

# First report of percutaneous closure of anterior mitral leaflet perforation using a paravalvular leak device (PLD)

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This report describes the first use of the Occlutech Paravalvular leak device to close anterior mitral leaflet perforation.

## Case report

A 79-year-old woman, with a history of arterial hypertension and permanent atrial fibrillation, 4 years after surgical aortic valve replacement due to stenosis, was admitted to a district hospital because of acute pulmonary edema. Transthoracic echocardiography (TTE), performed after typical pharmacological treatment of symptoms, showed severe mitral insufficiency with suspicion of leaflet perforation. Simultaneously, the appearance and function of the bioprosthesis (systolic P mean 14 mm Hg) and left ventricle (LV) (end-diastolic diameter 45 mm, ejection fraction 58%) were normal. The patient was then transferred to the Cardiologic Department for further diagnosis and treatment. Here two components of the mitral regurgitation were discriminated on TTE – central, functional moderate regurgitation (vena contracta of 5.5 mm) accompanied by additional significant backflow across a fistula located in the basal area of the anterior mitral leaflet. Real-time three-dimensional transesophageal echocardiography (RT 3D TEE) confirmed the presence of an oval-shaped aortic-mitral curtain perforation and enabled its exact sizing, which was 6 mm × 5 mm (Figures 1 A, B). Coronary vessel angiography did not reveal significant changes, and laboratory tests were normal. Facing both high risk of surgical correction and lack of the patient's consent for reoperation, we decided to attempt a percutaneous closure of the perforation.

The procedure was carried out in a hybrid operating room, in general anesthesia, under fluoroscopy and TEE guidance. We started with femoral venous access followed by transeptal puncture (guidewire set Fast-Cath 8.5 Fr). Then, the fistula was crossed with a Balance Middleweight 0.014" guidewire. It was next replaced with an Amplatz Super Stiff 0.035" 260 cm guidewire over which a long sheath Delivery Set 9 Fr was introduced into the LV. Finally, a 6 mm × 3 mm PLD RECTANGULAR (Paravalvular Leak Device, Occlutech) was implanted and totally sealed the perforation as documented by TEE (Figure 1 C) and fluoroscopy (Figure 1 D). The postprocedural period was uneventful, and the patient was discharged from hospital after 10 days.

During 1- and 5-month follow-up TTE examination, the stable position of the plug without residual backflow was confirmed. Simultaneously, the functional component of mitral regurgitation was found reduced to mild. Of note, the patient remained stable in NYHA class II.

## Discussion

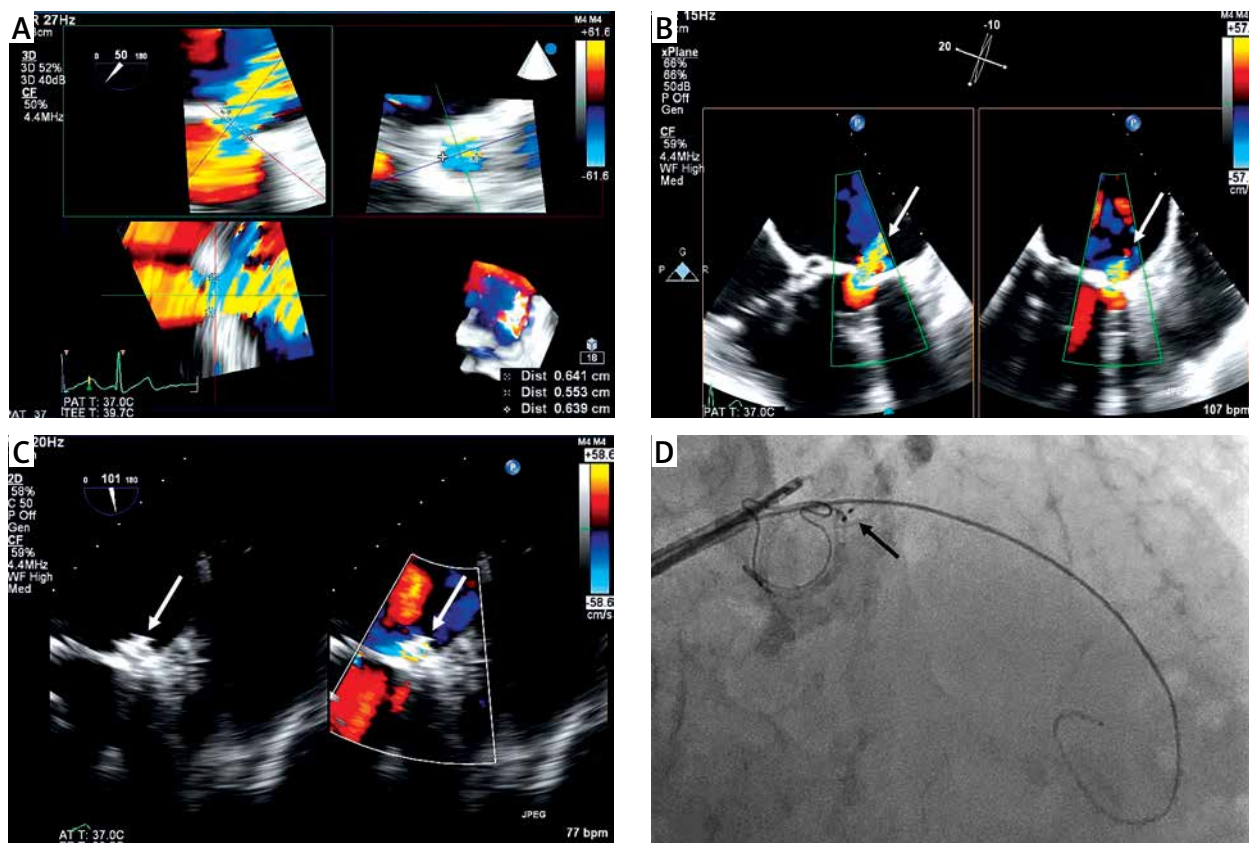
The cardiac surgical procedure based on repair surgery is a standard treatment in patients with backflow of the valvular system. Due to the high risk of complications, the number of percutaneous treatments is increasing [1]. These procedures have undeniable advantages, such as a relatively low complication risk and shorter hospitalization. They are especially recommended in patients in a poor general condition with a high risk of negative consequences of cardiac repair surgery when there are co-existing diseases and when the patient does not agree to cardiac surgery [2].

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**Figure 1.** **A** – Transesophageal color-coded Doppler echocardiography before the percutaneous procedure. Measurement of the perforation. **B** – Transesophageal color-coded Doppler echocardiography. The arrow indicates the regurgitation jet from the left ventricle into the left atrium as a result of a perforation of the anterior mitral leaflet. **C** – Transesophageal color-coded Doppler echocardiography after the percutaneous procedure, no flow through the perforation. The arrow indicates the occluder. **D** – Fluoroscopy image, CRA projection, 39°, RAO projection 28°. The arrow indicates the occluder

We have presented the first experience using the Occlutech Paravalvular Leak Device (PLD) to close aortic-mitral curtain perforation. This device offers the combination of a small delivery sheath size, high flexibility, less material, and a low profile.

### Conflict of interest

The authors declare no conflict of interest.

### References

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