

activity, also had a sterilizing effect. The ideal choice in this case was moxifloxacin. In subsequent visits, the patient reported good tolerance to the drugs, and no changes were detected on clinical laboratory tests.

Some systemic diseases increase the risk of developing active TB, and CD is one of these risk factors.⁵ Although the mechanism has not been entirely clarified, it may be due to malabsorption and lack of vitamin D in individuals with this disease.⁶ Celiac patients often have persistent low-grade inflammation and vitamin deficiencies, even many years after the introduction of a gluten-free diet. This diet also tends to be low in vitamin D, increasing the risk of deficiency. Vitamin D has been shown to induce nitric oxide synthesis in the macrophages, suppressing intracellular *M. tuberculosis* growth. It also increases the effect of interferon- γ in promoting the granulomatous process, and induces the differentiation of monocytes to epithelioid cells and multinucleated giant cells that form a major part of the granulomas.^{6,7}

The strongest genetic links with CD are found in the MHC locus, and the correlation with HLA-DQ2 (DQA1*05/DQB1*02) is well established.⁶ Associations between TB and various HLA alleles have been documented, but they are not as strong as in CD.⁶ In northern Europeans, HLA-DQ2 is often part of the 8.1 ancestral haplotype⁸ that contains a number of genes, including specific alleles of class I and class II HLA molecules, and genes coding for TNF- α and C2 and C4 complement factors. Since the C2 molecule is important in the mycobacterial invasion of macrophages, a C2 allele in particular may promote TB infection in a patient subgroup.⁶

In addition to increasing the risk of developing TB, CD may be a risk factor for TB complications, increasing severity and the risk of death (up to 6-fold) due to TB.⁴ An additional complication is that patients with TB who have CD-mediated malabsorption may be at risk of developing resistance to anti-TB drugs, due to their lower bioavailability.⁶ As in our case, drug tolerance among CD patients may also be poor, since some medications such as isoniazid are formulated with ingredients containing gluten. By replacing some these first-line drugs with a second-line drug, we were able to improve tolerance, and to continue treatment.

In conclusion, poor tolerance to TB medications in a celiac patient requires a review of the drug components to see if they

contain gluten. If the problem persists after the gradual introduction of the drugs, first-line drugs can be replaced by second-line agents.

References

1. World Health Organization. Global Tuberculosis Report, 2016. Geneva: WHO; 2016. Available from: <http://apps.who.int/iris/bitstream/10665/250441/1/9789241565394-eng.pdf?ua=1> [accessed 1.08.17].
2. Nahid P, Dorman SE, Alipanah N, Barry PM, Brozek JL, Cattamanchi A, et al. Official American Thoracic Society/Centers for Disease Control and Prevention/Infectious Diseases Society of America Clinical Practice Guidelines: treatment of drug-susceptible tuberculosis. *Clin Infect Dis*. 2016;63:e147–95.
3. Caminero JA, Matteelli A, Lange C. Treatment of TB. In: Lange C, Migliori GB, editors. Tuberculosis. UK: European Respiratory Society; 2012. p. 154–66. *European Respiratory Monograph* 58, chapter 12.
4. Caminero JA, Cayla JA, García-García JM, García-Pérez FJ, Palacios JJ, Ruiz Manzano J. Diagnóstico y tratamiento de la tuberculosis con resistencia a fármacos. *Arch Bronconeumol*. 2017;53:501–9.
5. Urganci N, Kalyoncu D. Tuberculosis and tuberculin skin test reactivity in pediatric patients with celiac disease. *Miner Pediatr*. 2017;69:30–5.
6. Ludvigsson JF, Wahlstrom J, Grunewald J, Ekblom A, Montgomery SM. Coeliac disease and risk of tuberculosis: a population based cohort study. *Thorax*. 2007;62:23–8.
7. Rockett KA, Brookes R, Udalova I, Vidal V, Hill AV, Kwiatkowski D. 1,25-Dihydroxyvitamin D3 induces nitric oxide synthase and suppresses growth of *Mycobacterium tuberculosis* in a human macrophage-like cell line. *Infect Immun*. 1998;66:5314–21.
8. Candore G, Lio D, Colonna Romano G, Caruso C. Pathogenesis of autoimmune diseases associated with 8.1 ancestral haplotype: effect of multiple gene interactions. *Autoimmun Rev*. 2002;1:29–35.

