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Partial anomalous pulmonary venous connection detected during right pneumonectomy

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Abstract

Partial anomalous pulmonary venous connection (PAPVC) is a rare congenital anomaly. Generally, it is seen on the right side and is associated with an atrial septal defect. Herein, we present a case of a 50-year-old male patient with a supracardiac type PAPVC detected during pneumonectomy for a right hilar mass. This is the second case report in the literature presenting surgical treatment of both lung cancer and PAPVC using pneumonectomy. Thoracic surgeons should be aware of this anomaly when they are planning to perform a major lung resection. If PAPVC and lung cancer are in the same lobe, anatomical lung resections including pneumonectomy can be safely performed.

Keywords: Partial anomalous pulmonary venous connection • Anomalous pulmonary venous return • Lung cancer • Pneumonectomy

INTRODUCTION

Partial anomalous pulmonary venous connection (PAPVC) is a rare congenital anomaly. Its incidence in the general population is 0.4–0.7%. Some of the pulmonary veins drain into the right side of the heart causing a left-to-right shunt. Generally, it is seen on the right side and is associated with an atrial septal defect. PAPVC is classified into supracardiac, cardiac, infradiaphragmatic, and mixed types according to the drainage of the anomalous vein. Supracardiac is the most common type of PAPVC [1]. PAPVC is usually asymptomatic in adults and most of the time detected during thoracic surgeries for another reason such as lung cancer. We present a case of a supracardiac type PAPVC detected during pneumonectomy for a right hilar mass.

CASE REPORT

A 50-year-old male patient was referred to our clinic for a right hilar mass. His medical history was unremarkable and physical examination was normal. A thoracic computed tomography scan of the patient revealed a central mass in the right lung, measuring 3.5×4.5 cm in diameter with no enlarged mediastinal lymph nodes. Incidentally, anomalous drainage of the right superior pulmonary vein into the superior vena cava was detected (Fig. 1A–C). Bronchoscopy revealed a lesion extending from the right upper lobe bronchus to the right main bronchus. Biopsy results revealed a squamous cell carcinoma. The patient's diagnosis was a stage IIA (T2bN0M0) lung carcinoma coexisting with PAPVC. Systolic pulmonary artery pressure was measured 30 mmHg by preoperative echocardiography and no atrial septal defect was observed. A preoperative arterial blood gas sample revealed a PaO_2 of 77 mmHg and a $PaCO_2$ of 37 mmHg in room air temperature. Cardiopulmonary function tests of the patient showed a forced expiratory volume in 1 s 3.59 l, 83% of the predicted value; a carbon monoxide diffusing capacity of 80% of the predicted value and maximal oxygen consumption of 24.3 ml/kg/min. We decided to perform pneumonectomy without any additional examination, considering that resection would eliminate the existing shunt. Right thoracotomy was performed. During exploration, 3 anomalous branches of the upper lobe vein draining into the superior vena cava were seen. One branch of the upper lobe vein, middle lobe and inferior lobe veins was draining into the left atrium (Fig. 2A). All the vessels including anomalous veins were encircled with vascular tapes. The right pulmonary artery was clamped for 3 min and any signs of haemodynamic instability were checked. Two branches of the anomalous vein were divided by a mechanical stapler, the other one using a polymer clip and then the standard pneumonectomy with mediastinal lymph node dissection was performed (Fig. 2B). There were no postoperative complications. A postoperative echocardiography scan showed decreased pulmonary artery pressure and arterial blood gas values were also good (systolic pulmonary artery pressure: 25 mmHg, PaO2: 73 mmHg, PaCO2: 41 mmHg in room air, respectively). The patient was discharged on the eighth postoperative day. The pathology report of the patient showed a T2bN0M0 squamous cell carcinoma with negative surgical margins (vascular, bronchial and parenchymal), negative lymph nodes (station 4-7-8-10-11) and without lymphovascular or perineural invasion. The patient was referred to the oncology clinic for additional treatment.

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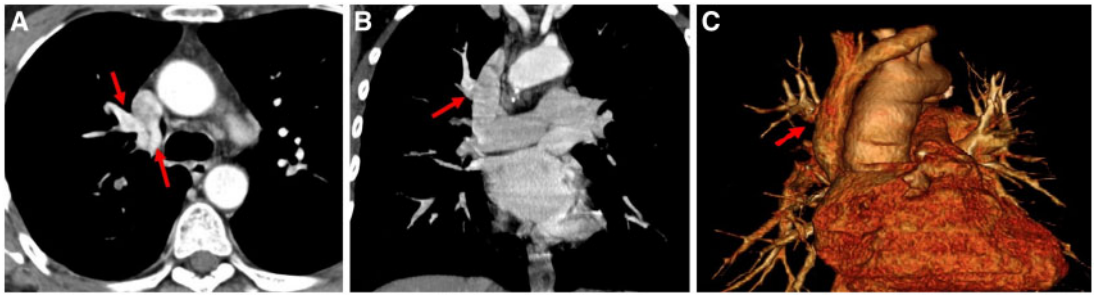


Figure 1: Axial (**A**) and coronal MIP images (**B**) represent the anomalous drainage of the right superior pulmonary vein into superior vena cava. Volume rendered image shows the right-sided supracardiac type partial anomalous pulmonary venous connection (**C**) (red arrows show partial anomalous pulmonary venous connection). MIP: maximum intensity projection.

