Left atrial appendage closure in secondary prevention of stroke in a patient with atrial fibrillation as well as prior stroke and iatrogenic intracranial haemorrhage

Zamknięcie uszka lewego przedsionka w profilaktyce wtórnej udaru mózgu u pacjentki z migotaniem przedsionków oraz przebytym zawałem mózgu i jatrogennym krwawieniem wewnątrzmózgowym

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Abstract

We present a case of a female patient after a transient ischaemic attack (TIA) and a brain infarction, in addition to other risk factors for stroke including atrial fibrillation, in whom warfarin was used for secondary prevention. Three months after a brain infarction, the patient experienced bleeding in the left hemisphere of the brain that was most likely a complication of anticoagulant therapy. Given the restrictions in the choice of stroke prevention methods, and the limitations associated with the patient's negativism, we decided to use an alternative method for secondary prevention of cerebral ischaemia, namely percutaneous closure of the left atrial appendage (LAA). The procedure and post-procedure course were uneventful. During an 8-month follow-up, the patient did not experience new cerebrovascular accidents.

Key words: left atrial appendage, stroke

Streszczenie

Przedstawiono chorą, u której po przejściowym ataku niedokrwiennym (ang. *transient ischemic attack* – TIA) oraz zawale mózgu, wobec obecnych czynników ryzyka niedokrwienia mózgu, w tym migotania przedsionków (ang. *atrial fibrillation* – AF), w profilaktyce wtórnej zastosowano warfarynę. Po 3 miesiącach od zawału mózgu wystąpiło krwawienie do lewej półkuli mózgu będące najpewniej powikłaniem stosowanej terapii antykoagulantem. Wobec ograniczeń w wyborze profilaktyki udaru mózgu oraz wynikających z negatywizmu pacjentki zdecydowano się na alternatywną metodę wtórnej profilaktyki niedokrwienia mózgu – przezskórne zamknięcie uszka lewego przedsionka (ang. *left atrial appendage* – LAA). Zabieg oraz okres pooperacyjny przebiegły bez powikłań. W 8-miesięcznej obserwacji nie stwierdzono u pacjentki świeżych incydentów naczyniowych mózgu.

Słowa kluczowe: uszko lewego przedsionka, udar mózgu

Introduction

Stroke accounts for about 90% of thromboembolic complications in atrial fibrillation (AF). It is believed that all types of AF (paroxysmal, persistent or permanent) are associated with comparable risk for brain infarction. It is estimated that among people < 60 years of age, the incidence of atrial fibrillation is 0.1-0.2%, while in patients older than 80 years it is 9.1-11% [1-3]. In patients with stroke, AF is present in 15-25% of cases, including 4% of patients under 55 years of age [4]. The so-called clinically silent brain infarctions (detected in neuroimaging studies) in atrial fibrillation are noteworthy, as they can be the underlying cause of cognitive disorders.

Anticoagulation is recommended for stroke prevention in patients with atrial fibrillation (class I, level A). In patients who are unable to use oral anticoagulants, antiplatelet therapy is recommended (class I, level A) [5]. Bleeding is an important complication of oral anticoagulant therapy, and

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its incidence, according to different authors, is estimated at 7.6-9.4% [6]. Left atrial appendage closure in patients with atrial fibrillation and reccurent brain ischaemia in spite of antithrombotic therapy, and/or in the case of iatrogenic bleeding, may be a therapeutic option in reduction of the risk for stroke and associated severe complications. The role of left atrial appendage occlusion as a treatment strategy for secondary prevention of stroke is currently undetermined, and the decision on its application should be preceded by a thorough analysis of indications and potential benefits for each patient, especially in the elderly.

Case report

A 74-year-old female patient with comorbidities, including hypertension, coronary artery disease, atrial fibrillation, diabetes, renal failure, TIA, using aspirin (at a dose of 100 mg) was admitted to the hospital because of sudden onset of weakness left limbs. At admission, the physical examination revealed dysarthria and a left-sided hemiparesis with ataxia of the left limbs (8 points on the NIH Stroke Scale). A computed tomography (CT) of head scan showed signs of vascular brain injury. The patient was admitted to the Stroke Unit, where diagnostic procedures excluded the presence of haemodynamically significant carotid and cerebral artery stenoses, but many embolic signals in the middle cerebral arteries were detected.

For secondary prevention of stroke, warfarin was introduced with the use of the international normalized ratio (INR) to control warfarin therapy (5 points on the CHA_2DS_2VASc Scale, 4 points on the HAS-BLED scale). The patient left the hospital in a good general condition (1 point on the Rankin Scale). In the second month after brain infarction, the patient underwent angioplasty with a stent implantation into the left anterior descending artery. Therapy with an oral anticoagulant was maintained. One month later, acute dysarthria and right legs weakness occurred. Neurological examination revealed severe mixed aphasia, central facial palsy, and a right-sided hemiparesis (10 points on the National Institutes of Health Stroke Scale (NIHSS)). A CT scan of head revealed intracerebral haemorrhage in the region of the internal capsule in the left hemisphere (Figure 1). The INR on the day of onset of symptoms was 1.7. The patient was admitted again to the Stroke Unit, where her condition improved. At discharge, only motor aphasia was present, which did not impair verbal communication significantly (1 point on the Rankin Scale).

Because of the need for anticoagulation, together with an increased risk of side effects of this therapy (7 points on the CHA_2DS_2VASc Scale, 6 points on the HAS-BLED Scale), the patient was treated with percutaneous left atrial appendage closure. The procedure was performed in the Department of Invasive Cardiology, Upper Silesian Medical Centre in Katowice in the second month after intracranial haemorrhage (Figure 2). The patient is currently in an outpatient follow-up. The neurological examination in the eighth month after LAA closure revealed mild aphasia. The control ultrasound monitoring of the middle cerebral arteries demonstrated embolic signals. The patient uses aspirin in a daily dose of 100 mg.

