Fenestrated Membrane of the Left Atrial Appendage Orifice

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A 22-year-old woman with hypertension and end-stage renal disease was referred for a transthoracic echocardiogram to evaluate cardiac function. The study revealed normal chamber sizes and left ventricular systolic function; however, an unusual turbulence was noted on color-flow Doppler in the left atrium, originating adjacent to the anterior mitral valve leaflet base. A transesophageal echocardiogram, obtained for better characterization of this jet, showed a linear echogenic structure extending across the orifice of the left atrial appendage (LAA) (Fig. 1). Biplane and 3-dimensional full-volume images revealed a thin membrane (Fig. 2) that substantially decreased the cross-sectional area of the orifice as compared with that of the body of the LAA (0.57 vs 1.78 cm^2) (Figs. 3 and 4). A to-and-fro turbulent, high-velocity jet at the level of this orifice was consistent with restriction of blood flow into and out of the LAA (Fig. 5). These findings were consistent with a fenestrated congenital membrane of the LAA. Of note, the LAA was free of thrombus.

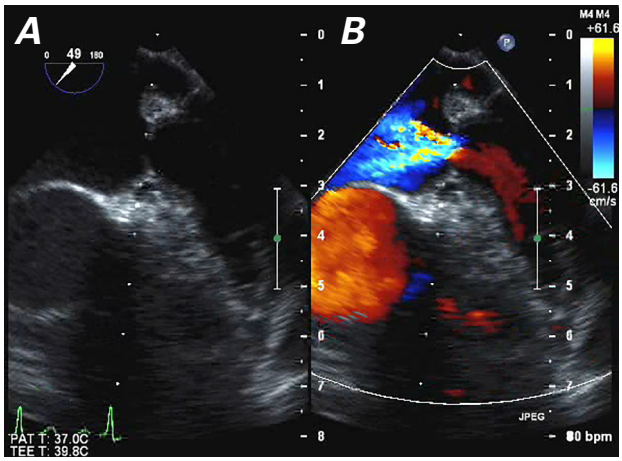

Fig. 1 ***A****) Transesophageal echocardiogram (mid-esophageal view at 35°) shows a thin linear membrane extending across the mouth of the left atrial appendage;* ***B****) color-flow Doppler mode shows a to-and-fro turbulent jet of high velocity, originating at the level of the left atrial appendage orifice.*

Supplemental motion image is available for Figure 1.

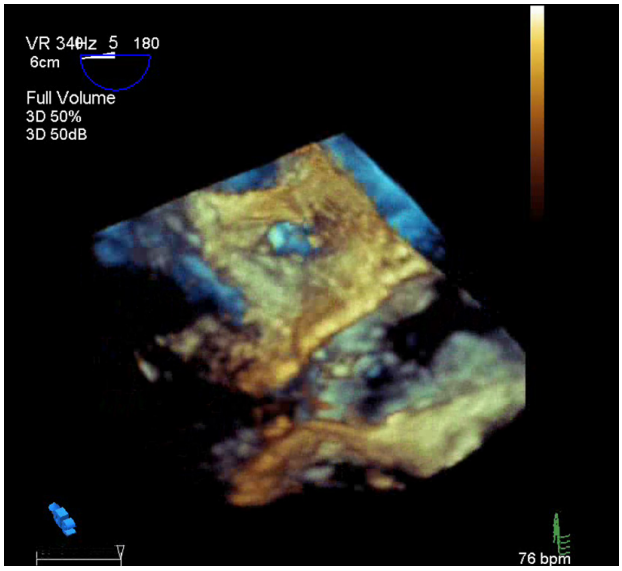

Fig. 2 *Transesophageal echocardiogram (3-dimensional en face rendering) shows the left atrial appendage orifice from the left atrial perspective.*

Supplemental motion image is available for Figure 2.

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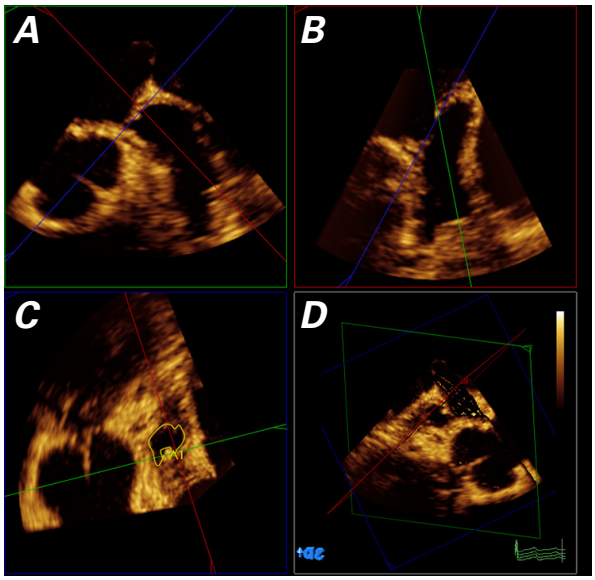

