Endovascular treatment of high bleeding risk acute ischemic stroke

Przezcewnikowe leczenie udaru niedokrwiennego o wysokim ryzyku powikłań krwotocznych

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ABSTRACT

A case of acute ischemic stroke following pacemaker implantation treated via endovascular intervention together with intra-arterial thrombolysis has been presented. Through right radial access, proximal thrombotic occlusion of the left M1 segment of the middle cerebral artery was confirmed within 2.5 hours of symptoms onset. The Sion Blue wire was placed through the thrombus in the distal region of the artery and then the thrombus was aspirated with Finecross microcatheter. At the end of the procedure through the microcatheter two selective intra-arterial boluses of 5 mg of Alteplase were injected. The patient was discharged 6 days after the intervention with Rankin score 2, without bleeding events.

Key words: ischemic stroke, thrombolysis, transcatheter endovascular intervention

Kardiol. Inwazyjna 2017; 12 (2): 15–18

STRESZCZENIE

Przedstawiono przypadek ostrego udaru niedokrwiennego po implantacji kardiostymulatora, leczony za pomocą interwencji wewnątrznaczyniowej z jednoczesnym lokalnym podaniem trombolizy. Po wprowadzeniu cewnika przez prawą tętnicę promieniową uwidoczniono proksymalne zamknięcie segmentu M1 lewej tętnicy środkowej mózgu w ciągu 2,5 godziny po wystąpieniu objawów. Następnie umieszczono prowadnik Sion Blue dystalnie do miejsca zakrzepu, a zakrzep zaaspirowano mikrocewnikiem Finecross. Po zakończeniu procedury poprzez mikrocewnik wstrzyknięto dotętniczo dwa bolusy Alteplazy po 5 mg. Pacjent został wypisany do domu 6 dni po interwencji w stopniu według Rankina 2, bez zdarzeń krwotocznych.

Słowa kluczowe: udar niedokrwienny mózgu, tromboliza, przezcewnikowa interwencja wewnątrznaczyniowa

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Introduction

To date the only proven therapy for acute ischemic stroke is early recanalization [1]. This could be done either with administration of intravenous tissue plasminogen activator [2] or via endovascular intervention, which includes intra-arterial thrombolysis [3] or mechanical thrombectomy [5–6].

It is estimated that stroke occurs in up to 2.9% of all patients who undergo general surgery [7].

Postoperative acute ischemic stroke is common in hospitalized patients. These patients have the benefit of early diagnosis and the burden of high bleeding risk after intravenous fibrinolysis. According to AHA/ASA Guideline major surgery is a relative contraindication for systemic fibrinolysis. Intra-arterial thrombolysis (IAT) uses a lower dose and local delivery of lytic agent and accomplishes clot-specific lysis of occlusive thrombi with limited systemic plasminogen activation and may therefore be a viable therapeutic option in postoperative stroke patients.

Case

We present a case of postoperative acute ischemic stroke treated via endovascular intervention.

In July, 2016, a 78-year-old female with history of hypertension, hyperlipidemia, paroxysmal atrial fibrillation, was admitted to the emergency room because of AV block III degree. Ambulatory therapy was just amlodipine and atorvastatin, without bradycardic or antithrombotic medicines. She was conscious without any neurologic deficit. Before admission in our cardiology unit she received 60 mg of enoxaparine subcutaneously. Prompt treatment with implantation of pacemaker type DDD was performed. A few hours after the procedure she experienced acute stroke with sudden weakness in her left arm and leg. Her NIHSS score was 10. We performed computed tomography (CT), which excluded hemorrhage and showed early ischemic changes in the territory of right middle cerebral artery (Figure 1).

Because of the recent surgical intervention and the enoxaparine administration within 8 hours before acute stroke onset, we decided that the risk of intravenous fibrinolysis will be associated with high risk of bleeding and therefore endovascular treatment is the best option in these settings.

Diagnostic angiography started within 2.5 hours of symptoms onset.

