Perioperative Intra-Aortic Balloon Pumping and Staged Coronary Intervention for a Patient with Concurrent Coronary Artery Disease and Cancer

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Coronary artery disease and cancer may sometimes co-exist in elderly patients. Patients with multi-vessel coronary artery disease are at an increased risk of cardiac complications during and after major non-cardiac surgery.1 Therefore, revascularization is recommended before non-emergent surgeries. However, prompt attention to the cancer is desirable, and treatment strategy for these patients is always an issue. We report a case of effective IABP use in an elderly patient with multi-vessel coronary artery disease, and recent myocardial infarction with gastric cancer.

Key Words: Drug eluting stent • Intra-aortic balloon pumping • Non-cardiac surgery • Percutaneous coronary intervention • Perioperative

INTRODUCTION

Coronary artery disease and cancer may sometimes co-exist in elderly patients. Patients with multi-vessel coronary artery disease are at an increased risk of cardiac complications during and after major non-cardiac surgery.1 Therefore, revascularization is recommended before non-emergent surgeries. However, prompt attention to the cancer is desirable, and treatment strategy for these patients is always an issue. We report a case of effective IABP use in an elderly patient with multi-vessel coronary artery disease, and recent myocardial infarction with gastric cancer.

CASE REPORT

A 79-year-old woman with exertional chest pain was admitted to our facility due to sudden onset of strong, sustained chest pain. An electrocardiogram showed acute myocardial infarction of the anterior wall (Figure 1). Emergent coronary artery angiography (CAG) revealed a complete occlusion in the mid portion of the left anterior descending coronary artery with chronic total occlusion of the right coronary artery (Rentrop III collateral from the left circumflex artery), and 99% stenosis in the left circumflex artery (Figure 2). Percutaneous coronary intervention (PCI) was performed immediately to the left anterior descending coronary artery, which was successfully revascularized using a bare metal stent (3.0 × 23 mm MULTI-LINK VISION™, Abbott Vascular) (Figure 2). Maximum Creatine Kinase was 2487 IU/L, and the patient developed mild heart failure as a result. After the intervention, it was discovered that she had been previously diagnosed with an early gastric cancer, which would have required surgery at a different hospital. Although the patient’s heart failure was successfully treated by diuretics, her left ventricular ejection fraction dropped to 40%, and...
the patient had frequent chest symptoms with mild exertion (Canadian Cardiovascular Society Angina Classification Class 3).

A gastrectomy was planned one month after the myocardial infarction. The perioperative use of IABP was selected. It was inserted via the right femoral artery just before the operation. Two hours after the surgery, 300 unit/hour of dalteparin sodium was given intravenously until the IABP was removed at 30 hours post-op. The patient remained stable during and after the operation. She recovered successfully and right coronary artery PCI was performed two weeks after the gastrectomy, using DES (Cypher®, Cordis Corp.). DES implantation to the left circumflex coronary artery was also performed two months after hospital discharge. There was no restenosis at the one year follow up, and left ventriculography showed improved wall motion.

DISCUSSION

Myocardial ischemia and perioperative myocardial infarction are the most frequent causes of major morbidity and mortality in patients with ischemic heart disease undergoing non-cardiac surgery. To reduce the risk of non-cardiac surgery in patients with multi-vessel coronary artery disease, revascularization is recommended by either bypass surgery or PCI. However both therapies have certain problems. Bypass surgery is an invasive therapy, and recovery can take time. Physically stronger patients usually have superior surgical outcomes, so debilitated patients may encounter more dif-

Figure 1. (A) Chest X-ray on admission: the cardiothoracic ratio was increased (68%) with pulmonary congestion. (B) Electrocardiography: right bundle branch block and ST elevation in V2–V4.

Figure 2. Coronary angiography on admission: (A) Right coronary artery: chronic total occlusion from segment 1 with bridge collateral. (B) Left coronary artery (right anterior oblique cranial view): total occlusion with thrombus from segment 7 (white arrow). (C) Left coronary artery: 99% stenosis in segment 13 (white arrow). (D) Bare metal stent implantation was performed after thrombus aspiration (3.0 × 23 mm MULTI-LINK VISIONTM, Abbott Vascular).
ficulties with consecutive cardiac and non-cardiac surgeries. Moreover, disease progression may occur while patients wait to recover from the first cardiac surgery, especially cancer patients. On the other hand, PCI requires anti-platelet therapy after the intervention to prevent thrombosis. Although DES reduce restenosis, termination of anti-platelet therapy is not recommended for stent thrombosis for at least 12 months. BMS use may allow patients to stop the medicine earlier, but it causes restenosis at a higher rate compared to DES, and still requires some course of anti-platelet therapy. Balloon angioplasty entails a shorter term of medication, but the restenosis rate is much higher. And overall, repetitive interventions may injure the kidneys, and intervention itself does have risks.

IABP will increase the diastolic aortic pressure and augment diastolic coronary artery flow. In systole, IABP reduces aortic root pressure and afterload of left ventricle. Theoretically, it would both help patients with coronary artery disease, as well as those with impaired left ventricular function.

Our patient had impaired wall motion of the LAD area and other vessels had severe stenosis or total occlusion. Revascularization before operation was desirable, but she was a feeble and elderly woman, who seemed at great risk from consecutive operations. We considered PCI before the surgery, but treating a chronic total occlusion and small vessels with balloon angioplasty or BMS would create a high probability of restenosis. We were also concerned about provoking gastric cancer bleeding by prolonged anti-platelet therapy. Therefore, we chose IABP for perioperative coronary flow support and afterload reduction with a successful outcome.

While perioperative pharmacological treatments with β-blockers, statins, and angiotensin-converting enzyme inhibitors are recommended for risk reduction, the loading period can take valuable time. Unlike these drugs, IABP can be prepared on the day of the surgery. IABP can also increase diastolic pressure and eventually diastolic coronary flow.

Perera et al. reported that elective IABP support during high risk PCI did not reduce the incidence of major cardiac events. However, patients undergoing major non-cardiac surgery may receive some benefit. During surgery, general anesthesia, as well as the invasive nature of the surgery itself, may induce hemo-
dynamic instability. In fact, data from six randomized controlled trials suggests that perioperative IABP use has a beneficial effect for high risk patients undergoing coronary artery bypass surgeries. Although more data accumulation is still needed, patients designated as significantly high risk are likely to receive some benefit from perioperative IABP.

Perioperative IABP use still has several issues to be resolved, such as the proper length of IABP use, and the anticoagulant therapy in conjunction with IABP. Longer application of IABP may be beneficial for hemodynamics. However, due to the major complications, such as infection, thrombosis, bleeding, and limb ischemia, quick removal of the IABP is recommended as soon as hemodynamic stability is confirmed. The risk of thrombosis can be reduced by using anticoagulant drugs, however perioperative bleeding may increase. Careful monitoring, short life anticoagulants should be considered, while prompt drug reversal is necessary, when major bleeding is identified.

Previous studies have reported similar IABP use as in our case. However, these patients will need to undergo coronary artery bypass surgery or frequent PCI after the non-cardiac surgery. Development of PCI has significantly reduced restenosis after interventions for small vessels as well as complex lesions. Successful interventions by DES may expand the utility of IABP for patients with severe coronary artery disease, where non-cardiac surgery is part of a strategy of rapid treatment.

REFERENCES
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