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Pulmonary Venous Occlusion as a Complication of Ablation Therapy for Atrial Fibrillation[☆]



Oclusión venosa pulmonar como complicación del tratamiento ablativo de la fibrilación auricular

To the Editor,

Atrial fibrillation (AF) is the most common supraventricular tachyarrhythmia, and the arrhythmia that causes most morbidity and mortality. More than 90% of the underlying ectopic foci of electrical activity originate in the pulmonary veins (47% in the left superior pulmonary vein).¹

In recent years, a rhythm control strategy has been developed in which the pulmonary veins are isolated electrically with catheter ablation. This procedure is indicated in the first-line treatment of patients with symptomatic paroxysmal AF refractory to antiarrhythmic drugs, and offers improved quality of life with a complication rate of 2.9%.²

We present a case of pulmonary vein occlusion and stenosis with venous infarction as a complication of ablation for AF.

Our patient was a 61-year-old hypertensive man, who had undergone AF radiofrequency ablation 4 months previously. He presented with dyspnea and sudden onset of intense left pleuritic pain, with no symptoms of nausea, vomiting, or sweating, and no fever. The patient also complained of cough with mild bloody expectoration.

On examination, breathing was normal at rest, and no signs of hemodynamic compromise were observed. Auscultation revealed reduced breath sounds in the left lung base.

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Oxygen saturation in room air was 96%, and D-dimer concentration was normal (0.29 mg/L).

Chest X-ray revealed peripheral alveolar consolidation in the lower lateral region of the left upper lobe (LUL) and lingula, associated with pleural effusion (not shown).

In view of the clinical picture (bloody sputum) and radiological findings in the chest, and despite the normal D-dimer results, we felt it necessary to request a chest CT angiogram to rule out pulmonary thromboembolism.

This examination revealed total occlusion of the left superior pulmonary vein, with the lumen occupied by a material that showed mild enhancement (Fig. 1A). Severe stenosis was also detected in the left inferior pulmonary vein (not shown).

In the pre-ablation CT angiogram, the caliber of the left superior pulmonary vein was normal and the lumen was permeable (Fig. 1B).

In the post-ablation lung window image, alveolar consolidations were observed in the lower lateral region of the LUL, lingula, and posterior base of the lower lobe. These consolidations coincided with the drainage of the obstructed, stenotic veins seen on the CT angiogram, and, as such, were diagnosed as venous infarction (Fig. 1C).

Cardiac catheterization was subsequently performed, confirming occlusion of the left superior pulmonary vein and critical

stenosis of the left inferior pulmonary vein at the level of the ostium. Balloon angioplasty, followed by stent implantation in each vein, were performed in the same procedure (Fig. 1D).

Non-invasive imaging techniques are used during pulmonary vein ablation, both for planning and for guidance during the procedure.² Echocardiography is the technique of choice for the evaluation of congenital heart disease, but it is less than optimal for evaluating the cavo-atrial junction and inappropriate for visualizing the more proximal parts of the pulmonary veins. The most appropriate techniques for defining pulmonary vein morphology and size, and for obtaining reference baseline images for subsequent evaluations of acute or late complications, are 3D gadolinium-enhanced magnetic resonance angiogram and contrast-enhanced CT angiogram (cardiac gating is not necessary).¹

The anatomy of the pulmonary veins and their possible anatomical variants must be understood. Under normal conditions, 4 pulmonary veins carry oxygenated blood from both lungs and drain into the left atrium. The right superior pulmonary vein drains the upper and middle lobes, the left superior pulmonary vein drains the upper lobe and lingula, and the 2 inferior pulmonary veins drain the lower lobes.³ In the distal segment of the pulmonary veins, a 2–17 mm section passes through the myocardium (myocardial sleeves), and this is a common site of ectopic electrical activity.⁴