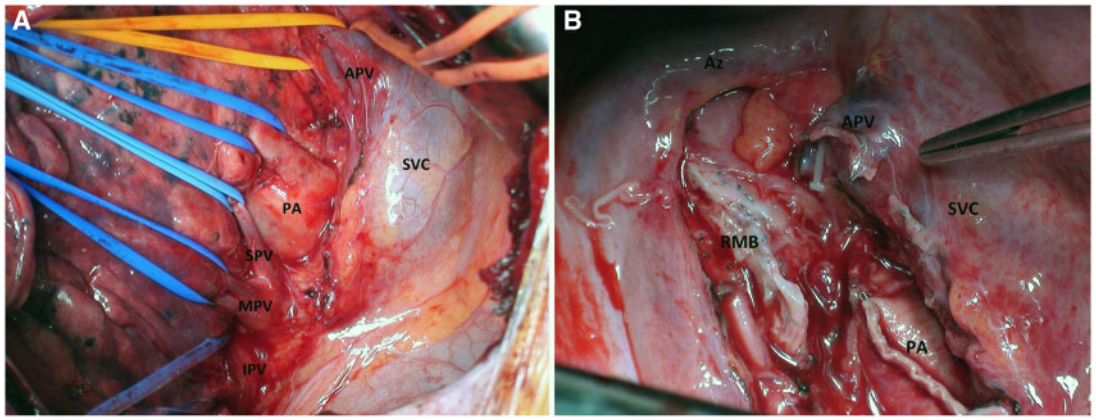


Figure 2: Intraoperative view of the anomalous pulmonary vein before resection (**A**) and after resection (**B**). APV: anomalous pulmonary vein; Az: azygos vein; IPV: inferior pulmonary vein; MPV: middle lobe pulmonary vein; PA: pulmonary artery; RMB: right main bronchus; SPV: superior pulmonary vein; SVC: superior vena cava.

Ethics statement

Written informed consent was obtained from the patient for publishing this case report and accompanying images.

DISCUSSION

There are 29 PAPVC cases coexisting with lung cancer in the literature including the present case. The mean age of the patients is 61.2 years. Seventeen (58.6%) patients were male. Eighteen (62%) patients had right-sided PAPVC and superior vena cava was the most frequent drainage site. Four patients were operated for PAPVC correction and PAPVC was diagnosed preoperatively in 13 (44.8%) cases [1–5]. This is the second case report presenting the surgical treatment of both lung cancer and PAPVC by pneumonectomy [4].

The first publication of PAPVC coexisting with lung cancer was made by Black *et al.* in 1992 [5]. The patient had intrapericardial pneumonectomy for right hilar mass and died 18 days after the operation due to haemodynamic instability although she had an emergency correction operation for PAPVC on the left side. This is the only published case that presents a patient who died after pulmonary resection due to PAPVC. This case clearly demonstrates the catastrophic complications of PAPVC.

Surgical indication for PAPVC is when the pulmonary/systemic blood flow ratio is >2. However, preoperative or concurrent PAPVC correction is recommended if PAPVC and lung cancer are in different lobes as resection may cause right heart failure by increasing the amount of the existing shunt [4]. As with our case, when PAPVC and lung cancer are in the same lobe, lung resection can treat them both.

CONCLUSION

In conclusion, PAPVC is a rare congenital anomaly. Thoracic surgeons should be aware of this anomaly when they are planning to perform a major lung resection. If PAPVC and lung cancer are in the same lobe, anatomical lung resections including pneumonectomy can be safely performed.

Conflict of interest: none declared.

REFERENCES

[1] Galetta D, Veronesi G, Leo F, Solli P, Spaggiari L. Anomalous right upper lobe venous drainage. Ann Thorac Surg 2006;82:2272–4.
[2] Singhal K, Newton AD, Corbett C, Predina JD. Management of partial anomalous pulmonary venous connections in patients requiring pulmonary resection: a case report and systematic review. J Thorac Dis 2017;9:5434–9.
[3] Kurihara N, Saito H, Usami S, Imai K, Konno H, Atari M *et al.* Lung cancer surgery in partial anomalous pulmonary venous connection patients. Ann Thorac Surg 2018;105:e7–9.
[4] Liu Z, Yang R, Shao F, Pan Y. Ipsilateral partial anomalous pulmonary venous connection in right lung cancer with absent right upper lobe. World J Surg Oncol 2015;13:104.
[5] Black MD, Shamji FM, Goldstein W, Sachs HJ. Pulmonary resection and contralateral anomalous venous drainage: a lethal combination. Ann Thorac Surg 1992;53:689–91.

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