

CASE REPORT

Concomitant Heart Surgery with Pulmonary Hamartoma Resection: A Case Report

Eş Zamanlı Kalp Cerrahisi ve Pulmoner Hamartom Rezeksiyonu: Olgu Sunumu

¹Atilla Orhan , ²Ömer Tanyeli , ²Niyazi Görmüş 

¹Selçuk University, Faculty of Medicine, Dept. of Cardiovascular Surgery
²Necmettin Erbakan University, Faculty of Medicine, Dept. of Cardiovascular Surgery

Correspondence

Atilla Orhan, Selçuk University, Faculty of Medicine, Dept. of Cardiovascular Surgery, Selçuklu, Konya / Türkiye

E-Mail: atillaorhan@gmail.com

How to cite ?

Orhan A. , Tanyeli Ö. , Görmüş N. Concomitant Heart Surgery With Pulmonary Hamartoma Resection. Genel Tıp Dergisi. 2022; 32(5): 624-626

ABSTRACT

Concomitant lesions of the heart and lung are rare, but when present, they pose a therapeutic challenge to surgeons. A combined procedure clears the need for a second major procedure, improving outcomes and providing economic benefits. However, cardiopulmonary bypass may adversely affect the natural history of pulmonary masses when malignancy is suspected. To avoid these suspects, off-pump techniques may be preferred in suitable patients.

This article presents a case of simultaneous off-pump coronary artery bypass grafting and pulmonary hamartoma resection in a 53-year-old man who detected a lung mass during preoperative preparation.

Keywords: coronary artery bypass grafting, hamartoma, off-pump

ÖZ

Kalp ve akciğerin eşlik eden lezyonları nadirdir, ancak mevcut olduklarında cerrahlar için terapötik bir zorluk oluştururlar. Kombine bir prosedür, sonuçları iyileştirerek ve ekonomik faydalar sağlayarak ikinci bir ana prosedüre olan ihtiyacı ortadan kaldırır. Ancak kardiyopulmoner baypas, maligniteden şüphelenildiğinde pulmoner kitlelerin doğal seyrini olumsuz etkileyebilir. Bu şüphelerin önüne geçmek için uygun hastalarda off-pump teknikler tercih edilebilir. Bu makalede preoperatif hazırlık sırasında akciğerde kitle tespit edilen 53 yaşındaki erkekte eş zamanlı off-pump koroner arter baypas greftleme ve pulmoner hamartom rezeksiyonu yaptığımız bir olguyu sunuyoruz.

Anahtar Kelimeler: hamartom, koroner baypas, off-pump

Introduction

Patients who require both open heart surgery and lung resection because of a suspected lung mass and heart disease are a matter of debate among surgeons (1). However, most surgeons prefer simultaneous intervention due to acceptable results and low-cost (2). Among the factors forcing them to attempt a simultaneous intervention is a belief that the surgeons cannot afford two separate procedures due to the patient's advanced age and frailty (1, 2). Another factor is the concern that an open-heart operation to be performed at the first stage in a staged procedure will cause the spread of possible lung malignancy (2). Nevertheless, simultaneous cardiac revascularization and lung resections have been performed safely for five decades (3, 4).

Before planned cardiac surgery, pulmonary masses are rarely recognized and pose a therapeutic challenge for surgeons (1, 5). Pulmonary chondromatous hamartomas are the most common benign lung tumors. These hamartomas account for 8% of all pulmonary neoplasms (6). These neoplasms are developmental malformations arising from the peribronchial mesenchyme (1, 2, 7, 8).

Heart surgeries can be performed with (on-pump)

or without (off-pump) cardiopulmonary bypass (CPB). The on-pump technique is a standard technique. The off-pump technique is well-known and widely used in coronary revascularization, especially in patients with low ejection fraction and severe left ventricular dysfunction (1, 2, 9). In patients requiring both lung resection and coronary revascularization, surgeons are concerned that CPB may cause mass metastasis. Therefore, the off-pump technique is preferred when suitable in such cases (1, 2).

This report aims to present our experience with concomitant off-pump coronary revascularization and pulmonary chondromatous hamartoma resection and discuss its benefit and safety.

Case Report

A 53-year-old man, diabetic and hypertensive for eight years, was admitted with unstable angina to the hospital. He had a 35-pack-year smoking history, had a history of an acute cerebrovascular accident a year ago, and his brother had died of myocardial infarction. On physical examination, the cardiovascular system examination was normal; however, there were signs and symptoms of chronic obstructive pulmonary disease.

Electrocardiography revealed subacute posteroinferior myocardial infarction. The x-ray revealed a well-circumscribed lesion in the left lung. A computerized chest tomography confirmed this finding (Figure 1). Coronary angiography showed three-vessel disease with severe left ventricular dysfunction.