Through right radial access proximal thrombotic occlusion of her left M1 segment of the middle cerebral artery was confirmed (Figure 2 and 3). There was no stenosis in both extra- and intracerebral segments of carotid arteries. Flexor® Shuttle® Guiding Sheath was introduced from the right radial artery to the left common carotid artery. Sion Blue guidewire and microcatheter Finecross were used to reach M1 segment. The wire was placed through the thrombus in the distal region of the artery and then the microcatheter was advanced to perform several thrombo-aspirations. As a result the flow in the artery was restored and the distal segments have been appeared. At the end of the procedure through the microcatheter two selective intra-arterial boluses of 5 mg of Alteplase were injected (t-PA) (Figure 3 and 4). The blood flow in the artery was greatly improved and the neurologic state was getting better. Fortunately the patient did not have bleeding in the surgical incision or intracranial. She was discharged 6 days after the intervention with considerably lower neurologic symptoms, without bleeding events. We performed additional CT scan, which showed no complications. At discharge her Rankin score was 2. At 1 and 6 month follow up she did not have any adverse events.

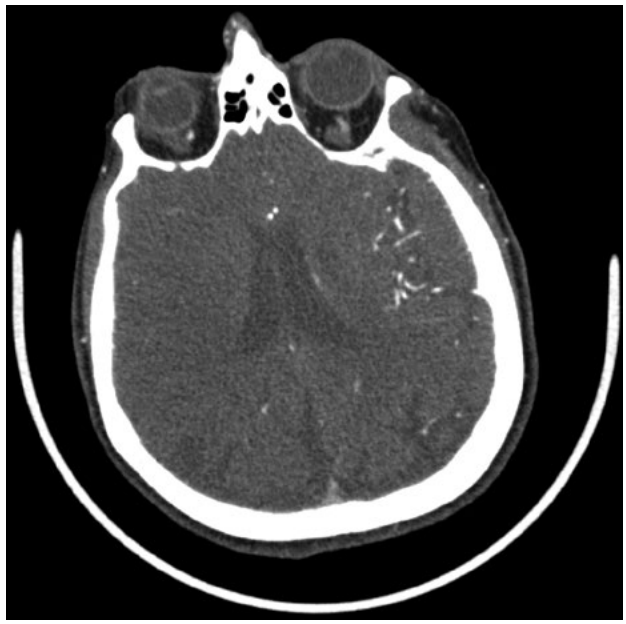

Figure 1.

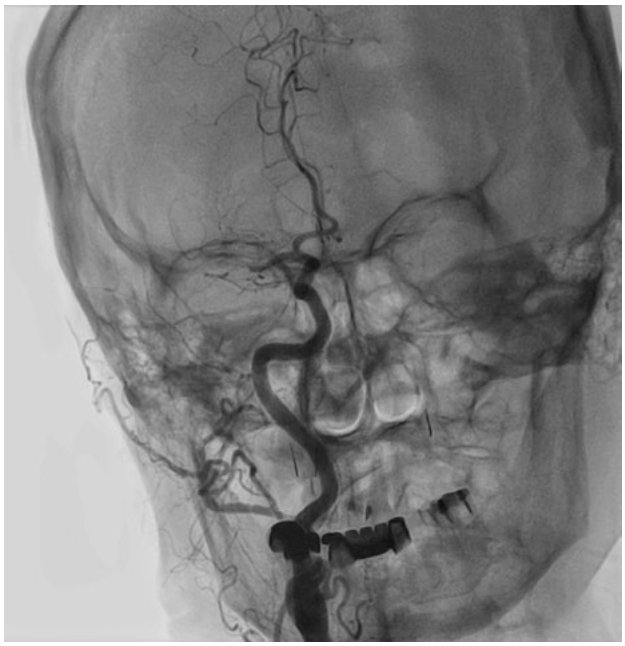

Figure 2.

Discussion

Intra-arterial fibrinolysis is considered for patients ineligible for intravenous thrombolysis. Compared with systemic therapy, intra-arterial therapy offers several advantages, including a higher concentration of lytic agent delivered to the clot target and lower systemic exposure to drug. Disadvantages include additional time required to initiate therapy, availability only at specialized centers, and mechanical manipulation within potentially injured vessels. Intra-arterial fibrinolysis or mechanical thrombectomy is reasonable in patients who have contraindications to the use of intravenous fibrinolysis (Class IIa; Level of Evidence C) [8]. The intra-arterial approach is thought to be more efficacious for recanalization of proximal arterial occlusions than intravenous