Discussion

Atrial fibrillation is associated with a 5-fold increase in the likelihood of ischaemic stroke, with the annual risk in

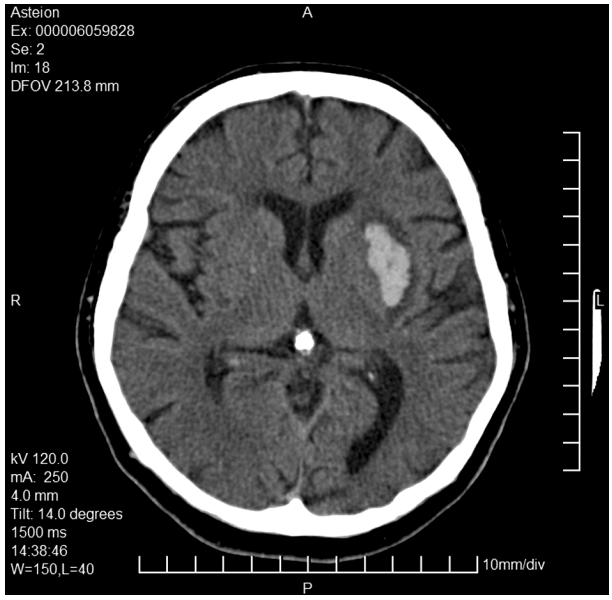

Fig. 1. Left hemisphere haemorrhage
Ryc. 1. *Krwotok do lewej półkuli mózgu*

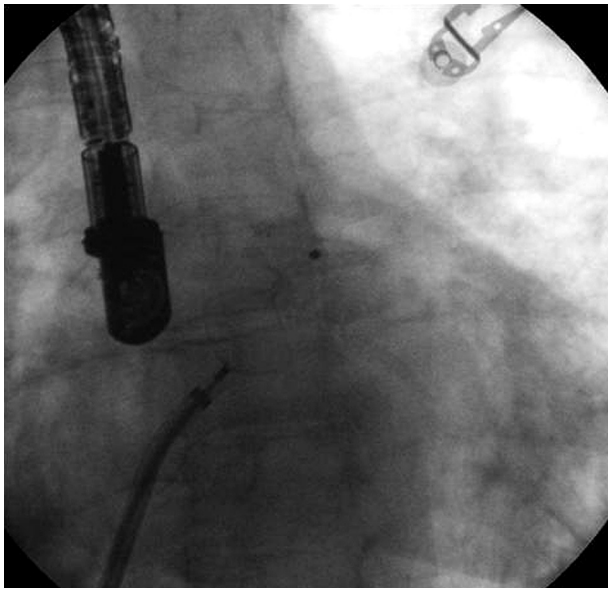

Fig. 2. Implantation of left atrial appendage device (Amplatzer Cardiac Plug)
Ryc. 2. *Implantacja okludera uszka lewego przedsionka (Amplatzer Cardiac Plug). Zdjęcie dzięki uprzejmości dr. Przemysława Węglarza*

these patients, according to different authors, varying from 2% to 10% [7]. The risk is high in patients > 75 years of age, with concomitant hypertension, diabetes, structural heart disease, and in patients with a history of an ischaemic cerebral accident (for most of those diseases the risk increases by a quarter for each decade of life) [7]. For the risk assessment of vascular brain incident in patients with AF, the CHA_2DS_2VASc Scale is used [it is a modification of the CHADS scale developed based on the results of the SPAF (Stroke Prevention in Atrial Fibrillation) trial]. The scale uses a scoring system. A total point score of at least 2 points means that a patient is in a group at high risk for cerebral ischaemia. This scale has a high accuracy in the assessment of patients' risk in 1-year and 10-year follow-up (respectively 0.85 and 0.88) [8]. Patients with a total point score of at least two points should receive anticoagulant therapy with the use of INR to control the therapy. The use of oral anticoagulants reduces the relative risk of ischaemic stroke, including a risk reduction by 67% with warfarin (recommended at high risk of ischaemic stroke), and with aspirin by 22% [9]. It is associated, however, with bleeding complications, including intracranial bleeding, with the incidence estimated at 0.2% per year [9]. The HAS-BLED Scale developed on the basis of the Euro Heart Survey allows for risk stratification of haemorrhage. A total point score of at least 3 points on this scale is associated with the threat of its occurrence. The incidence of intracranial bleeding is increased with INR > 3.5, but no difference is observed at INR 2.0-3.0, compared with lower values [10].

It is believed that because of drug intolerance and/or bleeding complications up to 54% of patients at high risk of cardioembolic complications do not receive oral anticoagulants [11]. The introduction of inhibitors of factor II and factor Xa of the coagulation system gives the opportunity for effective protection of patients with non-valvular AF. Another alternative is the percutaneous closure of LAA, the most common site of thrombus formation in the heart. The results of the PROTECT-AF study demonstrated that the effectiveness of this method in the prevention of complications of AF is comparable to anticoagulation [12]. In a group of 5 patients, Kukuła *et al.* reported an uneventful periprocedural period and follow-up with a median length of 54 months [11].

Taking into account the risk for brain infarction and, at the same time, for iatrogenic bleeding in our patient, we decided to use an alternative method of stroke prevention: percutaneous left atrial appendage closure (LAA). After the cardiac intervention, in an 8-month neurological follow-up, there were neither incidents reflecting disorders in cerebral circulation, nor complications of the therapy.

Because patients in whom LAA closure is considered belong to a group of patients with many comorbidities, the correct qualification for the procedure and performing the procedure require close cooperation of a neurologist and a cardiologist with experience in this area.

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