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Thrombectomy for ischaemic stroke in a young patient. Case presentation

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Abstract: Acute Ischemic stroke in young patients has been increasingly diagnosed with the development of neuroimaging technique. Early endovascular treatment can lead to significant improved functional outcome. We present a case of 19-years old boy with acute ischemic stroke by distal middle cerebral artery occlusion. A selective thrombus aspiration with Penumbra system was performed. Satisfactory recanalization was achieved with significant recovery of the patient.
Key words: thrombectomy, ischemic stroke, young

Introduction

Ischemic stroke is a devastating disease that affects young adults with incidence ranges from 3.4 to 11.3/100,000 people per year in primarily white population. Endovascular thrombectomy for an acute ischemic stroke in young patients is a lifesaving treatment that also leads to eloquent functional outcome. Wide spectrum of etiologies, risk factors and management strategies for ischemic stroke in young patients were described, in correlation with factors such as genetic differences, environmental influences, and the development and accessibility of health services. Better surviving chances have been reported in stroke to young group of patients than older ones. However, the ability of prediction and early diagnosis would be of maximum importance in this patient population category[2,7,8].

In this report, we present our experience with a case of young patient with acute ischemic stroke, which was successfully treated with mechanical trombectomy, by using Penumbra's aspiration system.

Case presentation

The patient was a 19-years-old, righ-handed boy, with no significant past medical history, developed sudden onset of dysarthria, left-sided weakness at 9:30 I the morning. He was taken to a primary emergency center one and a half hour later, where cerebral CT demonstrated a fresh thrombus in the M2 segment of right middle cerebral artery (MCA), suggestive for an intracranial arterial thrombosis. The patient was transferred to our

clinic approximately 9 hours after the onset of the symptomatology. The patient was transferred to our clinic approximately 9 hours after the onset of the symptomatology. Given his age and time interval from onset of symptomatology, a decision was made to avoid intravenous administration of tissue plasminogen activator (iv t-PA). National Institutes of Health Stroke Scale (NIHSS) score at the time of arrival to our hospital was estimated to 20. Repeated brain CT showed effacement of right basal ganglia and loss of gray-white differentiation in the right superior temporal lobe. The cerebral CT angiography has highlighted the extension of intimal thrombus from right M2 temporal segment to M1 segment of right MCA. The patient was immediately transferred to neurointerventional suite. The cerebral digital subtraction angiogram demonstrated an abrupt proximal occlusion of the right M1 and a distal A4 segment partial occlusion. The distal right MCA territory was good supplied through well retrograde compensation from right anterior cerebral artery and right posterior cerebral artery. In order to avoid an aggressive manipulation of an unknown vascular territory (possible vascular dissection) we decided to initially use the Penumbra aspiration system rather than a clot retrieval device (figure 1).

