

Lung Resection Combined with Percutaneous Coronary Intervention Using Cypher Stents: A Case Report

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Treatment of concomitant severe coronary artery disease and lung cancer is a complicated issue. The present study describes a case of a 65-year-old man with coronary artery disease and primary lung cancer that was successfully treated with lung resection and percutaneous coronary intervention (PCI) using Cypher stents. Prior to lung resection, the patient underwent a PCI for diffuse stenosis of the right coronary artery and the circumflex artery. Cypher stents were deployed for both lesions. Five days after stent implantation, a right lower lobectomy was performed successfully. To the best of our knowledge, this is the first report of lung resection and PCI using Cypher stents. (Ann Thorac Cardiovasc Surg 2007; 13: 56–9)

Key words: lung cancer, percutaneous coronary intervention, drug-eluting stent, Cypher stent

Introduction

Treatment of patients with concomitant lung malignancy and severe ischemic heart disease is a challenging issue. Previous groups have utilized lung resection combined with conventional coronary artery bypass grafting (CABG) under cardiopulmonary bypass (CPB) or off-pump CABG.^{1–3} However, use of CABG increases operative time, pulmonary complications, and the duration of hospitalization. While percutaneous coronary intervention (PCI) may provide a safer option, the procedure is limited by various complications. These include late luminal loss, binary restenosis, and the need for repeat revascularization.

Local drug-eluting stents (DESs) have been utilized to reduce the development of neointimal hyperplasia and restenosis following PCI. To date, 2 polymer-coated DES, the Cypher (sirolimus-eluting) stent (Cordis, Miami

Lakes, Fla., USA) and the Taxus (paclitaxel-eluting) stent have become commercially available.^{4,5} The present study describes a case of a 65-year-old man with coronary artery disease and primary lung cancer that was successfully treated by combined lung resection and PCI using Cypher stents.

Case Report

A 65-year-old man with a history of hypertension, hypercholesterolemia, type 2 diabetes, and angina underwent a chest computed tomography (CT) for a health check-up. This revealed a 4.0-cm noncalcified lesion in the right lower lobe without hilar or mediastinal adenopathy (Figs. 1A and 1B). Serum tumor markers were normal. Transbronchial brushings were performed under fluoroscopy, and cytologic evaluation revealed malignant cells. Preoperative evaluation with coronary angiography revealed a long 99% stenosis at segments 2 and 3 of the right coronary artery, 99% stenosis of the posterior descending artery, and total occlusion of the circumflex artery at segment 13 (Fig. 2). Although there were good collateral vessels from the left anterior descending artery, the left anterior descending coronary artery itself has a 50% stenosis at segment 7. Perioperative coronary risk was estimated as high, and PCI was scheduled prior to