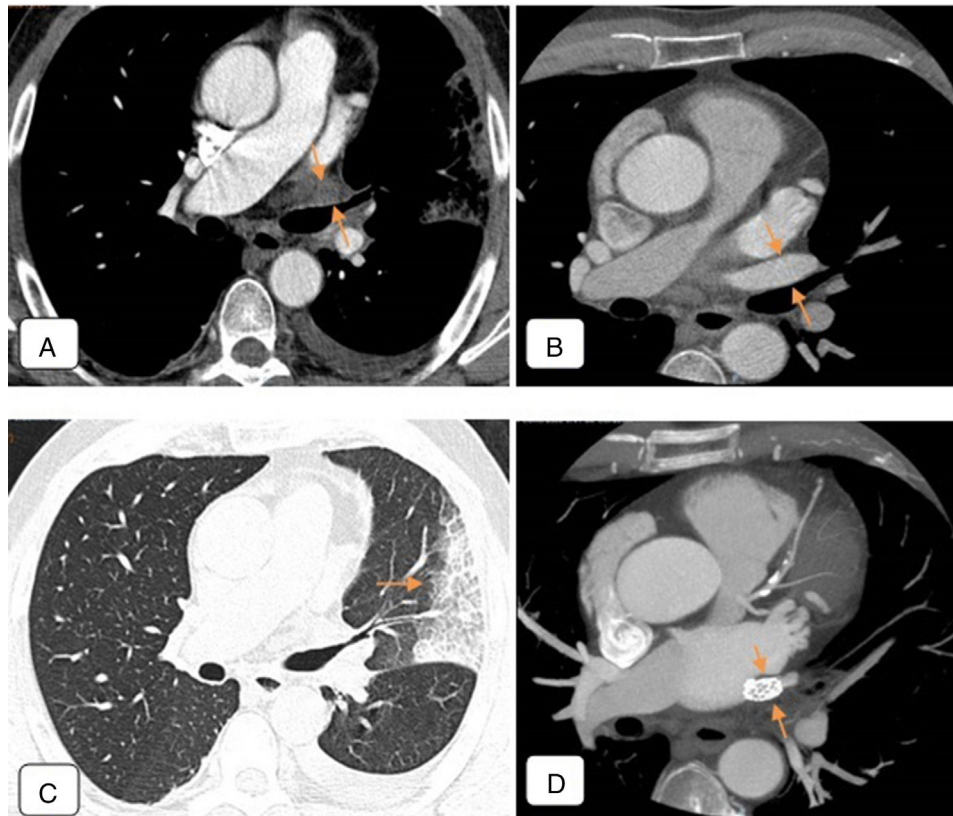


Fig. 1. (A) Chest CT angiogram 4 months after ablation, showing total occlusion of the left superior pulmonary vein, the lumen of which is occupied by material that shows mild enhancement (arrows), that probably corresponds to inflammatory tissue. Moderate-sized left pleural effusion. (B) Pre-ablation chest CT angiogram. Axial image of a region similar to that of (A). Left superior pulmonary vein is permeable with normal caliber (arrows). (C) Chest CT of pulmonary parenchymal window: alveolar consolidation in left upper lobe and lingula, coinciding with the drainage territory of the obstructed left superior pulmonary vein, consistent with venous infarction (arrow). (D) Follow-up CT angiogram after angioplasty. Stent restoring patency observed in left superior pulmonary vein (arrows).

The major congenital variants include an abnormal number or diameter of pulmonary veins, abnormal drainage, and abnormal connections with the pulmonary arterial tree. Acquired abnormalities include hypertension, thrombosis, calcifications, collateral circulation, and stenosis or obstruction. The latter 2 may be caused by cancer, fibrosing mediastinitis, tuberculosis, or complications after radiofrequency ablation.³

Complications arising from the ablative procedure are caused by thermal injury to the vessel wall.⁵ Pulmonary vein stenosis occurs in 0.5% of patients, and usually develops about 3 months after ablation.² Thermal lesions produce scarring and contraction of the vessel wall, causing architectural remodeling and hyperplasia of the intima, producing venous stenosis. Patients may have non-specific respiratory symptoms (dyspnea, cough, chest pain, or hemoptysis) and the severity of symptoms is associated with the number of veins affected, and the degree, length, and duration of stenosis.^{5,6}

Mild stenoses may be difficult to detect. CT angiogram clearly shows pulmonary venous occlusion, but this complication is rarer, since anticoagulation starts immediately after the procedure.²

Pulmonary parenchymal abnormalities are indirect signs of significant stenosis or venous occlusion, which can include multifocal opacities or peripheral consolidations that might indicate alveolar infarction or hemorrhage, or interstitial septal thickening.⁵ Venous occlusion is frequently accompanied by perivenous infiltrate and locoregional lymphadenopathies caused by thermal damage.²

