

Letter to the Editor: Concomitant Off-Pump Coronary Artery Bypass Grafting and Thymectomy

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Thymoma in patients with coronary disease is rare. Although simultaneously performing a cardiac procedure and thymectomy for patients with combined thymoma and cardiac disease has been reported, a clear consensus regarding the optimal surgical treatment is lacking. Moreover, in all of the previously reported cases, the surgical intervention and standard cardiopulmonary bypass were performed simultaneously. We present the case of a patient who underwent combined off-pump coronary artery bypass grafting (CABG) and thymectomy. We show that this combined procedure is the treatment of choice for patients with a severely ischemic myocardium and a malignant thymoma.

A 76-year-old Taiwanese man had a history of ptosis and exhaustion of 1 year's duration. Because of the exacerbation of the symptoms in the last few months before the study, he visited our clinic. He received a diagnosis of ocular myasthenia gravis (MG). A subsequent computed tomography scan of the chest revealed a tumor of approximately $9 \times 5 \times 2$ cm located in the anterior mediastinum (Figure). He was admitted to our ward for a surgical intervention. He had been under medical treatment for benign prostate hyperplasia and had a history of coronary artery disease. A preoperative myocardial scintigram identified moderate to severe myocardial ischemia in the left anterior descending (LAD) branch of the coronary artery. The coronary angiography results revealed single-vessel disease with 50% stenosis of the LAD branch of the coronary artery (Figure).

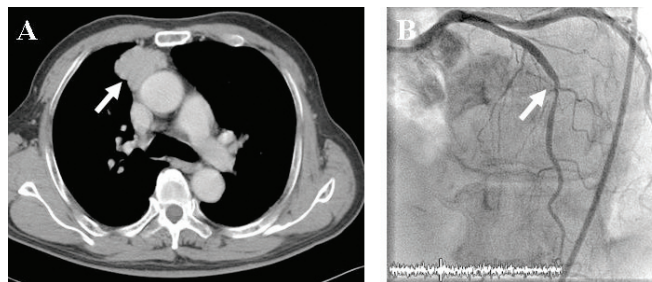
A routine median sternotomy was performed during the hospitalization. The anterior mediastinum was filled with a hard, irregular mass of $9 \times 5 \times 2$ cm that had infiltrated the underlying right upper lobe of the lung and pleura. A thymectomy and a wedge resection of the right upper lobe of the lung were carried out, and all thymic tissue was removed. We also walled the tumor off during the resection to avoid hematogenous metastasis. We then harvested the left internal

mammary artery (LIMA) for conduits. Off-pump CABG was subsequently performed (the LIMA graft was anastomosed to the LAD artery).

Histologic examination of the excised mass revealed an invasive thymoma, type B2, which is characterized by scattered plump epithelial cells with vesicular nuclei and distinct nucleoli among a large population of lymphocytes. In addition, small foci of tumor emboli that presented as a lymphovascular invasion were observed in the surrounding tumor portion.

We have presented the case of this patient with 2 major disorders: (1) coronary artery disease with single-vessel disease and 50% stenosis of the LAD artery, and (2) ocular MG with malignant thymoma. If angioplasty had been performed, the patient would need to take antiplatelet medicine, and the thymectomy would not be performed because of the risk of bleeding. If the patient did not take antiplatelet medicine, thrombus would form progressively, and coronary artery disease would recur. Furthermore, according to the long-term patency of the coronary artery, stenting is not better than CABG. Besides, our patient's initial diagnosis was possibly invasive thymoma; hence, a video-assisted thoracoscopic surgery or a ministernotomy thymectomy could not be performed completely. Therefore, we suggested that the patient undergo the CABG and thymectomy simultaneously. Combined CABG and thymectomy were also successful in a previous case described by Al-Smady et al [2009].

Previous groups have performed the same surgical procedure via an on-pump technique; however, we believe that



A, Computed tomography scan of the chest showing a tumor of approximately $9 \times 5 \times 2$ cm located in the anterior mediastinum (arrow). B, Coronary angiogram showing 50% stenosis of the left anterior descending artery (arrow).

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because of the risk of surgical stress, off-pump CABG seems a better option than conventional on-pump CABG. Furthermore, many authors have shown that off-pump coronary revascularization not only reduces activation of the inflammatory mediators but also reduces morbidity, compared with on-pump surgery [Ascione 2000]. Moreover, most studies have shown the following similar trends: reduced blood loss and need for transfusion, a reduced myocardial enzyme release up to 24 hours, a reduced risk of early neurocognitive dysfunction, and the lower likelihood of renal insufficiency after an off-pump CABG [Sellke 2005].

Invasive thymomas frequently infiltrate the neighboring organs in the mediastinal pleura, including the lungs, pericardium, great vessels, and the heart [Amirghofran 2009]. A previous study reported the rate of hematogenous metastasis in a patient with thymoma [Kondo 2003]. Our case was of an invasive stage III thymoma infiltrating the underlying right upper lobe of the lung and pleura. Therefore, concomitant off-pump CABG and thymectomy may be a better choice in cases of patients with an invasive thymoma and may also help to avoid hematogenous metastasis induced by cardiopulmonary bypass. Thymectomy is also effective for ocular MG; a previous study [Roberts 2001] found that 70% of patients experienced cure or improvement. In our case, the patient's ocular MG improved but was not cured. Postoperative radiotherapy is suggested for invasive thymic tumor [NCCN 2009]; therefore, our patient received radiotherapy 1 month after his recovery from the surgery. No recurrence has yet been found.

Cases of successful combined off-pump cardiac procedures and thymectomy are extremely rare. Nevertheless, we consider the combined procedure to be safe and surgically feasible. Furthermore, the combined procedure may reduce the operative risk of 2 separate interventions and thus help avoid hematogenous metastasis induced by cardiopulmonary bypass.

Moreover, beating-heart surgery for coronary artery disease has numerous benefits, as mentioned above, and we suggest that the concomitant operations of beating-heart CABG and thymectomy is a better treatment modality. In our case, the procedure was successful. After a 1-year follow-up, the patient has fully recovered, and no recurrence has been noted. In conclusion, combined off-pump CABG and thymectomy may be a good choice of treatment for such patients.

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