Hereditary Hemorrhagic Telangiectasia and Myocardial Infarction

Efrén Martínez-Quintana, MD, PhD² Fayna Rodríguez-González, MD² Silvia Gopar-Gopar, MD¹

¹ Cardiology Service, Insular-Materno Infantil University Hospital, Las Palmas de Gran Canaria, Spain

² Ophthalmology Service, Dr Negrín University Hospital of Gran Canaria, Las Palmas de Gran Canaria, Spain

Address for correspondence Efrén Martínez-Quintana, MD, PhD, Servicio de Cardiología, Complejo Hospitalario Universitario Insular-Materno Infantil, Avenida Marítima del Sur s/n 35016 Las Palmas de Gran Canaria, Spain (e-mail: efrencardio@gmail.com).

Int J Angiol 2016;25:e81–e83.

Abstract

Keywords

- hereditary hemorrhagic telangiectasia
- Osler–Weber–Rendu syndrome
- pulmonary arteriovenous malformations
- myocardial infarction

Hereditary hemorrhagic telangiectasia, also known as Osler–Weber–Rendu syndrome, is an autosomal dominant genetic disorder that leads to epistaxis, gastrointestinal bleeding, iron deficiency anemia, and arteriovenous malformations at the lungs, the liver, and the brain. However, due to its rarity and its unspecific findings on routine examinations, diagnosis is not easy unless suspected due to hypoxemia or paradoxical embolism. We present a case of a 46-year-old woman with hereditary hemorrhagic telangiectasia and hypoxemia who presented a myocardial infarction secondary to paradoxical embolism through pulmonary arteriovenous malformations.

Pulmonary arteriovenous malformations (PAVMs) may be acquired or congenital. Symptoms often develop between the fourth and sixth decades of life and the degree of symptoms depends on the amount of unoxygenated blood shunted from the pulmonary artery into the pulmonary veins. Characteristic findings may be related to hereditary hemorrhagic telangiectasia (HHT) (~15–35% of HHT patients have PAVMs, and 50–85% of PAVMs patients have HHT¹) and include epistaxis, massive hemoptysis, cyanosis, dyspnea, polycythemia, or iron deficiency anemia depending on the extent of hypoxemia or bleeding, headaches, dizziness, convulsions, brain abscesses, infective endocarditis, congestive heart failure, or paradoxical embolism. However, when the shunt is small, no symptoms result.

Case Report

A 46-year-old woman was referred to our hospital due to chest pain and presyncope. Her clinical history included arterial hypertension, dyslipidemia, impaired glucose tolerance, iron deficiency anemia, and spontaneous recurrent

epistaxis that occasionally needed emergency nasal packing. She also had a previous superior sagittal sinus thrombosis which needed oral anticoagulation and clopidogrel treatment. She had no history of early ischemic heart disease but one of her brothers and her only daughter had had recurrent and self-limiting episodes of epistaxis.

On physical examination, no murmurs were heard and only few telangiectasias were seen on her face (►Fig. 1A). Electrocardiogram and laboratory tests, at hospital admission, were normal apart from a hemoglobin of 9.3 g/dL, a raised creatine kinase (CK) of 241 IU/L (normal value [NV]: 21–232), and a troponin I of 0.94 mg/mL (NV: 0.0–0.16). Meanwhile, chest radiography showed a lung vascular dilatation at the right lower lobe (►Fig. 1B).

Due to her acute coronary event, a cardiac catheterization was requested which showed normal coronary arteries except for the fact that there was distal embolization and occlusion of the first diagonal artery (►Fig. 1C). Meanwhile, computed tomography (CT) pulmonary angiogram, done to find out the cause of hypoxemia, showed arteriovenous malformations at the right lower lung lobe (►Fig. 1D),

Fig. 1 (A) Telangiectasias at the facial level (arrowheads). (B) Chest radiograph posterior-anterior projection showing a pulmonary vascular dilatation at the right lower lobe (arrowhead). (C) Left coronary angiography showing normal coronary arteries with distal embolization at the level of the first diagonal artery (arrowhead). (D) Computed tomography pulmonary angiogram showing an arteriovenous malformation at the right lower lung lobe (arrowhead).

evidencing one of them a feeding artery of 8 mm in diameter and a thrombus inside. On the other hand, transthoracic echocardiography revealed a normal left ventricular function without associated valve disease, atrial shunt, or pulmonary arterial hypertension. Meantime, contrast transthoracic echocardiography revealed the massive appearance of contrast bubbles in the left atrium. No data of coronary artery spasm was seen in the intravenous methylergonovine maleate echocardiogram.