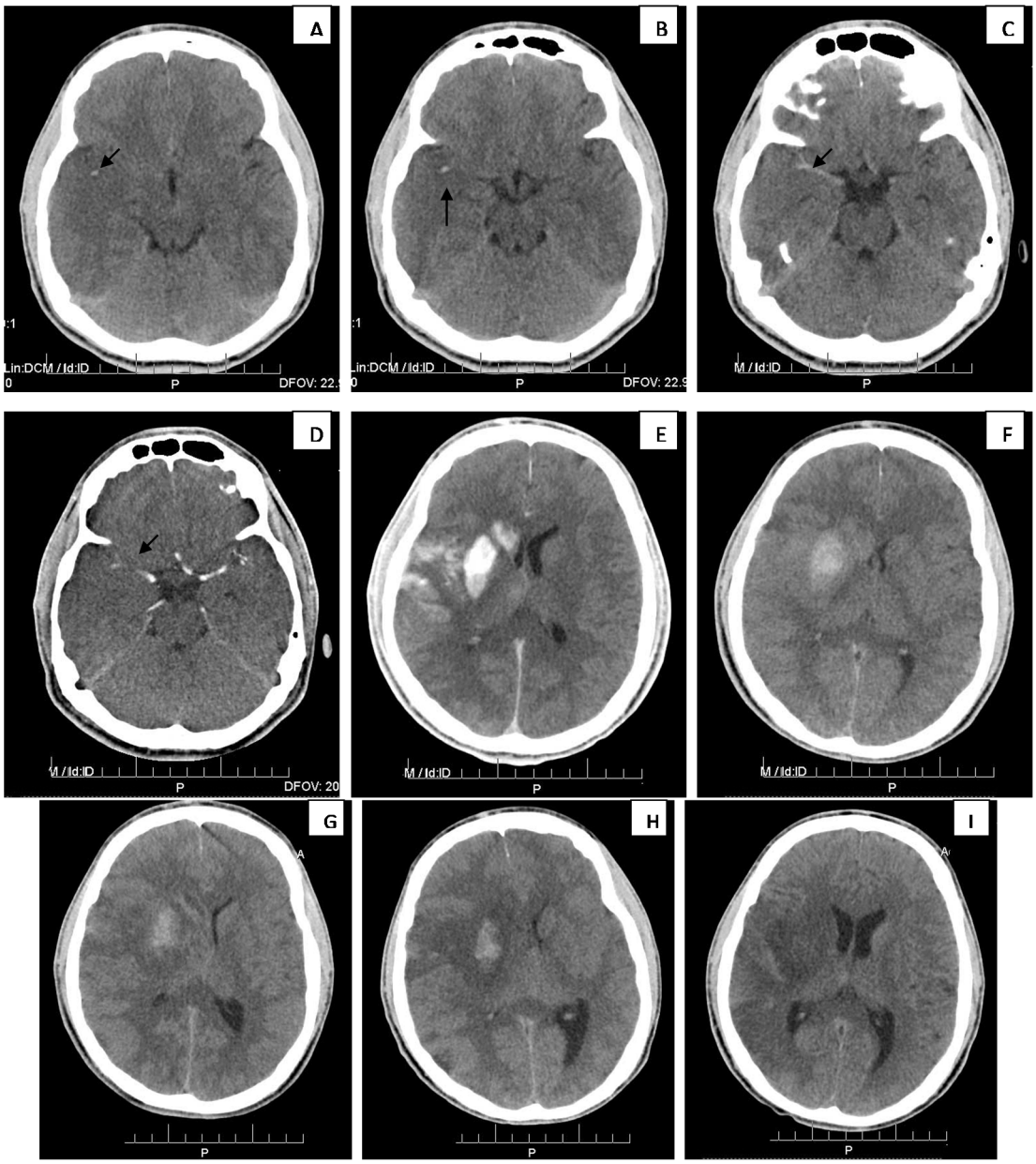

Figure 1 - A, B – right M2 thrombus; C- right M2, M1 thrombus; D – angio-CT aspect of M1 thrombus occlusion; E – postoperative CT control; F – 24 h CT control; G – 3 days Ct control; H – 5 days CT control; I – 15 days CT control

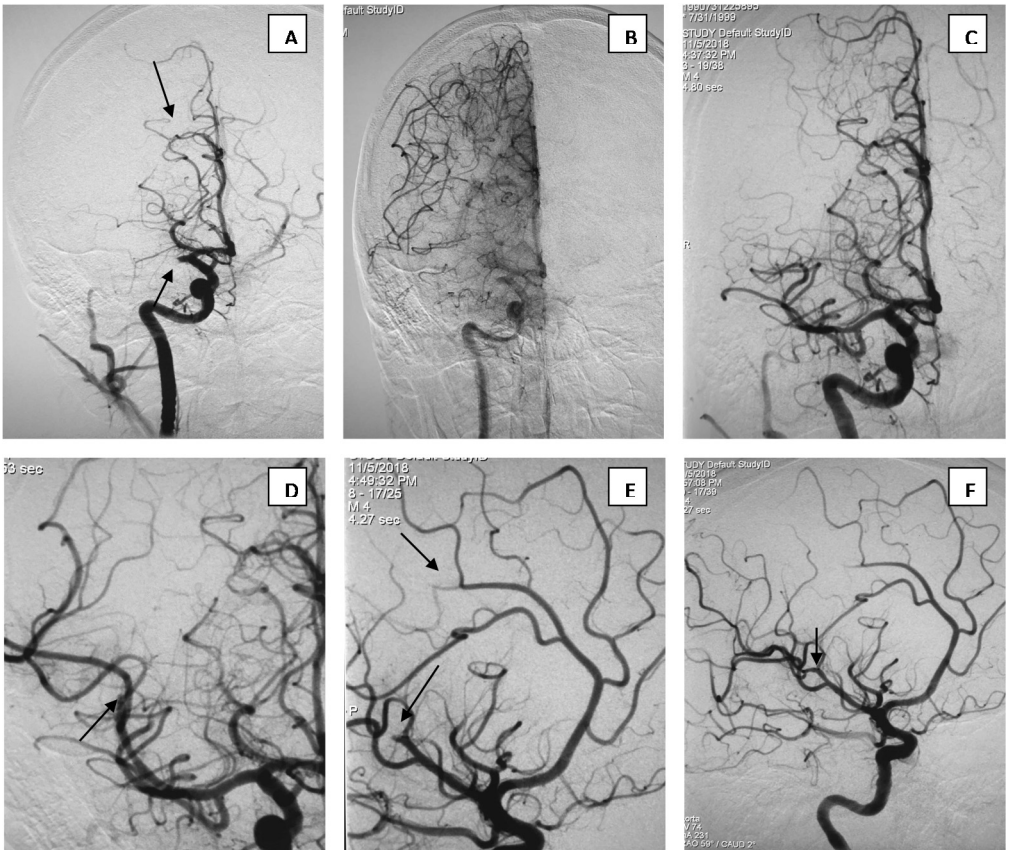

Figure 2 - A – right M1 and A4 thrombus occlusion; B – right MCA territory collateral compensation; C – right M1 and partial M2 desobstruction; D , E– occluded temporal branch of inferior right M2 segment; F –permeable temporal branch of inferior right M2

