

Atrial fibrillation or patent foramen ovale: where is the cause of recurrent ischemic strokes?

Migotanie przedsionków czy przetrwały otwór owalny – gdzie leży przyczyna nawracających udarów niedokrwiennych mózgu?

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Abstract

Ischemic stroke is one of the major causes of death and disability in high-developed countries. Closure of patent foramen ovale (PFO) is recommended if other causes of ischemic stroke, such as atrial fibrillation (AF), are excluded, especially in young patients. We present a case report of a 75-years-old female patient with five ischemic strokes in her medical history and newly diagnosed PFO. Atrial fibrillation was detected 25 years after first ischemic event. Implementation of anticoagulation therapy has prevented new ischemic strokes in this patient. According to emerging meta-analyses such treatment is sufficient not only in AF, but also in PFO related ischemic strokes. The patient had other risk factors for paradoxical embolism such as varices, post-thrombotic syndrome of lower limbs and the Eustachian valve, so it is unclear whether AF has been the major cause of all ischemic strokes in present case. Significant bleeding from limb varices during anticoagulation treatment occurred and required urgent surgical intervention. Because of the high risk of recurrent hemorrhages (HAS-BLED Score – 4 points), the patient was considered for two percutaneous procedures: occlusion of the left atrial appendage and consecutively the second one – PFO closure as additional prevention of stroke. This is an illustrative case that opens discussion on necessity and timing of cardiac interventions once possible cardiac sources of ischemic strokes are found and new facts arise.

Key words: anticoagulation therapy, atrial fibrillation, ischemic stroke, patent foramen ovale

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Introduction

Ischemic stroke is one of the major causes of death and disability in high-developed countries [1]. Atrial fibrillation (AF) is responsible for around one third of all ischemic strokes [2]. The role of patent foramen ovale (PFO) has been widely discussed especially in younger individuals and closure of PFO is recommended if other causes of ischemic stroke were excluded [3].

Case report

A 75-years-old female patient with five ischemic strokes in her medical history (1986–2012) and multiple other comorbidities (heart failure with reduced left ventricle ejection fraction, coronary artery disease treated with coronary-artery by-pass grafting in 2007, paroxysmal AF (PAF), systemic hypertension, diabetes mellitus type 2, lower limbs' varices disqualified to surgical treatment, post-thrombotic

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Table 1. Risk of Paradoxical Embolism (RoPE) Score results over the years

	1986	2003	2005	2009	2012
History of hypertension (No – 1 point; Yes – 0 points)	No	Yes	Yes	Yes	Yes
History of diabetes (No – 1 point; Yes – 0 points)	No	No	No	Yes	Yes
History of stroke/TIA (No – 1 point; Yes – 0 points)	No	Yes	Yes	Yes	Yes
Smoker (No – 1 point; Yes – 0 points)	No	No	No	No	No
Cortical infarct on imaging (Yes – 1 point; No – 0 points)	Yes	Yes	Yes	Yes	Yes
Age (18–29 yrs – 5 points; 30–39 yrs – 4 points; 40–49 yrs – 3 points; 50–59 yrs – 2 points; 60–69 yrs – 1 point; ≥ 70 yrs – 0 points)	43 yrs	60 yrs	62 yrs	66 yrs	69 yrs
	8 points	4 points	4 points	3 points	3 points
Chance of PFO-related stroke	84%	38%	38%	0%	0%

TIA – transient ischemic disease; PFO – patent foramen ovale

syndrome) was admitted because of non-ST elevation myocardial infarction in 2019. The coronary arteriography showed patent grafts and probably chronic occlusion of the left anterior descending artery (LAD) distal to anastomosis. An attempt to open chronically occluded LAD was unsuccessful and decision on conservative treatment was made by the Heart Team. The echocardiographic examination confirmed reduced left ventricular ejection fraction (LVEF 30%) and for the first time revealed spontaneous left-to-right shunt in interatrial septum (IAS) and presence of the Eustachian valve. Transesophageal echocardiography visualized patent PFO with right-to-left shunt induced by Valsalva maneuver. This finding made paradoxical embolism another possible cause of recurrent ischemic strokes next to PAF. This arrhythmia was recorded for the first time in 2012 just after the last stroke (CHA₂DS₂-VASc score – 9 points). Anticoagulation therapy was started immediately after diagnosis. The patient had other risk factors for paradoxical embolism such as varices, post-thrombotic syndrome of lower limbs and the Eustachian valve [3]. Ultrasonography of the carotid arteries was normal.

We stratified the patient's risk using the Risk of Paradoxical Embolism (RoPE) score dedicated to differentiate stroke-related vs incidental PFO [4]. See Table 1.