Because of her history of superior sagittal sinus thrombosis, a thrombophilia study (including tests for plasma coagulation, plasminogen, lupus anticoagulant, anticardiolipin antibodies, protein C, protein S, antithrombin, prothrombotic mutations, factor VIII, factor II, homocysteine, vitamin B12 and folic acid) was done which showed no abnormalities. Therefore, percutaneous closure of the fistulas was indicated (**Fig. 2**) improving her functional class and raising oxygen saturation levels from 86 to 93%.

Discussion

PAVMs are rare, occurring in 2 to 3 per 100,000 population. Eighty percent of them are congenital, being inherited as an

autosomal dominant vascular disorder in the case of HHT, and the rest are acquired due to chest trauma, malignancy, hepatopulmonary syndrome, modified Fontan or Glenn procedures, long-standing hepatic cirrhosis, mitral stenosis, actinomycosis, and schistosomiasis.² In fact, hepatic clearance has been blamed for the development of PAVMs in children following shunt procedures for congenital cardiac anomalies.³

Clinically important arteriovenous malformations can occur in several organs, such as the lung, brain, and liver. However, PAVMs are not easily diagnosed routinely, due to its rarity and unspecific findings on routine examinations. Nevertheless, many PAVMs can be identified on plain chest X-ray, although contrast CT and magnetic resonance angiography have the higher sensitivity and specificity for the diagnosis of clinically relevant PAVMs.⁴

Hypoxemia associated with transient ischemic attacks, cerebrovascular accidents, brain abscesses, or myocardial infarction, as seen in our patient, should make us suspect the existence of PAVMs. On the one hand because right-to-left shunt favors hypoxemia, and on the other hand because microemboli, which bypasses the filtration function of the lungs, may result in paradoxical embolism (especially in

Fig. 2 (A) Pulmonary arteriography showing two arteriovenous malformations at the right lower lung lobe (arrowheads). (B) Selective angiography in the feeding artery of the most lateral pulmonary arteriovenous malformation (arrowhead). (C) Embolization of the feeding arteries of both arteriovenous malformations with 5 mm coils (asterisk) and 6 and 8 mm mechanically controlled-release embolization devices (arrowheads).

patients with a feeding arteriovenous malformations artery diameter above 3 mm⁵). To this is added the fact that patients with HHT are at increased risk of iron deficiency anemia, secondary to blood loss from the vascular lesions, and venous thromboemboli.

Although coronary artery embolism is a recognized entity of myocardial infarction, there is little morphologic information about it. Underlying diseases predisposing to coronary emboli includes valvular heart disease, myocardopathy, coronary atherosclerosis, chronic atrial fibrillation, mural thrombi, or PAVMs if the patient has associated hypoxemia. Because of their distal location, most of the myocardial infarctions due to embolism are small, with little electrocardiographic changes and labeled, in many cases, as infarcts with angiographically normal coronary arteries. In these patients, thrombolysis is usually ineffective, due to the nature of the thrombus, and angioplasty is often required.

Our patient had definitive criteria for HHT⁶ and symptomatic PAVMs. In these cases, there is general agreement that PAVMs should be treated by an interventional approach, with multiple embolizations of coils or device implantation.⁷ Establishment and optimization of iron status is also crucial, because low iron levels carry an increased risk of thrombosis and thromboembolism in these patients.

Note

The authors hereby confirm that neither the manuscript nor any part of it has been published or is being considered

for publication elsewhere. We attest to the fact that all authors have contributed significantly to the work, have read the manuscript, and attest to the validity and legitimacy of the data and its interpretation. The authors have also certified that they comply with the principles of ethical publishing. No author has conflict of interest.

References

- 1 Gossage JR, Kanj G. Pulmonary arteriovenous malformations. A state of the art review. *Am J Respir Crit Care Med* 1998;158(2): 643–661
- 2 Sharifah AI, Jasvinder K, Rus AA. Pulmonary arteriovenous malformation: a rare cause of cyanosis in a child. *Singapore Med J* 2009; 50(4):e127–e129
- 3 Meek ME, Meek JC, Beheshti MV. Management of pulmonary arteriovenous malformations. *Semin Intervent Radiol* 2011; 28(1):24–31
- 4 Khalil A, Farres MT, Mangiapan G, Tassart M, Bigot JM, Carette MF. Pulmonary arteriovenous malformations. *Chest* 2000;117(5): 1399–1403
- 5 Andersen PE, Kjeldsen AD. Clinical and radiological long-term follow-up after embolization of pulmonary arteriovenous malformations. *Cardiovasc Intervent Radiol* 2006;29(1): 70–74
- 6 Faughnan ME, Palda VA, Garcia-Tsao G, et al; HHT Foundation International - Guidelines Working Group. International guidelines for the diagnosis and management of hereditary haemorrhagic telangiectasia. *J Med Genet* 2011;48(2): 73–87
- 7 Trerotola SO, Pyeritz RE. PAVM embolization: an update. *AJR Am J Roentgenol* 2010;195(4):837–845