We preferred off-pump coronary artery revascularization and simultaneous left lung mass resection technique because the patient had three-vessel disease with low left ventricle ejection fraction, lung mass, decreased respiratory function, and a history of cerebrovascular accident. In operation, firstly, the left internal mammary artery was harvested after median sternotomy. Secondly, a well-circumscribed mass of 3x3x2 cm was completely resected before systemic heparinization (Figure 2a). Finally, off-pump three-vessel coronary revascularization was performed. No postoperative complications were observed, and the patient was discharged on the sixth postoperative day.

The histopathology was pulmonary chondromatous hamartoma. Microscopically, the tumor tissue contained crypts of mature cartilage and clefts surrounded by respiratory epithelium. There was no sign of malignancy (Figure 2b).



Figure 1: Computerized chest tomography showing a well-circumscribed mass at the superior segment of the lingula (white arrow).

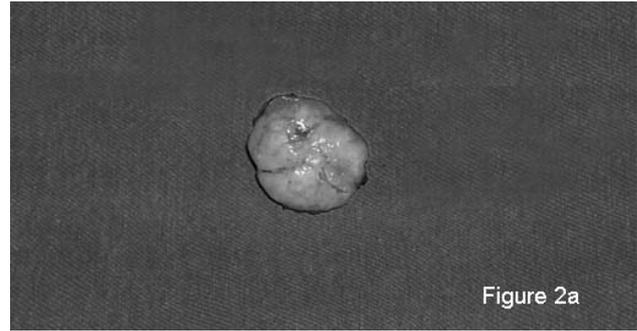


Figure 2a: Macroscopic view of the resected mass.

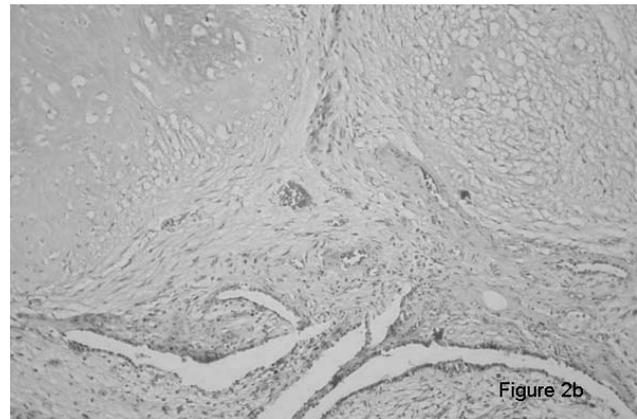


Figure 2b: Histopathological view showing mature cartilage islands and clefts surrounded by normal respiratory epithelium. These findings were regarded as the diagnosis of hamartoma under the light microscope (x10, hematoxylin-eosine-staining).

Discussion

Co-morbidities of the heart and lungs that require surgery are rare. However, most of these patients demonstrate cardiac complaints. Lung lesions are detected incidentally during preoperative examinations, as in our case (1, 2). While some surgeons prefer stepwise procedures in these patients, others prefer concomitant surgical intervention (1, 2). In coronary revascularization, surgeons use both on-pump and off-pump techniques. Considering the results, such as postoperative morbidity, mortality, and long-term survival, it is evident that the treatment option should be specific to the patient and the disease. Both techniques have advantages and disadvantages.

In on-pump coronary revascularization, patients are at risk of bleeding, which is an important cause of postoperative morbidity. In addition, the on-pump technique has disadvantages such as the potential to affect immunity, the concern of spreading the tumor, and shortening long-term survival. Most surgeons believe performing tumor resection before CPB will yield better results (1, 2, 10, 11). For these reasons, off-pump revascularization is preferred in appropriate cases. We chose this technique in our case because of its convenience. In addition, because off-pump revascularization is a technique that significantly

reduces the postoperative bleeding and needs for transfusion, it also protects the patient from the side effects of CPB, such as pulmonary dysfunction (1, 9).

Median sternotomy is the preferred approach in simultaneous heart and lung surgery. The exception to this technique is the left lower pulmonary lobectomy. Median sternotomy causes fewer complications than other techniques, and pulmonary functions are better tolerated in the postoperative period (1, 2, 10, 11).

We resected the left lung mass before systemic heparin was administered. We believe removing the lung mass and controlling bleeding before heparinization will reduce complications. Most surgeons prefer systemic heparinization after mass resection (2, 12).

Some surgeons argue against concomitant surgery. Instead, they advocate the step-by-step procedure (1, 2). The reason for their preference is the patient's age and general condition, size and location of the tumor, cardiac surgery strategy, and malignant or benign nature of the tumor (1, 2, 8). Therefore, this debate among surgeons continues. Unfortunately, there are few studies on both concomitant and step-by-step surgery. Furthermore, due to the lack of controlled randomized studies, there is no consensus yet on which method should be preferred (13, 14).