Stenoses are managed according to the grade of severity compared to the pre-ablation findings. If stenosis is 50%–70%, follow-up in 3–6 months is recommended; if stenosis is 75%, a repeat CT in 3 months is recommended, and if it is 90%, urgent treatment is required within 3–6 weeks, since the lesion could progress. The treatment of choice in this case is angioplasty followed, if necessary, by stent placement.²

In conclusion, pulmonary vein stenosis and occlusion are increasingly rare complications of ablation for AF, but it is important that they are investigated, since a good prognosis depends on

early diagnosis and prompt treatment. Imaging techniques such as CT angiography play a fundamental role in the management of these lesions, thanks to their good anatomical resolution, rapid results, and availability. In-depth understanding of the anatomy of the pulmonary veins and radiological findings of the complications of ablative surgery are therefore essential.

References

1. Ghaye B, Szapiro D, Dacher JN, Rodriguez LM, Timmermans C, Devillers D, et al. Percutaneous ablation for atrial fibrillation: the role of cross-sectional imaging. *Radiographics*. 2003;23:S19–33.
2. Madrid Pérez JM, García Barquín PM, Villanueva Marcos AJ, García Bolao JI, Bastarrika Alemañ G. Complicaciones asociadas a la ablación mediante radiofrecuencia de venas pulmonares. *Radiología*. 2016;58:444–53.
3. Varona Porres D, Persiva Morenza O, Pallisa E, Roque A, Andreu J, Martínez M. Learning from the pulmonary veins. *Radiographics*. 2013;33:999–1022.
4. Ravenel JG, McAdams HP. Pulmonary venous infarction after radiofrequency ablation for atrial fibrillation. *AJR Am J Roentgenol*. 2002;178:664–6.
5. Kwon M, Lee HY, Cho JH, Um SW. Lung infarction due to pulmonary vein stenosis after ablation therapy for atrial fibrillation misdiagnosed as organizing pneumonia: Sequential changes on CT in two cases. *Korean J Radiol*. 2015;16:942–6.
6. Yataco J, Stoller JK. Pulmonary venous thrombosis and infarction complicating pulmonary venous stenosis following radiofrequency ablation. *Respir Care*. 2004;49:1525–7.

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Angiolymphoid Hyperplasia With Eosinophilia of the Lung



Hiperplasia angiolinfóide con eosinofilia del pulmón

Dear Editor:

Angiolymphoid hyperplasia with eosinophilia (ALHE), also named epithelioid hemangioma, is a benign vascular tumor with unknown pathogenesis, characterized by the presence of well formed, but often immature vessels, and by the proliferation of epithelioid endothelial cells with prominent lymphocytic infiltration.¹ The majority of the ALHE lesions affects the subcutaneous tissue of the head and neck.² Reported cases of the pulmonary involvement are extremely rare.^{3,4}

We report the case study of a 27-year-old Caucasian woman, non-smoker. The patient performed an abdominal computed tomography (TC) for a history of abdominal pain that showed bilateral nodules in the pulmonary bases, reason why the patient has been referred to our hospital for study. The patient reported a history of cough and asthenia with 1-year evolution, which

have devalued over time. Physical examination, including skin observation, was unremarkable and the laboratory investigation was normal. The chest CT showed the presence of multiple bilateral pulmonary nodules (ranging between 10 and 14 mm), some of which in ground glass (Fig. 1A and B). The fiberoptic bronchoscopy was normal and the bronchoalveolar lavage showed a normal cell count. Histopathological examination of TC-guided transthoracic core needle biopsies of one of the left lung nodule have revealed proliferation of numerous small-caliber vessels with hyperplastic endothelial lining, lymphoid follicles and prominent eosinophilic background (Fig. 1C). Immunohistochemical study showed tumor cell positivity for CD34 (endothelial marker) (Fig. 1D). Overall, these findings indicated the diagnosis of angiolymphoid hyperplasia with eosinophilia. Given the rarity of the pulmonary involvement by ALHE, together with the presence of multiple pulmonary nodules (more common in epithelioid hemangioendothelioma), the possibility of surgical biopsy was discussed with Thoracic Surgery. Nevertheless, surgical option was discarded because of the low density of the nodules as well due to location constrains. Instead, we repeated TC-guided transthoracic core needle biopsies in one right lung nodule. The histopathological and immunohistochemical