

Diagnosis by Magnetic Resonance Imaging of a Case of Intramural Left Atrial Hematoma

Jesús Álvarez^a, Álvaro Rubio^a, Manuel de Mora, Gabriel Fernández Madero, Ricardo Vivancos and Félix Malpartida

^aUnidad de Cardiología. Hospital de Antequera. Servicio de Cardiología. Hospital Regional Carlos Haya. Málaga.

We report a case of spontaneous intramural left atrial hematoma with chest pain and pulmonary edema as the primary clinical manifestations. Echocardiographic techniques revealed obstruction of the left atrial cavity by cyst-like masses attached to the posterior and anterior atrial wall. A large intramural hematoma due to extensive atrial wall dissection was observed by magnetic resonance imaging. Surgery confirmed the diagnosis of intramural left atrial hematoma with no complications. We review the clinical and diagnostic profile of the three cases of spontaneous intramural left atrial hematoma reported in the world medical literature.

Key words: *Echocardiography. Magnetic resonance imaging.*

Full English text available at: www.revespcardiol.org

Hematoma intramural auricular izquierdo diagnosticado por resonancia magnética nuclear

Presentamos el caso de una paciente con hematoma intramural auricular izquierdo espontáneo que se manifestó con dolor torácico y edema pulmonar. Las técnicas ecocardiográficas objetivaron obstrucción al flujo auricular producido por masas de aspecto quístico en la pared posterior y anterior de la aurícula izquierda. Las imágenes con resonancia magnética demostraron un gran hematoma mural producido por disección extensa de la pared auricular. El diagnóstico de hematoma intramural se confirmó en una intervención quirúrgica sin complicaciones. Se revisa el perfil clínico y diagnóstico de los tres casos de hematomas intramurales espontáneos comunicados en la bibliografía.

Palabras clave: *Ecocardiografía. Resonancia magnética nuclear.*

CLINICAL CASE

A 37-year-old woman who was previously healthy and had no history of interest consulted for chest pain and acute dyspnea. At admission, clinical and radiological signs of pulmonary congestion without cardiomegaly were appreciated. The electrocardiogram showed only sinus tachycardia. The clinical situation quickly stabilized with conventional treatment consisting of furosemide and morphine.

Transthoracic and transesophageal echocardiography (Figure 1) revealed two oval masses in the posterolateral and anterior wall of the left atrium that caused severe obstruction of atrial flow. The large

posterior mass (7 × 3.5 cm) was of cystic appearance: it had a thick capsule-like outer wall and anechoic content except for the central region, where irregular echodense zones were visible. The retroaortic or anterior mass was 2 × 2 cm and of essentially solid appearance. There was a slight mural thickening that extended throughout the lateral region and atrial roof, and converged in the anterior and posterior nodular formations. No communication between the masses and atrial lumen was detected by color echo-Doppler. The drainage of the pulmonary veins was not obstructed, but blood flow through the left atrium was. The atrial lumen was reduced to a narrow medial conduit where a markedly turbulent flow was appreciated, with a mean intra-atrial gradient of 12 mm Hg calculated by Doppler.

Magnetic resonance imaging showed that the echocardiographic findings corresponded to a single process arising from the atrial wall. MRI confirmed the absence of any solution of continuity between the large mass on the posterior wall, the nodulation of the retroaortic region, and the laminar thickening of lateral

Correspondence: Dr. J. Álvarez Rubiera.
José Iturbi, 1. 29010 Málaga. España.
E-mail: jesusalvarezc@meditex.es

Received 14 January 2002.
Accepted for publication 19 February 2002.



Fig. 1. Images obtained by transesophageal echocardiography, four-chamber view, longitudinal plane 95° (upper image) and cross-sectional plane including the outflow tract of 0° (lower image). On the posterolateral wall of the left atrium, an oval mass of cystic appearance is visible, 7.3 cm in diameter (white asterisk). In the retroaortic area a second mass 2.2 cm, which is fundamentally solid (black asterisk), can be seen. LA indicates residual left atrial lumen; LV, left ventricle; AO, aorta; arrow, interatrial septum.

and upper walls (Figure 2). The homogeneous hyperintense signal in the T1 *spin echo* sequences and the intermediate signal in T2 characterized the lesion as hemorrhagic and, therefore, compatible with an evolving parietal hematoma. Coronary angiography excluded the presence of a vascular malformation. Studies for hydatidosis (with computed tomography of the chest, abdominal echography, and serology by hemagglutination), vasculitis, and coagulopathy were negative.

