune response and involves multiple non immune cellular systems, including intestinal microvascular endothelial cells.^[1] Patients with IBD have also an increased risk for coagulation disorders, such as protein-losing enteropathy, and development of heparin resistance is associated with a deficiency of antithrombin-III (AT-III). Thus, we believe that the off-pump (beating heart) coronary artery bypass grafting (CABG) is more appropriate for coroner bypass surgery in these patients. In this article, we report two IBD cases who underwent CABG surgery with off-pump technique.

CASE REPORT

Case 1– A 71-year-old male patient was admitted to our cardiology department with a complaint of acute chest pain. The patient underwent coronary angiography which revealed total occlusion of the left anterior descending (LAD) artery, 80% stenosis in the first diagonal branch (D1), and 80% proximal stenosis of the right coronary artery (RCA). The patient was referred to our clinic for CABG surgery. A year earlier, the patient was diagnosed with CD. The patient was under follow-up and recently the CD disease

was in remission. Physical examination and routine laboratory test results were normal. The patient was consulted to the gastroenterology department. Surgery was advised to the patient. He was informed about the procedure and a written informed consent was taken for surgery. With off-pump technique, a three-vessel CABG surgery was performed: left internal mammary artery (LIMA) to the LAD and saphenous vein as a graft to the D1 and RCA arteries. Thoracic drainage fluid in the postoperative period was 420 mL. No postoperative complication was seen and the patient was discharged uneventfully.

Case 2– A 71-year-old male patient was admitted to our emergency department with acute myocardial infarction. The patient was referred to the cardiology department for coronary angiography. Coronary angiography demonstrated triple-vessel disease and the patient was referred to our clinic for CABG surgery. The patient had a diagnosis of UC 10 years ago. The patient was under follow-up and recently the UC disease was in remission. Physical examination and routine laboratory test results were normal. Coronary angiography revealed 90% stenosis of the LAD artery, 80% stenosis in the first obtuse margin branch (OM1), and total occlusion of the RCA. The patient was

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consulted to the gastroenterology department. Surgery was advised to the patient. He was informed about the procedure and a written informed consent was taken for surgery. With off-pump technique, a three-vessel CABG surgery was performed: LIMA to the LAD and saphenous vein as a graft to OM1 and RCA arteries. Thoracic drainage in the postoperative period was 350 mL. No postoperative complication was seen and the patient was discharged uneventfully.

DISCUSSION

Inflammatory bowel disease encompasses two different but interrelated disorders: UC and CD. Ulcerative colitis is characterized by superficial inflammation which begins in the rectum and extends proximally along the colon.^[2] Crohn's disease is characterized by transmural patchy inflammation and can involve any region of the gastrointestinal tract from the mouth to the anus.^[2] Inflammation has a fundamental role in the development and progression of endothelial dysfunction. Endothelial dysfunction has been shown to be associated with reduced nitric oxide and increased oxidative stress and it has been described in patients with different inflammatory conditions.^[3]

Recently, it has become increasingly evident that chronic systemic inflammation plays a critical role in the pathogenesis of atherosclerosis and many studies have suggested a positive correlation between IBD and the occurrence of ischemic heart disease (IHD). Multiple inflammatory mediators such as C-reactive protein, interleukin-6, tumor necrosis factor- α (TNF- α), matrix metalloproteinases-2 and 9 are associated with the increased incidence of IHD. In addition, some subclinical atherosclerosis markers such as increased carotid artery intimal medial thickness, increased arterial stiffness, and increased carotid-femoral pulse wave velocity and insulin resistance are higher in prevalence in patients with IBD independent of traditional IHD risk factors, which may suggest a rapid progression of atherosclerosis in this population.^[4]

Conventional CABG performed using cardioplegic arrest and cardiopulmonary bypass is well-defined in the literature. On-pump CABG is associated with higher cardiac, pulmonary, renal, neurological, bleeding, and other systemic complications. Thus, off-pump CABG has gained an increased interest since 1990s as a strategy to prevent complications in high-risk patients, particularly. The main merit of off-pump CABG is the elimination of the many inflammatory

insults associated with the use of the extracorporeal circuit and the ischemia-reperfusion injury associated with cardioplegic arrest and non-physiological flow.^[5]

Heparin resistance is defined as activated clotting time <400 second after full-dose heparinization for open heart surgery.^[6] Antithrombin-III and alpha1-antitrypsin are the main inhibitors of the coagulation system. The plasma levels of these proteins decrease in protein-losing enteropathy, such as IBD. The loss of these two main coagulation system inhibitors can, thus, lead to thrombotic complications in patients with IBD.^[6] We believe that off-pump CABG is a more appropriate option for these patients, as on-pump CABG requires anticoagulation due to extracorporeal circulation which necessitates high-dose heparin. Herein, both of our patients were operated with off-pump technique successfully.

In conclusion, patients with chronic inflammatory bowel disease are at high risk for cardiovascular morbidity and mortality. Management of these patients undergoing open heart surgery can be more troublesome associated with coagulation disorders and these patients are also at high risk for on-pump technique. Therefore, we believe that beating heart technique is a more appropriate option for this patient population.

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