Technique procedure

The patient was intubated and a 6 French shuttle sheath was placed to the right femoral artery. A 6 French guiding catheter (Guider Softip XF, Boston Scientific) was positioned at the petrous segment of the right internal cerebral artery on hydrophilic coated guide wire 0.035 (Radiofocus, Terumo). A 032 Penumbra System was easy advanced initially to M1 segment over a 0.014 microguidwire (Transcend EX, Boston Scientific). After three aspiration session, partial recanalization of MCA territory was achieved. The temporal branch of inferior M2 segment was still occluded on control angiography. After selective micro-catheterization of this vascular branch a new aspiration session was initiated. Finally a good recanalization right MCA was achieved. The last angiography control showed a good right hemisphere blood supply. Intravenous heparin or atiplatelet agents were not administrated during the procedure to avoid massive reperfusion intracranial hemorrhage (figure 2).

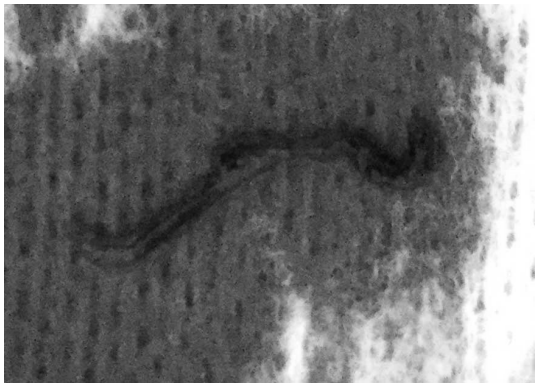

Figure 3 - Thrombus extracted from right M1 segment

Outcome and follow-up

The patient was extubated at 2 hours postinterventional and accommodated for 10 days to intensive care unit. Severe headache and confusion was maintained still 5 days from admission. The patient was discharged after 17 days to a recovery department with left predominantly brachial hemiparesis.

Control cerebral CT scan were performed postoperatively, fallowed at one, 3 and 15 days. Postoperatively the CT scan demonstrates intense contrast accumulation in basal ganglia, caudat nucleus and with diffuse aspect right superior temporal lobe. At 24 h postinterventional a diffuse hiperintense aspects residual to basal ganglia were detected. Foci of infarction were well detected at two weeks in right basal ganglia, mesial and superior right temporal lobe.

Discussion

Ischemic stroke is not a common situation in young patient, and should be considered as the differential diagnosis. Most of the authors included young adults in the 16 – 40 years age group. The etiology of stroke in young adults is different from that in older patients, and has an influence on diagnostic evaluation and treatment. Numerous studies have showed a large spectrum of stroke aetiologies and risk factors for young patients such as Moya-Moya syndrome, vascular dissections, haematological causes, vasculitis and drugs consumption (table 1). There was a general agreement that young patients have a better chance of surviving and outcome than older group (50 -80 years)[1,3,4].

The option of therapeutic strategy is decisive for successful treatment of ischemic stroke. Recent meta-analysis reported that intravenous administration of tissue plasminogen activator (iv aTPA) is safe and efficient for use in young patients. Nevertheless, its effects are limited due to limited time window and inadequate recanalization rate for large arterial occlusion. Ineffectiveness of iv aTPA in patients who already exhibited early ischemic changes has been demonstrated in numerous studies. Also, proximal middle cerebral artery occlusion was proved to be correlated with higher rates of symptomatic intracerebral hemorrhage after iv aTPA[6,7,9,10].

Endovascular mechanical thromectomy have also been advocated for the treatment of stroke in young patients, especially for those who are ineligible for iv aTPA or in which iv aTPA has failed. It was already proved that the upper time limit for endovascular thrombectomy of large anterior vessel occlusions in selected cases was extended up to 16 hours. The recent DEFUSE-3 and DAWN trials extended the role of delayed thrombectomy to selected patients up to 16

and respectively 24 h after symptom onset. While the main goal of thrombectomy is to save penumbral brain tissue, the possible risk of symptomatic intracranial hemorrhage transformation is continuously present. The remarkable clinical recovery after acute ischemic stroke in young patients is largely due to the good pial collateral flow[3,4].

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