

Patent Foramen Ovale

Foramen oval permeable

WHAT IS FORAMEN OVALE?

- Fetal circulation

During intrauterine life, oxygen reaches the fetus from the placenta through the umbilical cord, since lungs receive no air. Oxygenated blood drains into the right atrium and gets into the left atrium through a small hole in the interatrial septum called foramen ovale, which is essential for intrauterine life.

- Adult circulation

During adult life, the right atrium and ventricle contain oxygen-depleted blood, which is pumped to the lungs for oxygenation; blood then returns to the left atrium and the left ventricle to be distributed throughout the body.

Foramen ovale is an opening with a membranous tissue flap acting as a valve. During fetal life, the pressure of the right atrium is higher than that of the left atrium, and the flap remains separated leaving the foramen ovale open. After birth, the pressure of the left atrium increases, so the flap is shifted closing the opening.

For unknown reasons, in some individuals (about 25%) the flap fails to close with the rest of the wall (or the closing is incomplete), resulting in a patent foramen ovale (PFO).

Sometimes, the interatrial septum is visualized like a curtain floating in the bloodstream, widely moving back and forth and is called atrial septal aneurysm.

CLINICAL MANIFESTATIONS

In general, PFO does not cause symptoms, and most people with PFO never know they have it.

Patent foramen ovale can cause stroke through a mechanism named paradoxical embolism, in which a thrombus in the veins of the legs travels through the venous circulation to the right heart chambers, to the left atrium through the PFO, and through the aorta to the arteries in the brain.

A percentage of strokes of unknown origin can be secondary to paradoxical embolism through a PFO, particularly in young patients (under 55 years of age) with no risk factors or history of cardiovascular disease. Whether there is a causal relationship between paradoxical embolism and PFO is debatable, since PFO is quite common among the general population and it could be an incidental finding unrelated to the condition.

HOW IS PFO DIAGNOSED?

PFO can be detected as an incidental finding or due to stroke of unknown origin. Echocardiography is the test used to diagnose PFO, and sometimes a transesophageal echocardiography, supplemented by a transcranial Doppler ultrasound and/or cardiac magnetic resonance imaging, is also necessary.

TREATMENT

Incidental PFO in asymptomatic patients requires no treatment.

Closure can be surgical; nowadays, it is more frequent to use a closure device placed by a catheter threaded from the groin through the veins to the heart, sealing the hole and preventing communication between the atria (Figure 1).

To date, international recommendations discourage systematic closure of PFO in patients with strokes of unknown origin, except when it coexists with lower-extremity deep vein thrombosis (which suggests a mechanism of paradoxical embolism), in cases of recurrent stroke of unknown origin, or when a paradoxical embolism is clearly demonstrated.

Whether or not PFO closure is indicated in a patient with stroke of unknown origin, the doctor will prescribe medications such as antiplatelet agents (aspirin) or anticoagulants to reduce thrombus formation.

To reduce the chances of venous thrombosis –and of paradoxical embolism–, it is recommended not to remain sitting or standing in the same position for a long time; change position, and walk every two hours during a plane, car, or train trip, moving legs and feet.

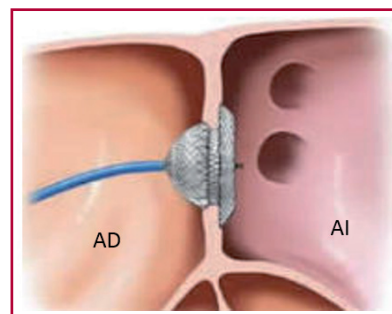


Fig. 1. Occluder device on patent foramen prior to release from the guide catheter. RA: Right atrium. LA: Left atrium.



Author: Alejandro Lakowsky, M.D.
Department of Cardiology,
Sanatorio Mater Dei, Buenos Aires

Editor: Julio Manuel Lewkowicz, MD
Sanatorio Güemes, Buenos Aires

INFORMATION ON THE WEB

- Guía SAC 2012 sobre diagnóstico y tratamiento agudo del ACV isquémico <http://ppct.caicyt.gov.ar/index.php/rac/article/view/1596/pdf>
- Guía 2014 de la Asociación Americana del Corazón de prevención del ACV <http://stroke.ahajournals.org/content/strokeaha/early/2014/04/30/STR.0000000000000024.full.pdf>
- Recomendaciones 2016 de la Academia Americana de Neurología sobre ACV recurrente y FOP <http://www.neurology.org/content/87/8/815.full.pdf+html>

*The information provided is intended to be informative and educational and is not a replacement for professional evaluation, advice, diagnosis or treatment by your health-care professional.
This page cannot be photocopied for commercial purposes, unless authorized by the Argentine Journal of Cardiology.*