During surgery, the external aspect of the left atrium was found to be normal. Left atriotomy was performed on the posterolateral wall, which provided access to a large cavity filled with hematic material and no communication with the true atrial lumen, which was decompressed by simply draining the hematoma. The histology of a fragment of atrial wall showed remains

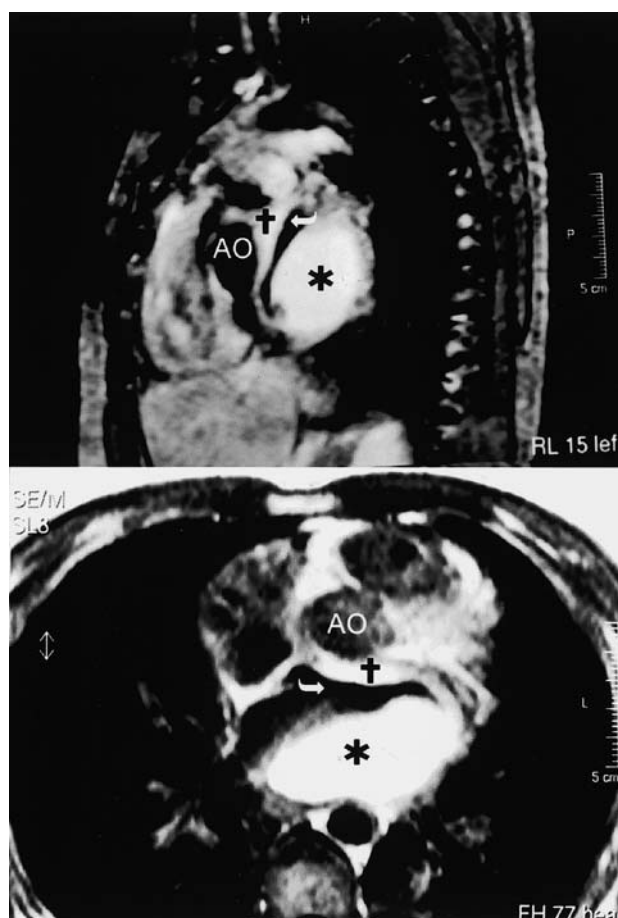


Fig. 2. Magnetic resonance imaging study. T1-weighted spin echo sequences. In the sagittal plane (upper image) and axial plane (lower image), a large oval mass is observed on the posterior wall of the left atrium (asterisk), with a hyperintense and homogeneous signal, extending laterally in the wall to the retroaortic region (cross). Arrow indicates residual left atrial lumen; AO, aorta.

of mural hematoma and non-specific focal fibrosis of the atrial myocardium, with no neoplastic or myxoid tissue, vascular malformations, or findings of hydatidosis. In the study by magnetic resonance imaging made 2 weeks after the intervention, there was only a small residual hematoma in the posterolateral wall of the left atrium. The patient recovered without complications and remains asymptomatic without treatment.

DISCUSSION

The intramural hematomas reported in the medical literature have been related for the most part with trigger factors such as heart surgery,¹ annular endocarditic abscesses,² cardiac trauma,³ hemangioma of the atrial wall,⁴ or aortic dissection,⁵ with spontaneous cases being exceptional.^{6,7} Intramural hematomas are usually located in the left atrium^{3,5-7} or in relation with the interatrial septum,² those of the right atrium being less frequent.^{1,4}

In the echocardiographic differential diagnosis of masses of lobular or cystic appearance related with the atrial wall, a large variety of processes have been described: hydatidosis,⁸ cystic myxomas,⁹ pseudocysts of the right atrium in relation to ventriculoperitoneal shunts,¹⁰ extrinsic compression by neoplasms like bronchogenic or pleuropericardial cysts,¹¹ simple hematic cysts,¹² atrial dissection,¹³ and intramural hematomas.

In analogy with aortic pathology, the conceptual difference between dissection and mural hematoma is established by the presence or absence of a connection between the mural hematoma and vascular lumen. Left atrial dissection is generally characterized by a relation with mitral valve replacement or endocarditis, a port of entry in the atrioventricular annulus, and the involvement of either the atrial wall or interatrial septum.^{13,14} The false chamber may or may not be connected with the atrial lumen and form masses of lobular appearance that can compress the true lumen as intramural hematomas do.

To date, only three cases of spontaneous atrial intramural hematomas, including the present case, have been reported in the literature.^{6,7} The clinical manifestations that have been reported include chest pain, dyspnea, and palpitations (in one patient the case was documented by atrial fibrillation⁶). Echocardiography studies (transesophageal in two cases) provided a diagnosis of atrial mass with a greater or lesser degree of luminal obstruction, but did not establish the cause of the process. The echocardiographic finding of masses of lobular or cystic appearance raised the question of the differential diagnosis with hydatidosis in all cases. The mouth of the pulmonary veins was not affected in any of the three cases reported.

