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Cerebrovascular disease and congenital cardiopathy

Ruth L Collins-Nakai,* Peter McLaughlin**

Summary

Congenital cardiovascular abnormalities may result in cerebrovascular complications such as brain abscess or the increasingly recognized cognitive defects following bypass pump surgery. However, stroke of various kinds are the most common cerebrovascular complication of cardiovascular diseases. Cardiovascular associations with stroke include atrial fibrillation/flutter, emboli from prosthetic heart valves, cerebral ischemia secondary to myocardial infarction or dysfunction, emboli secondary to LV dysfunction, infective endocarditis, tumors, LV aneurysm, atrial septal aneurysms, mitral valve prolapse and to paradoxical emboli from patent foramen ovale. Given the importance of hemostasis and thrombosis in cardiovascular diseases, and the increasing human suffering and toll taken by stroke, the contribution of patent foramen ovale to cryptogenic stroke is dis

Resumen

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Las anomalías cardiovasculares congénitas pueden resultar en complicaciones cerebrovasculares tales como abscesos cerebrales consecuentes a un bypass quirúrgico. Sin embargo, los infartos varios son la complicación cerebrovascular más frecuente de las enfermedades cardiovasculares. Las asociaciones cardiovasculares incluyen a la fibrilación ventricular/flutter, émbolos en las válvulas prostéticas cardíacas, isquemia cerebral secundaria a infarto o disfunción del miocardio, émbolos secundarios a una disfunción del ventrículo izquierdo, endocarditis infecciosa, tumores, aneurisma del ventrículo izquierdo, aneurismas del septo ventricular, prolapso de la válvula mitral, entre otras. Dada la importancia de la hemostasis y la trombosis en las enfermedades cardiovasculares, se discute la contribución del foramen oval patente en el infarto criptogénico.

Key words: Cryptogenic stroke. Patent foramen ovale. Congenital cardiovascular abnormalities.

Palabras clave: Infarto criptogénico. Foramen oval patente. Anomalías cardiovasculares.

The foramen ovale is a normal connection between right and left atria during fetal and immediate neonatal life. Its persistence beyond the first year of life is now considered to be pathological though the vast majority of patients manifest no symptomatology. The prevalence of a persistently patent foramen ovale (PFO) is estimated at between 10 and 15% of the "normal" population,^{1,2} but ranges between 17 and 35% (mean 26%) in pooled autopsy studies, and has been found to be as

high as 54% in patients with cryptogenic stroke.³ PFO has been increasingly recognized as a source of paradoxical embolism in which air, thrombus or fat passes from right to left atrium and then to the systemic circulation. Several studies have identified the combination of PFO and atrial septal aneurysm significantly increasing the risk of stroke. Patients with PFO and paradoxical embolism have an increased risk of future events (both stroke and transient ischemic attack). Overall, the risk of recurrent cerebrovascular events

* President-Elect InterAmerican Society of Cardiology.

** Professor of Medicine University of Toronto.

Correspondence: R Collins-Nakai MD: 15239-43 Avenue. Edmonton, Alberta. Canada T6H 5R3. Phone 780-432-4200. Fax 780-988-0853. E-mail: rcnakai@telusplanet.net

given the presence of PFO, ranges from 3-16%/year for stroke or TIA, with rates of recurrent stroke or death of 6-8% per year.^{4,7} It must be noted that the source of the embolism in so-called cryptogenic stroke is rarely found but is suspected to be the venous system with paradoxical embolus, or intracardiac structures. Most patients with PFO and stroke will have a positive contrast bubble study if done carefully, while a smaller percentage will have a positive colour Doppler visualization of a shunt, or echo visualization of the PFO flap.

In the past, medical therapies using antiplatelet agents, anticoagulation, and surgical closure have been tried with little success at preventing recurrences, increased risk of bleeding or complications, and little relish for (or benefit from) the treatments by patients.^{7,8} Device closure has been proposed as an alternative to anticoagulation or surgical closure in patients with presumed paradoxical embolus. There has now been over a decade of experience with transcatheter device closure of PFOs using a variety of devices, including the CardioSEAL, Amplatzer, buttoned device, and others. Patients receiving anticoagulation prior to device closure are maintained on low molecular weight heparin while off coumadin. Some patients are placed on coumadin or antiplatelet agents for three months and aspirin for six months following the procedure. Technical failu-

res are infrequent and complete closure can be expected in approximately 95% of patients,⁹ initial and intermediate term results reported by peripheral aneurysm with the Amplatzer PFO device was safe and effective at preventing recurrences.¹⁰ Other studies have shown a recurrence rate of stroke or TIA ranging from 1% to 5% at one year after device closure.¹¹ How this would compare to a comparable cohort of patients with best medical treatment in a controlled trial remains unknown. Concerns have remained about degree of closure and peri and post-interventional complications. In a recent report of 1,000 consecutive patients using a variety of different devices, technical closure was successful in all patients but atrial thrombi were noted on some devices postprocedure, with Amplatzer and Helex devices having the lowest incidence.¹² They identified atrial fibrillation and persistent atrial septal aneurysm after transcatheter closure as significant risk factors for thrombus formation.

In order to determine the relative efficacy of device closure of PFO there are several ongoing studies comparing medical and device closure, and device closure with various antiplatelet or anticoagulation postoperative protocols. No cost-benefit analyses of the devices are available at present and there is no indication that PFOs should be closed in asymptomatic patients in the absence of a TIA or stroke.



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