



Complete white out of a single transplanted lung in the immediate postoperative period

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ABSTRACT

Vascular complications are rare but serious events following lung transplantation. Of the potential adverse events post lung transplant, pulmonary vein thrombosis is rare but often fatal. Our case describes a 54 year-old male who underwent single left lung transplantation and suddenly became hemodynamically unstable shortly after the procedure. The diagnosis of acute pulmonary vein thrombosis was made with the use of trans-esophageal echocardiography identifying complete occlusion of the left upper pulmonary vein which led to successful surgical thrombectomy and revision of the anastomosis.

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Case

A 54 year old Caucasian male patient with a history of idiopathic pulmonary fibrosis underwent a single left lung transplant. The procedure was uncomplicated and the transplanted lung was anastomosed to the recipient bronchus, pulmonary artery and pulmonary veins uneventfully. Immediate post-operative bronchoscopy did not reveal any significant abnormalities. Also, the patient's HLA (Human Leukocyte Antigen) cross match panel was entirely negative.

However, within an hour after reperfusion of the lungs, the patient became increasingly hypotensive and hypoxemic. Physical examination revealed tachycardia, elevated jugular venous pressure and coarse rales throughout the left lung fields. Chest radiography revealed complete whiteout of the transplanted left lung (Fig. 1). An electrocardiogram revealed sinus tachycardia with non-specific ST segment changes. A repeat bronchoscopy revealed marked frothy secretions from the left lung and a diagnosis of primary graft dysfunction was made. Despite treatment with vasopressors, antibiotics, and Nitric Oxide his condition continued to deteriorate. He developed multiorgan failure and veno-venous Extra Corporeal Membrane Oxygenation (ECMO) along with renal replacement therapy was initiated.

Bronchoscopy was repeated and showed persistence of copious secretions from the left lung. Additionally, the electrocardiogram now showed diffuse ST segment elevations and a transthoracic echocardiogram was attempted to evaluate left ventricular function.

However, transthoracic sonographic windows were poor and a trans-esophageal echocardiogram (TEE) was performed instead. This revealed a large thrombus in the left upper pulmonary vein protruding into the left atrium (Fig. 2). Color Doppler revealed almost no flow through this vein (Fig. 3). The patient then underwent surgical thrombectomy from the left atrium and pulmonary vein with revision of the anastomosis. The patient remained in critical condition for



Fig. 1. Chest radiograph (Antero-posterior projection) with massive opacification of transplanted left lung.

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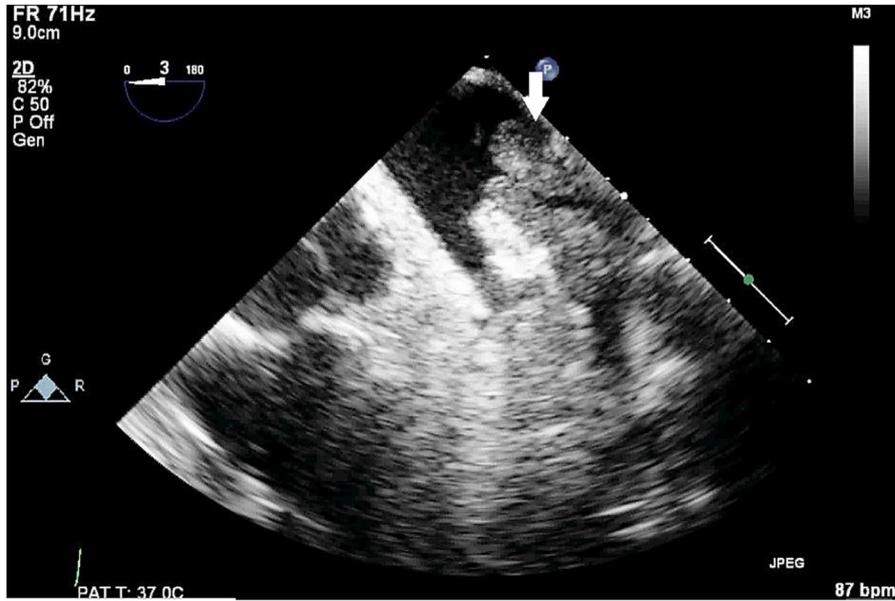


Fig. 2. Trans-esophageal echocardiogram showing large thrombus burden at the ostium of left upper pulmonary vein.

