

Device closure of “long-tunnel” type patent foramen ovale using transseptal puncture technique

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Introduction

Patent foramen ovale (PFO) is common and may predispose to paradoxical embolism. Transcatheter device closure of PFO can be challenging in certain cases of “long-tunnel” PFO morphology.

Methods

All cases of PFO device closure using transseptal puncture at the Mayo Clinic from 01/01/2010 to 09/30/2013. Clinical, demographic, and procedural data were abstracted from the medical record. PFO tunnel configuration was arbitrarily defined as a tunnel length ≥ 12 mm as observed in intracardiac echocardiography (ICE) at the time of device closure.

Results

Twelve patients (mean age 40.8 [range 15-67] years; 7 males [58%]) underwent PFO device closure with transseptal puncture. Prior to catheterization, PFO with atrial level shunt was diagnosed in all patients by transesophageal echocardiography with color Doppler and/or saline contrast injection (bubble study). Median tunnel length measured by ICE was 15 mm. The most common indication for PFO closure was previous stroke (n=7). Other causes included transient ischemic attack (TIA) (n=2), peripheral thromboembolism (n=1), presence of intracardiac implantable cardioverter-defibrillator (ICD) leads (n=1), and right atrial thrombus with cerebral abscess (n=1). GORE® HELEX® Septal Occluder was used for closure in all but one patient. There was one procedural complication involving a left atrial wall perforation during septal puncture, which resulted in a trivial pericardial effusion that resolved without intervention. At six months, two patients had a residual right-to-left shunt identified by bubble study on transthoracic echocardiography. One of those patients had no shunt one year later. The other underwent surgery for PFO repair, suffered a catastrophic aortic dissection, and died. At latest follow up (mean 543 days, [range 170-1162]) no recurrent strokes or TIAs were reported.

Conclusions

In patients with long tunnel type PFOs, the transseptal puncture technique can be very effective for device closure, though it is not without risk. GORE® HELEX® Septal Occluder may be an effective option for facilitating device closure in these patients.