Fig. 3 *Transesophageal echocardiogram (3-dimensional full-volume rendering) shows the left atrial appendage (LAA) orifice. Multiplanar reformatted images of the LAA depict **A**) the axial (green) and **B**) sagittal (red) planes, **C**) a cross-sectional (blue) plane across the level of the LAA membrane, and **D**) the relationship of the cross-sectional planes (green axial, red sagittal, and blue cross-sectional) to each other. The fenestration at the LAA orifice has a planimetric area of 0.57 cm^2 (A1), measured during atrial systole.*

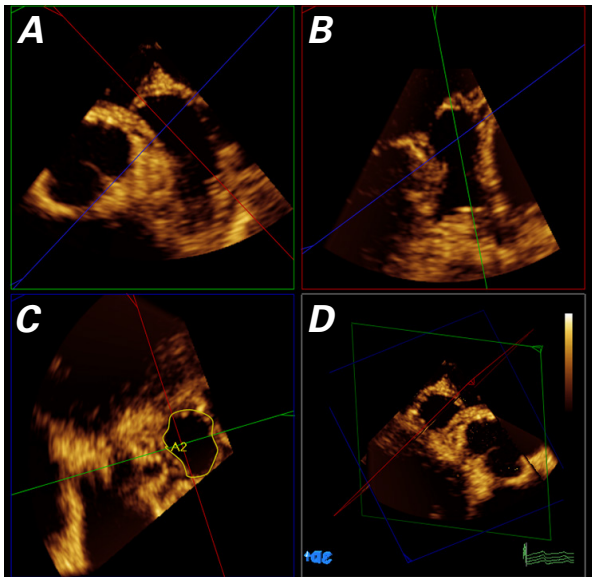

Fig. 4 *Transesophageal echocardiogram (3-dimensional full-volume rendering) shows the left atrial appendage (LAA) mid body. Multiplanar reformatted images of the LAA depict **A**) the axial (green) and **B**) sagittal (red) planes, **C**) a cross-sectional (blue) plane of the LAA body, and **D**) the relationship of the cross-sectional planes to each other. The planimetric area is 1.78 cm^2 (A2). Note the disparity between cross-sectional areas, A1 at the LAA orifice (Fig. 3) versus that at A2 across the LAA body (shown here). Both were measured at the same time, during atrial systole.*

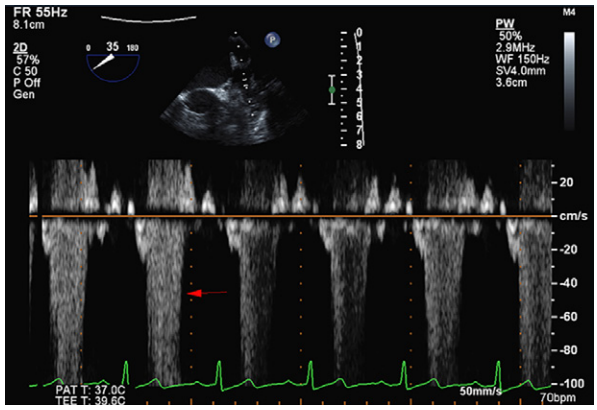

Fig. 5 *Transesophageal echocardiogram in pulsed-wave Doppler mode (midesophageal view at 35°) shows high-velocity flow.*

Comment

Left atrial appendage membrane is an extremely rare, congenital variant of LAA anatomy. Reported only a handful of times, similar membranous partitions of the appendage have been described as obstructive (at the mouth of the appendage) and nonobstructive (within the body). The clinical significance of this entity is currently unknown. It is possible that the obstructive subgroup increases the likelihood of LAA thrombus development, especially in patients with atrial fibrillation or flutter. Conversely, these membranes might decrease the chance of clot embolization by decreasing the cross-sectional area of the LAA orifice.[1] The LAA, with its substantial distensibility, might serve as a decompression chamber that positively influences left atrial pressure and volume relationships. Thus, an LAA membrane could adversely affect the hemodynamic modulation of left atrial pressure, promoting atrial arrhythmogenesis.[2,3] An increased prevalence of atrial arrhythmias in the presence of LAA membranes has been described, but given the small sample size, the causal association remains unclear. More widespread recognition of this entity might aid in understanding the clinical implications, if any, of this rare congenital anomaly.

References

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