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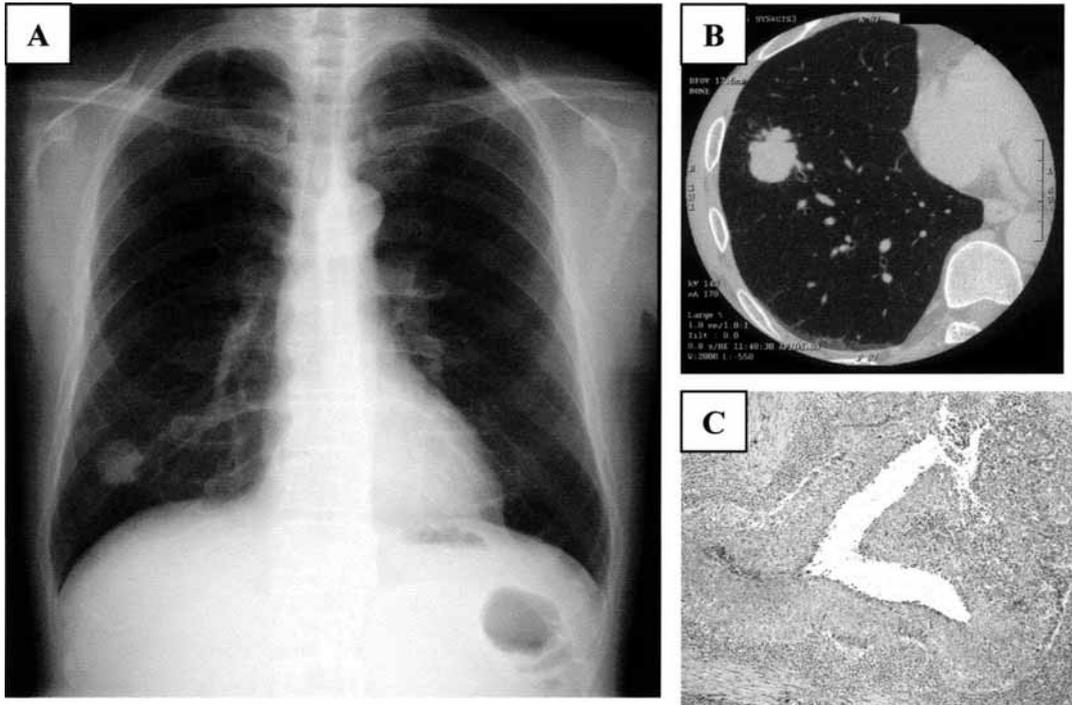


Fig. 1.

A, B: Chest radiograph and computed tomography demonstrated a noncalcified lesion in the right lower lobe.

C: Microscopic examination revealed that the tumor was a papillary adenocarcinoma.

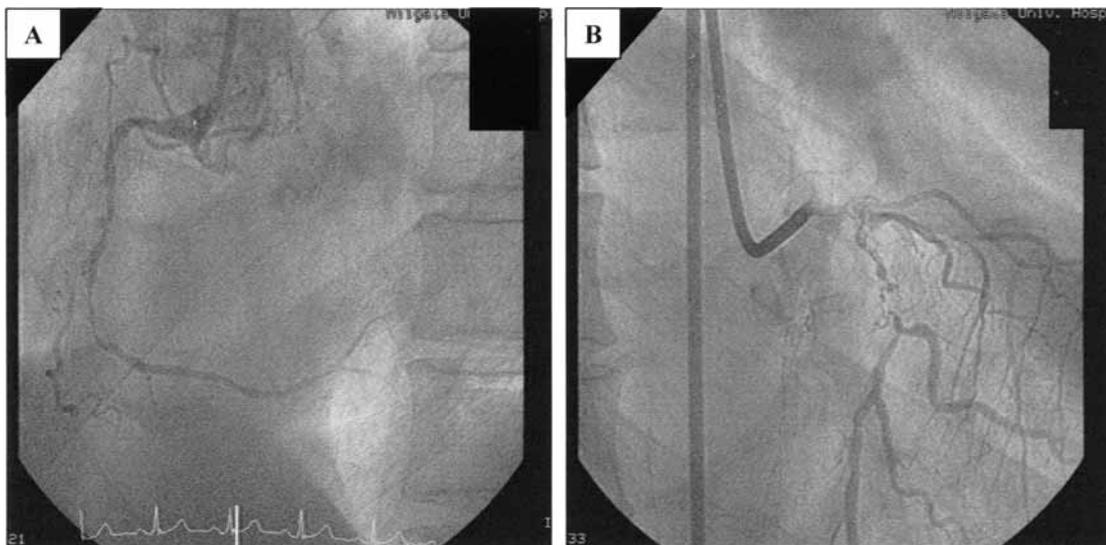


Fig. 2. Coronary angiography showed a long 99% stenosis of the right coronary artery at segments 2 and 3, a 99% stenosis at segment 4PD (**A**), and total occlusion of circumflex artery (**B**).

lung resection.

The patient underwent an intravascular ultrasound-guided PCI for diffuse stenosis of the right coronary artery and occlusion of segment 13 of the circumflex artery.