In our case, histopathological findings showed benign pulmonary chondromatous hamartoma. Pulmonary hamartomas are well-circumscribed and benign masses in the lung parenchyma. Most of these tumors are of parenchymal origin (15).

They are often detected incidentally by computerized chest tomography performed in patients presenting with cardiac complaints. We believe that simultaneous surgical intervention can generally be preferred in these patients due to the difficulty of performing a preoperative biopsy in patients requiring open heart surgery. In addition, surgical resection remains the gold standard in diagnosis and treatment, as a needle-aspiration biopsy of a patient with suspected pulmonary hamartoma rarely yields diagnostic findings (2, 7).

Conclusion

Based on our experience in our case and the limited number of studies in the literature, we think that the concomitant surgical approach in treating patients with coronary revascularization and suspected lung mass is safe and carries a low risk of morbidity and mortality. However, the chosen treatment method should still be patient-specific due to the lack of controlled randomized studies.

Funding

The authors have no affiliation with any organization with a direct or indirect financial interest in the subject matter discussed in the manuscript.

Conflict of Interest

The authors have no conflict of interest.

References

- Zhang R, Wiegmann B, Fischer S, et al. Simultaneous cardiac and lung surgery for incidental solitary pulmonary nodule: learning from the past. *The Thoracic and Cardiovascular Surgeon* 2012;60(02):150-5.
- Šantavý P, Szkorupa M, Bohanes T, Lonský V. Simultaneous cardiac surgery with pulmonary resection. *Cor et Vasa* 2015;57(2):e82-e5.
- Dalton Jr ML, Parker TM, Mistrot JJ, Bricker DL. Concomitant coronary artery bypass and major noncardiac surgery. *The Journal of Thoracic and Cardiovascular Surgery* 1978;75(4):621-4.
- Girardet R, Masri Z, Lansing A. Pulmonary lesions in patients undergoing open heart surgery: approach and management. *The Journal of the Kentucky Medical Association* 1981;79(10):645-8.
- Johnson JA, Landreneau RJ, Boley TM, et al. Should pulmonary lesions be resected at the time of open heart surgery? *The American Surgeon* 1996;62(4):300-3.
- Haberal MA, Dikis OS, Erkan A. Pulmonary hamartoma: Retrospective analysis of 24 cases. *Dicle Tıp Dergisi* 2019;46(1):27-32.
- Bini A, Grazia M, Petrella F, Chittolini M. Multiple chondromatous hamartomas of the lung. *Interactive Cardiovascular and Thoracic Surgery* 2002;1(2):78-80.
- Alqahtani YA, Fallatah RZ, Alnaimi M. Incidental Benign Giant Pulmonary Chondroid Hamartoma. *Journal of Oncology Research Reviews & Reports SRC/JONRR-150 DOI: [https://doi.org/10.47363/JONRR/2021\(2\)2021;146:2-3](https://doi.org/10.47363/JONRR/2021(2)2021;146:2-3)*.
- Ueki C, Miyata H, Motomura N, et al. Off-pump versus on-pump coronary artery bypass grafting in patients with left ventricular dysfunction. *The Journal of thoracic and cardiovascular surgery* 2016;151(4):1092-8.
- Knaepen P, Van Swieten H, Vanderschueren R, Ernst J, Van den Bosch J. Concomitant open heart surgery and pulmonary resection for lung cancer. *European journal of cardio-thoracic surgery: official journal of the European Association for Cardio-thoracic Surgery* 1995;9(6):310-3; discussion 3.
- Rao V, Todd TR, Weisel RD, et al. Results of combined pulmonary resection and cardiac operation. *The Annals of thoracic surgery* 1996;62(2):342-7.
- Atılgan K, Demirdağ E, Metin B, Er ZC, Çiçekçioğlu F. A simultaneous coronary artery bypass grafting on beating heart and right upper lobectomy in a patient with a lung adenocarcinoma. *Turkish Journal of Thoracic and Cardiovascular Surgery* 2018;26(4):646.
- Tourmousoglou CE, Apostolakis E, Dougenis D. Simultaneous occurrence of coronary artery disease and lung cancer: what is the best surgical treatment strategy? *Interactive cardiovascular and thoracic surgery* 2014;19(4):673-81.
- Habal P, Simek J, Lonsky V, Novotny J. Possibilities of combined surgical treatment of lung tumours and heart diseases. *ACTA MEDICA-HRADEC KRALOVE-* 2006;49(3):175.
- Minami Y, Iijima T, Yamamoto T, et al. Diffuse pulmonary hamartoma: a case report. *Pathology-Research and Practice* 2005;200(11-12):813-6.