

ARGUMENT IN FAVOR OF PERCUTANEOUS CLOSURE OF PATENT FORAMEN OVALE (PFO)

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A patent foramen ovale (PFO) is an opening between the atrial septum primum and secundum. Birth usually results in functional closure of the foramen followed by anatomical fusion. However, a PFO has been shown to persist in 25%-35% of adults. Transesophageal contrast echocardiography demonstrates the PFO with a right-to-left bubble passage after release of a Valsalva. in 5%-20%.

Several studies have confirmed a strong association between the presence of a PFO and the risk for paradoxical embolism or stroke. The relative risk of a thromboembolic event is 4-fold in patients with a PFO and 33-fold in patients with also an atrial septal aneurysm. A retrospective French multicenter study reported a yearly risk of 1.2% to sustain a recurrent CVA and of 3.4% to suffer a recurrent CVA or TIA despite oral anticoagulants or antiplatelet drugs in patients with PFO and cryptogenic stroke. A subgroup analysis of the American PICSS trial showed a yearly incidence of stroke or death after an initial event of 5% with warfarin and 9% with acetylsalicylic acid. The presence of a PFO more than doubles the mortality in patients with clinically relevant pulmonary embolism. Although most PFO studies focus on middle-aged adults, the risk of a PFO increases with age. To date there is no consensus about type of treatment (oral anticoagulation, antiplatelet therapy, or device closure) or duration of medical therapy after an index event. Currently the association of PFO and migraine is in the limelight and a favorite topic of the device industry. Proof of effectiveness with this indication is likely to be achievable in a couple of years, much quicker than with prevention of paradoxical embolism. Surgical PFO occlusion has largely been abandoned due to the technical ease and success of percutaneous closure.

Percutaneous closure of PFO was performed with various devices at the University Hospital Bern, Switzerland, since April 1994 in over 1000 patients, most with presumed paradoxical embolism. At the last available echocardiographic bubble test, complete closure was documented in 86% of patients (89% of those treated with an Amplatzer PFO Occluder and 54% - 81% in the remainder) and significant residual shunts (>25 bubbles in left atrium) in 4% and 17%, respectively. During follow-up with 3-6 months of antiplatelet therapy, a recurrent embolic event was observed in 1.6% of patients per year. Overall, the incidence of recurrences and events appears favorable compared with the projected course under medical treatment.

Several randomized multicenter trials comparing catheter closure with medical treatment have been started (PC, PEPSIS, RESPECT, CLOSURE, CARDIA). The PC trial is most advanced trial with about 400 patients randomized. However, results are not expected before 2009. The best comparative data consist in a matched control study on patients with cryptogenic stroke and a PFO. It compared the risk of recurrence Between 158 patients treated medically and 150 concomitant patients undergoing percutaneous PFO closure. At four years of follow-up, percutaneous PFO closure resulted in a trend towards risk reduction of death, stroke, or TIA (9% versus 24%; $p=0.08$) compared with medical treatment. Patients with more than one cerebrovascular event and those with complete PFO occlusion had a significantly lower risk for recurrent stroke or TIA after percutaneous PFO closure compared with medically treated patients.

The calculated occurrence of patients with cryptogenic strokes associated with a PFO amounts to somewhere between 100 and 300 per year and million of inhabitants. The latter number corresponds to more than 10% of yearly coronary angioplasty cases. Coronary and peripheral paradoxical emboli before exclusion of competing causes plus the presumed associations between PFO and decompression illness in divers or migraine open additional vast fields of potential indications for catheter closure. Finally, the linearly decreasing prevalence of a PFO with age suggests a selective mortality of PFO carriers (unless spontaneous closure be assumed), inviting preventive closure at young age before venous thrombi start to occur.

A PFO represents a lethal threat growing with age. It can be closed in 15 minutes virtually free of complications and in the awake patient who can resume unrestricted physical activities a few hours after the intervention.