The availability and improvements in imaging techniques, such as echocardiography, helical computed tomography, and magnetic resonance imaging, have increased knowledge of intra and paracardiac masses.¹⁵⁻¹⁷ In spite of the excellent anatomic resolution of each of these techniques, two or more of these techniques may sometimes be required for the diagnosis of the etiology or extension of the cardiac masses because the techniques often provide complementary information. In the case presented, the three-dimensional resolution and capacity for tissue characterization of magnetic resonance imaging studies were decisive in visualizing the spatial distribution and hemorrhagic nature of the lesions seen in the echocardiogram.¹⁸ Previously, magnetic resonance imaging had been used only in the diagnosis of the case reported by Delgado,⁶ in which it typified the lesion as a cystic mass with hematic content. In all three cases, the diagnosis was confirmed in the operating theater and followed by a very favorable outcome.

We conclude that atrial intramural hematomas should be included in the differential diagnosis of atrial masses. Intramural hematomas can have an echocardiographic appearance of pseudomasses, sometimes of cystic or lobular appearance. The capacity for anatomic and tissular characterization of magnetic resonance imaging should give it a determinant role in the diagnosis of this rare pathology.

REFERENCES

1. Trappe HJ, Daniel WG, Hertzner R, Döhring W, Lichtlen PR. Intramural right atrial hematoma following coronary artery bypass surgery. *Am Heart J* 1985;109:917-8.
2. Schecter SO, Fyfe B, Pou R, Goldman ME. Intramural left atrial hematoma complicating mitral anular calcification. *Am Heart J* 1996;132:455-6.
3. Rowe SK, Porter CB. Atrial septal hematoma: two-dimensional echocardiographic findings after blunt chest trauma. *Am Heart J* 1987;114:650-2.
4. Hangler HB, Vorderwinkler KP, Fend F, Dapunt OE. Intramural right atrial myocardial hemangioma treated by emergency surgery. *European J Cardiothorac Surg* 1997;11:782-4.
5. Yacoub MH, Schottenfeld M, Kittle CF. Hematoma of the interatrial septum with heart block secondary to dissecting aneurysm of the aorta. *Circulation* 1972;46:537-45.
6. Delgado JF, Rofilanchas JJ, Gómez C. Spontaneous left atrial hematoma. *Int J Cardiol* 1991;31:353-6.
7. Shaikh N, Rehman UN, Salazar MF, Grodman RS. Spontaneous intramural atrial hematoma presenting as left atrial mass. *J Am Soc Ecocardiogr* 1999;12:1101-3.
8. Oliver JM, Sotillo JF, Domínguez FJ, López de Sa E, Calvo L, Salvador A, et al. Two-dimensional echocardiographic features of echinococcus of the heart and great blood vessels: clinical and surgical implications. *Circulation* 1988;78:327-35.
9. Hwang JJ, Lien WP, Kuan P, Hung CR, How SW. Atypical myxoma. *Chest* 1991;100:550-1.
10. Loh E, Eaffini LE, Lee RT, Couper GD, Schoen FJ. Giant right atrial LeVeen shunt pseudocyst. *Am J Cardiol* 1989;63:1989-90.
11. Doi YI, Takata J, Kitaoka H, Matsumura Y, Yabe T. Mediastinal cyst masquerading as left atrial tumour. *Lancet* 1996;348:58-9.
12. Roberts PF, Serra AJ, McNicholas KW, Shapira N, Lemole GM. Atrial blood cyst: a rare finding. *Ann Thorac Surg* 1996;62:880-2.
13. Gallego P, Oliver JM, González A, Domínguez FJ, Sánchez-Recalde A, Mesa JM. Left atrial dissection: pathogenesis, clinical course, and transesophageal echocardiographic recognition. *J Am Soc Ecocardiogr* 2001;14:813-20.
14. Cordero ML, López Pérez JM, Merayo E, Gullías JM, Rodríguez JP. Diseción auricular izquierda y endocarditis infecciosa. *Rev Esp Cardiol* 1998;51:402-3.
15. Lestuzzi C, Nicolosi GL, Mimo R, Pavan D, Zanuttini D. Usefulness of transesophageal echocardiography in evaluation of paracardiac neoplastic masses. *Am J Cardiol* 1992;70:247-51.
16. Lundt JT, Ehman RL, Julsrud PR, Sinak LJ, Tajik AJ. Cardiac masses: assessment by MR imaging. *Am J Roentgenol* 1989;152:469-73.
17. Pons Llado G, Carreras F, Borrás X, Llauger J, Palmer J. Ecocardiografía y resonancia magnética en el cálculo de la masa ventricular izquierda. *Rev Esp Cardiol* 2001;54:22-8.
18. Semelka RC, Shoenut JP, Wilson ME, Pellech AE, Patton JN. Cardiac masses: signal intensity features on spin-echo, gradient-echo, gadolinium-enhanced spin-echo, and turbo FLASH images. *J Magn Reson Imaging* 1992;2:415-20.