At discharge, rivaroxaban (20 mg/d.) plus clopidogrel (75 mg/d.) were administered. One month after discharge a significant bleeding from limb varices occurred that required urgent surgical intervention. Because of the high risk of recurrent hemorrhages (HAS-BLED Score – 4 points), the patient was considered for two percutaneous procedures: occlusion of the left atrial appendage (LAA) and consecutively PFO closure as additional prevention of stroke [3, 5].

Discussion

Implementation of anticoagulation therapy in 2012 has prevented new ischemic strokes in our patient. According to emerging meta-analyses such treatment is sufficient not only in AF, but also in PFO related ischemic strokes [6–8].

Anticoagulation treatment is not inferior to PFO closure as comes to prevention of recurrence of ischemic strokes and both these options are superior to the antiplatelet therapy [6–8]. In European position paper on the management of patients with PFO expert recommend to carefully select patients for percutaneous closure of PFO in case of cryptogenic ischemic stroke [3]. It is advised especially in younger patients (18–65yrs) in the case of lack of other possible causes of ischemic stroke. Individual approach for patients over 65yrs is recommended. It is unclear whether AF has been the major cause of ischemic stroke in present case; especially, considering that it was detected 25 years after first ischemic event. The patient was evaluated using RoPE score, which did not give an exact conclusion on the role of PFO. Active bleeding during anticoagulation generated a new problem. LAA occlusion may be considered as an alternative to anticoagulation therapy in patients with contraindications to antithrombotic treatment [5]. Consensus Document for percutaneous occlusion of the LAA in patients with non-valvular AF also points to other indications for LAA closure than bleeding, such as elderliness or risk of frequent falls [9]. This is an additional argument in favor of LAA occlusion in our patient. The question about PFO closure is still open; however, it seems reasonable after LAA occlusion. This is an illustrative case that opens discussion on necessity and timing of cardiac interventions once possible cardiac sources of ischemic strokes are found and new facts arise. Probably no definite answers can be found yet if there is still time to wait with possible interventions in this kind of patient and continue pharmacological treatment. Should those procedures be performed simultaneously? If this is feasible, probably yes. This kind of attempt reduces complication rate linked to multiplying procedures and reduces necessity of repeating transesophageal echocardiography (TEE).

Conflict of interest

None declared.

Streszczenie

Udar niedokrwienny mózgu jest istotną przyczyną niepełnosprawności oraz zgonów w krajach wysokorozwiniętych. Zamknięcie drożnego otworu owalnego (PFO) jest zalecane, jeśli wykluczy się inne, częstsze przyczyny udaru niedokrwiennego, takie jak migotanie przedsionków (AF), co szczególnie dotyczy młodszych pacjentów. Zaprezentowano przypadek 75-letniej chorej z wywiadem pięciu udarów niedokrwiennych mózgu w okresie 26 lat oraz nowo wykrytym PFO. Migotanie przedsionków zdiagnozowano 25 lat po pierwszym udarze niedokrwiennym mózgu. Włączenie leczenia przeciwnadciśnieniowego zapobiegło wystąpieniu kolejnych udarów niedokrwiennych mózgu. Zgodnie z najnowszymi badaniami takie postępowanie jest skuteczne nie tylko w prewencji udarów związanych z AF, ale również z PFO. Chora była również obciążona wieloma innymi czynnikami ryzyka wystąpienia zatorów skrzyżowanych: żyłkami kończyn dolnych, zespołem pozakrzepowym kończyn dolnych, zastawką Eustachiusza, dlatego też nie było jasne, czy to AF stanowiło główny czynnik wystąpienia wszystkich incydentów niedokrwiennych. Podczas leczenia przeciwnadciśnieniowego u pacjentki wystąpiło istotne krwawienie z żyłaków kończyn dolnych, które wymagało pilnego leczenia chirurgicznego. Ze względu na wysokie ryzyko nawrotu krwawienia (HAS-BLED – 4 pkt.) u chorej rozważano wykonanie dwóch przezskórnych procedur: zamknięcia uszka lewego przedsionka oraz następnie zamknięcia PFO jako dodatkowej prewencji przed kolejnymi udarami niedokrwiennymi ośrodkowego układu nerwowego.

Współwystępowanie AF i PFO otworzyło dyskusję dotyczącą do głównej przyczyny nawracających udarów niedokrwiennych mózgu. Zamknięcie uszka lewego przedsionka i PFO są alternatywnymi metodami zapobiegającymi udarom niedokrwiennym mózgu w przypadku przeciwwskazań do antykoagulacji.

Słowa kluczowe: antykoagulacja, migotanie przedsionków, udar niedokrwienny mózgu, przetrwały otwór owalny

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