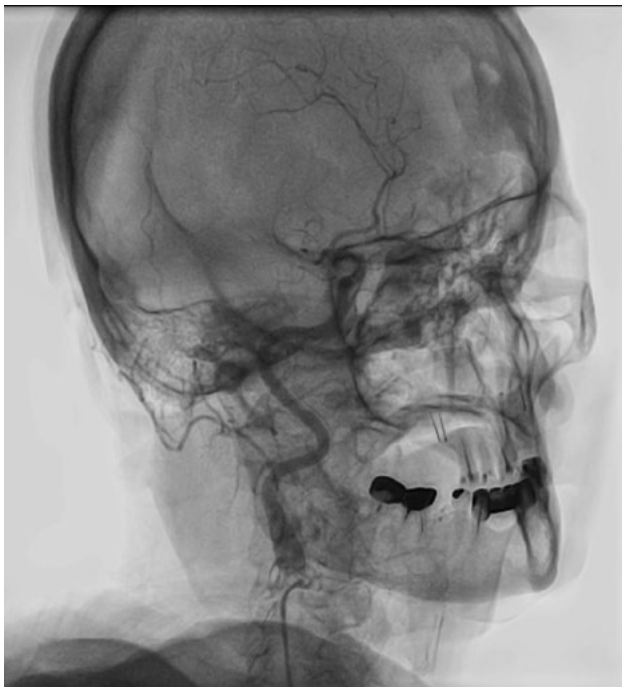

Figure 3.

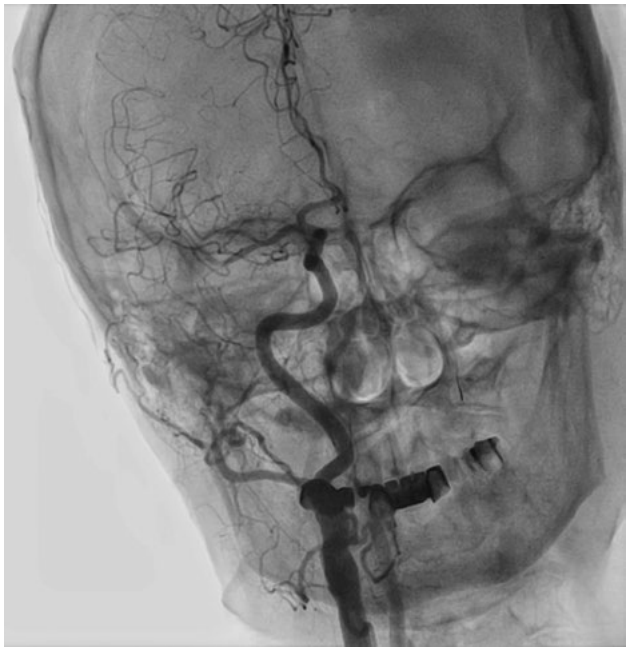

Figure 4.

Figure 5.

fibrinolysis, but the evidences for this approach are limited. Supportive evidence comes primarily from a cohort study by Mattle et al. [9]. They compared stroke outcomes at 2 stroke units, each of which treated exclusively with either intravenous rtPA or intra-arterial urokinase. Favorable outcomes (mRS score 0–2) have been found in 29 out of 55 (53%) intra-arterial versus in 13 out of 57 (23%) intravenous cases (P = 0.001).

Chalela et al. [10] presented published series of 36 postoperative stroke patients treated with intra-arterial thrombolytic therapy. The surgery was mostly major unlike our case. All patients had angiography performed within the average 5.5 hours of symptom onset, with thrombolysis completed within 8 hours of symptom onset. Like our case two thirds of strokes were due to cardioembolic mechanism. The most compelling finding in this study was that 2 patients had fatal intracranial hemorrhage when receiving intra-arterial thrombolysis soon after craniotomy. Both hemorrhages were ipsilateral to the craniotomy site. Surgical site bleeding occurred in 9 (25%) patients, including fatal in 3 (8%) and minor in 6 (17%) cases. The fatal surgical site bleeds included pericardial tamponade in a patient after coronary artery bypass grafting and intracranial hemorrhages in 2 patients with recent craniotomy. Transfusion in the absence of overt systemic bleeding occurred in 4 (11%) patients. Asymptomatic intracranial hemorrhage was detected on follow-up CT in 6 (17%) patients. Symptomatic intracranial hemorrhage occurred in 3 (8%) patients and was fatal in 2 (6%).

Conclusion

In patient with ischemic stroke following pacemaker implantation and high risk of bleeding, endovascular treatment together with intra-arterial thrombolysis was safe and effective.

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