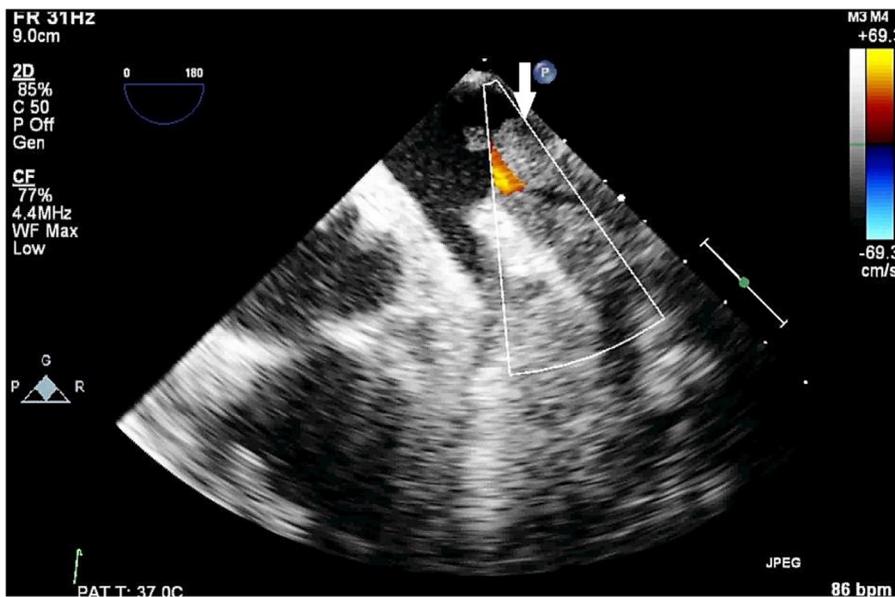


Fig. 3. Color Doppler in the same view showing near occlusive nature of the pulmonary vein thrombus.

several weeks but was ultimately weaned off ECMO and had normalization of renal function.

Hypoxemia and shock in the acute post lung transplant setting includes a differential diagnosis of allograft rejection, infection, myocardial ischemia and operative complications including thrombosis of the pulmonary vein anastomosis. Pulmonary vein thrombosis is known to occur in approximately 15% of patients after lung transplantation and can have ominous consequences – 5 of the 13 patients diagnosed with Pulmonary vein thrombosis in a prospective series of 87 patients undergoing lung transplantation died in the immediate post-operative period.¹ Larger size and occlusive nature of the thrombus (as in our patient) is associated with poorer outcomes. Treatment options for pulmonary vein complications following lung transplant are limited to systemic anticoagulation, thrombolytics, thrombectomy, and resection.²

Surgical thrombectomy and anastomosis revision remains the standard of care in the setting of large acute thrombosis or hemodynamic instability following lung transplantation.² TEE is an easily accessible bedside imaging modality that can reliably assess the pulmonary vein ostia and should routinely be considered in all cases of acute decompensation following lung transplant. Some transplant centers have also adopted a practice of routinely performing trans-esophageal echocardiography in the first 24 h after lung transplantation to ensure there is no complication with respect to pulmonary vein stenosis or thrombosis.^{1,3,4} With this case, we hope to highlight that the finding of a unilateral complete whiteout of a hemithorax immediately after lung transplant should prompt an urgent TEE to evaluate pulmonary venous anastomosis in addition to the usual work up for primary graft dysfunction.

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Conflicts of interest

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Supplementary materials

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References

1. Schulmann LL, Anandarangam T, Leibowitz DW, DiTullio MR, McGregor CC, Galantowicz ME, Homma S. Four year prospective study of pulmonary venous thrombosis after lung transplantation. *J Am Soc Echocardiogr.* 2001;14:806–812.
2. Chaaya G, Vishnubhotla P. Pulmonary vein thrombosis: a recent systematic review. *Cureus.* 2017;9(1):e993.
3. Gonzalez-Fernández C, Gonzalez-Castro A, Rodríguez-Borregán JC, Lopez-Sánchez M, Suberviola B, Nistal JF, Martín-Durán R. Pulmonary venous obstruction after lung transplantation. Diagnostic advantages of transesophageal echocardiography. *Clin Transpl.* 2009;23:975–980.
4. Michel-Cherqui M, Brusset A, Liu N, Schlumberger S, Ceddaha A, Fischler M. Intraoperative transesophageal echocardiographic assessment of vascular anastomoses in lung transplantation. A report on 18 cases. *Chest.* 1997;111(5):1229–1235.