After balloon angioplasty of the right coronary artery lesion and the ostium of segment 13 of the circumflex artery, a 2.5/18.0-mm Cypher stent was deployed in the distal right coronary artery, and a second 2.5/28.0-

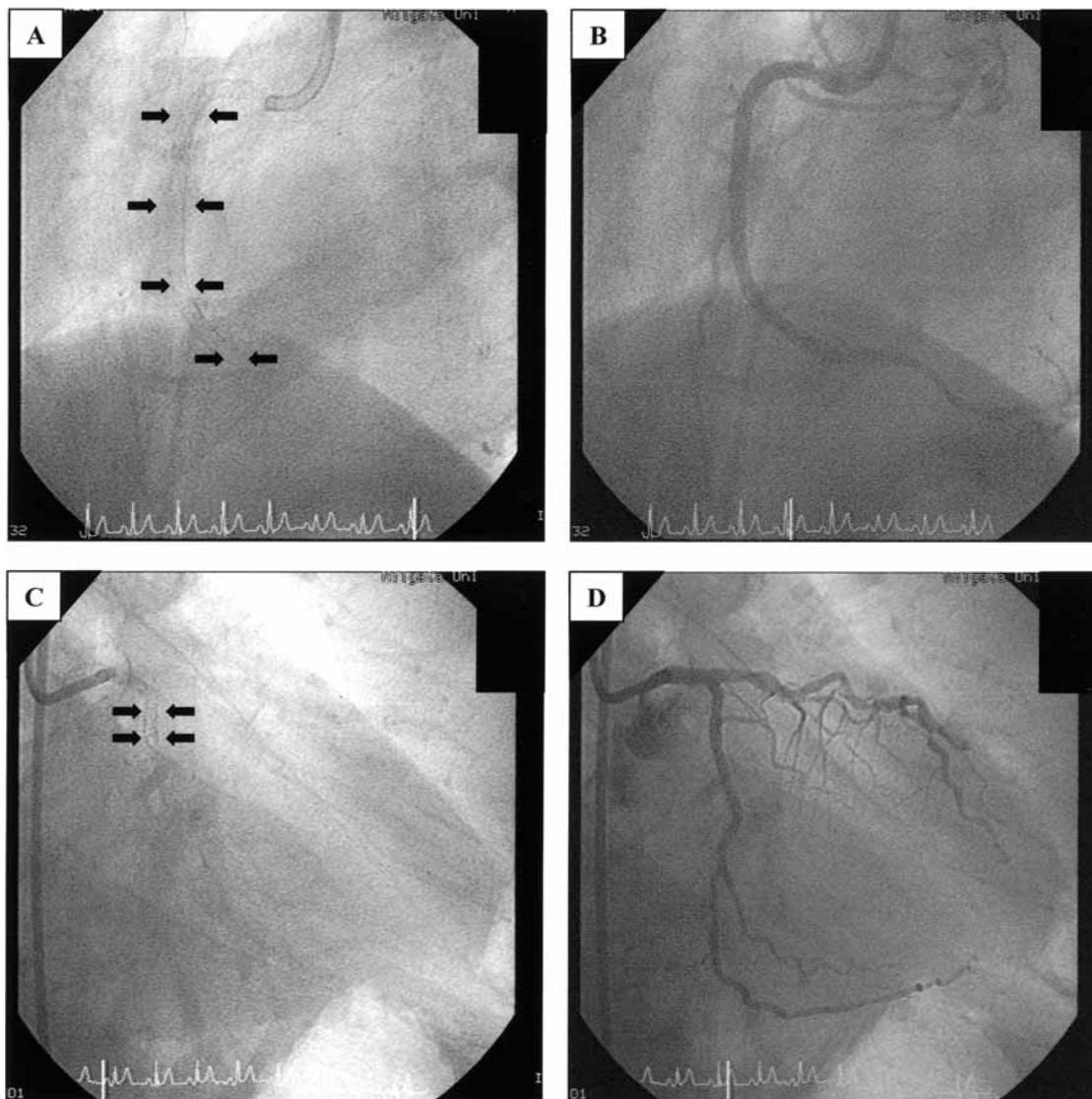


Fig. 3. After implantation of Cypher stents, coronary angiography revealed no evidence of stenosis. Arrows, cypher stents in (A) and (C).

