



POLISH HEART JOURNAL

Kardiologia Polska

The Official Peer-reviewed Journal
of the Polish Cardiac Society
since 1957

Online first

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ISSN 0022-9032

e-ISSN 1897-4279

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Article type: Clinical vignette

Received: June 17, 2024

Accepted: July 8, 2024

Early publication date: July 9, 2024

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A large atrial septal aneurysm in a patient with atrial fibrillation: Is it just a structural deformation or a clinical problem?

Short title: A large atrial septal aneurysm in a patient with atrial fibrillation

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We present a 68-year-old man who was admitted with signs of exacerbation of heart failure in the course of atrial fibrillation (AF) with an undefined onset with heart rate up to 170 bpm. Metoprolol and digoxin were ineffective in slowing HR, so landiolol was used and the patient was prepared for electrical cardioversion (ECV). Enoxaparin was started at a dose 2×100 mg.

Bedside transthoracic echocardiography did not reveal any significant valve disease; however, reduced ejection fraction to 35%, atrial enlargement and bulging of interatrial septum (IAS) towards right atrium were found (**Figure 1A**). N-terminal pro-B- type natriuretic peptide level was 10963 pg/ml and the glomerular filtration rate 40–60 ml/kg/min/1.73 m².

A routine transoesophageal echocardiography (TEE) before ECV showed a spontaneous echo contrast in the left atrium, but no thrombus in the left atrial appendage (Supplementary material, *Figure S1*). Then a large atrial septal aneurysm (ASA) with dense blood in its cavity, an unexpected soft structure in the bent of the patent foramen ovale (PFO)

channel on the border of the aneurysm (Figure 1B) and a small point shunt through the PFO (Figure 1C) were found.

Due to the most probable *in situ* thrombus in the PFO channel and the potential risk of stroke, ECV was not performed.

TEE was repeated after 7 days of optimal treatment, at a slower HR. The PFO thrombus was much smaller, so the shunt through the PFO became more pronounced (Supplementary material, Figure S2); however, blood in the aneurysm cavity was more dense (Figure 1D). 3D TEE revealed an unusual morphology of the aneurysm. Two recesses, approximately 20–22 mm deep, separated by a septum and facilitating blood retention were found (Figure 1E–F).

In this situation another ECV was not considered and a long-term therapy with rivaroxaban was initiated. The patient was discharged in a stable clinical condition.

ASA is defined as an excursion of IAS above 10 mm beyond the septal plane into the right or left atrium [1]. It may be associated with an increased risk of stroke through paradoxical embolism, formation of thrombi in its cavity or coexisting AF [1]. Interestingly, Węglarz et al. [2] did not confirm that ASA with PFO heighten the risk of ischemic stroke, however it is important what type of ASA the studied patients had.

A large ASA may pose a significant problem because it modifies the shape of IAS, leads to local blood stasis at its bottom and may promote the formation of a thrombus in the PFO [3]. Reduced LA function during AF and low LVEF are also undeniable prothrombotic factors.

Yan et al. [4] reported the association of *in situ* PFO thrombus with episodes of stroke and migraine. PFO thrombus is a rare phenomenon in patients with AF, but it may influence therapeutic decisions, including ECV.

Tzimas et al. [5] described a fatal outcome of the patient with a huge ASA not recognized in preoperative transthoracic echocardiography, who experienced a thromboembolic event during cardiac surgery, caused by thrombi from the ASA, detached during cannulation.

In patients with AF, we usually look for a thrombus in the left atrial appendage; however, precise assessment of IAS morphology in TEE is mandatory for a detection of other potentially threatening abnormalities.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/polish_heart_journal.

Article information

Conflict of interest: None declared.

Funding: None.

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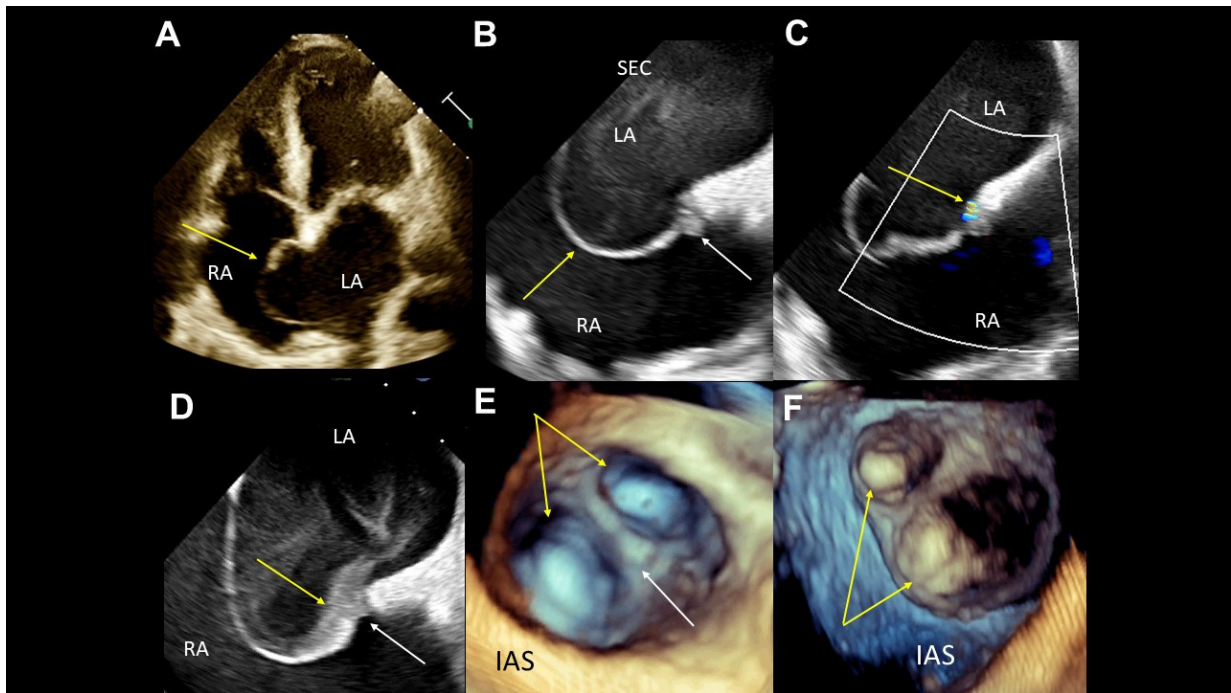


Figure 1. **A.** Atrial enlargement and bulging of the interatrial septum towards the right atrium (arrow); transthoracic echocardiography; a 4-chamber view. **B.** A large atrial septal aneurysm (yellow arrow) and a small thrombus in the bent of the PFO channel on the border of the aneurysm (white arrow). **C.** Small point left to right shunt through the PFO (arrow); 2-dimensional transoesophageal echocardiography, color Doppler. **D.** Follow-up: more dense blood in the aneurysm cavity (yellow arrow) and a smaller PFO thrombus (white arrow); 2-dimensional transoesophageal echocardiography. **E.** An unusual morphology of the atrial septal aneurysm: two recesses separated by a septum (arrows), a view from the left atrium. **F.** Atrial septal aneurysm — view from the right atrium; 3-dimensional transoesophageal echocardiography

Abbreviations: Ao, aorta; LA, left atrium; LV, left ventricle; PFO, patent foramen ovale