Images in cardiology

Giant Chiari Network, Foramen Ovale, and Paradoxical Embolism

Red de Chiari gigante, foramen oval y embolia paradójica

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A Chiari network is identified in the course of 1.3% to 4% of all autopsies and in 2% of patients who undergo transesophageal echocardiography. This network is associated with patent foramen ovale (PFO) in up to 80% of cases. Moreover, a number of scientific articles have linked this association to the development of stroke.

The patient, a 78-year-old man with a history of embolic stroke and no evidence of cerebrovascular disease, complained of progressive breathlessness and dyspnea even on minimal exertion (New York Heart Association class III). A transesophageal echocardiogram revealed severe degenerative mitral regurgitation, severe functional tricuspid regurgitation, and a prominent Chiari network, in the shape of an inverted cone with a cul-de-sac [Figure A, white arrow], the distal end of which reached the PFO [Figure B, white arrowheads]. We also observed turbulent flow from the left atrium to the right atrium through the PFO [Figure B, white arrow].

The patient underwent mitral valve replacement, tricuspid valve repair, and PFO closure by means of simple suture with cardiopulmonary bypass. In the right atrium, we observed a large Chiari network (6.2 cm x 6 cm), which we resected completely [Figures C and D, black arrow, TV, tricuspid valve].

Although this malformation is uncommon, the characteristics of the Chiari network described here might explain the pathophysiology of a paradoxical embolism. The cul-de-sac would promote blood stasis and thrombosis, the inverted cone morphology would enable the mobilization of the thrombus toward the fenestrated region [Figure D, arrow], and the proximity of this region to the PFO could explain the embolism, especially during atrial diastole and Valsalva maneuvers.

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