mm Cypher stent was deployed in the mid-right coronary artery. A third 2.5/23.0-mm Cypher stent was deployed in the proximal-right coronary artery (Fig. 3A). Another stent was placed in segment 13 of the circumflex artery (Fig. 3C). Angiography at that time showed well apposed struts throughout the entire stented segment without identifiable gaps between the stents (Figs. 3A–D).

Five days after stent implantation, a right lower lobectomy was performed with hilar and mediastinal lymph node dissection under antiplatelet medications. Hemodynamics were stable during surgery, and there were no perioperative coronary events. In spite of continuing

antiplatelet medication, there was no bleeding tendency, and hemostasis was achieved in a routine manner. The postoperative course was uneventful. Pathological examination of the lung nodule revealed a papillary adenocarcinoma (Fig. 1C). The patient was diagnosed as pT2N0M0, stage IB. There has been no evidence of restenosis at clinical and angiographic follow-up at 9 months.

Discussion

The DES is a novel device that has been used to prevent the development of neointimal hyperplasia and restenosis

following PCI.^{3,4)} This new technology is attractive in that it provides an alternative to invasive conventional CABG or off-pump CABG for the patient with concomitant coronary artery disease and lung cancer,^{2,3)} particularly when it is not possible to perform both operations from the same thoracotomy site. For example, median sternotomy provides an adequate view for off-pump CABG but not for lower lobe resection.

PCI with Cypher stents requires the use of antiplatelet agents following PCI to prevent occlusion of the implanted stents. Combined therapy with clopidogrel (or alternatively, ticlopidine), in addition to aspirin, is the current standard of care after PCI with stent implantation. Aspirin is continued indefinitely after the procedure, while clopidogrel is continued for at least 3 months. Although major surgery is not recommended for the patients receiving antiplatelet agents, it is not practical to postpone the surgery in a patient with an aggressive malignancy. Therefore, we performed lung resection in the present patient within a week of PCI. Despite the antiplatelet therapy, there was no bleeding complication, and intercostal block was employed for postoperative pain control rather than using an epidural catheter. To the best of our knowledge, this may be the first report of successful lung resection and PCI using Cypher stents for patients with concomitant lung cancer and ischemic heart disease. This strategy may represent an alternative to lung resec-

tion combined with CABG in selected patients with severe coronary artery disease and lung malignancy. Although implantation of the Cypher stent is associated with a low incidence of clinical events and a very low percentage of angiographic restenosis, long-term patency should be monitored to warrant this strategy.

References

1. Rao V, Todd TR, Weisel RD, et al. Results of combined pulmonary resection and cardiac operation. *Ann Thorac Surg* 1996; **62**: 342–7.
2. Mariani MA, van Boven WJ, Duurkens VA, Ernst SM, van Swieten HA. Combined off-pump coronary surgery and right lung resections through midline sternotomy. *Ann Thorac Surg* 2001; **71**: 1343–4.
3. Ahmed AA, Sarsam MA. Off-pump combined coronary artery bypass grafting and left upper lobectomy through left posterolateral thoracotomy. *Ann Thorac Surg* 2001; **71**: 2016–8.
4. Stone GW, Ellis SG, Cannon L, et al. Comparison of a polymer-based paclitaxel-eluting stent with a bare metal stent in patients with complex coronary artery disease: a randomized controlled trial. *JAMA* 2005; **294**: 1215–23.
5. Kastrati A, Dibra A, Eberle S, et al. Sirolimus-eluting stents vs paclitaxel-eluting stents in patients with coronary artery disease: meta-analysis of randomized trials. *JAMA* 2005; **294**: 819–25.