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Minor stroke and major vascular occlusion. A case report

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Abstract Occlusion of middle cerebral artery (MCA) is generally associated to severe stroke and poor prognosis; however a few patients with mild to moderate presentation and long-term reversibility of neurological deficits have been reported. A 66-year-old male presented with left-side weakness and dysarthria (NIHSS score 7), which progressively resolved within a few days; ischaemic lesion of the anterior arm of the right internal capsule was found at brain CT obtained 72 h after presentation. Transcranial Colour Doppler showed absence of flow of the right MCA. Cerebral angiography showed occlusion of the right MCA that was retrogradely revascularised by leptomeningeal collaterals. Non-invasive intracranial vascular examinations could identify major intracranial artery lesions in patients who present with mild to moderate stroke symptoms. These patients could be identified and followed to clarify their best treatment and prognosis.

Key words Acute ischaemic stroke • Minor stroke • Middle cerebral artery occlusion • Transcranial Doppler

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Case report

A 66-year-old male was admitted to our hospital because of weakness of the left arm and leg, which had begun two hours earlier. One week before he had had a similar episode of left-side weakness, which resolved spontaneously within two hours. Two weeks before, the patient had started doxazosin treatment for benign prostatic hypertrophy. The patient was a non-smoker; his past medical history included only untreated borderline hypertension.

On evaluation in the Emergency Department, general physical examination showed no abnormalities, blood pressure was 150/90 mmHg in both arms and neurological examination revealed moderate hyposthenia and hypoaesthesia of the left side, inferior left VII cranial nerve palsy and mild dysarthria without gaze or visual field deficit. The score, according to the National Institute of Health Stroke Scale (NIHSS), was 7. On the basis of the Bamford scale a clinical diagnosis of possible lacunar syndrome was made.

Laboratory examinations, electrocardiogram and chest X-ray were normal. Brain CT, obtained in the Emergency Department about 30 min after patient presentation, did not show either haemorrhagic or ischaemic lesions.

The patient satisfied all inclusion criteria of our ongoing study named Study of Efficacy of Tirofiban in acute Ischaemic Stroke (SETIS) and after written consent he was blindly randomised to intravenous treatment with tirofiban, a GPIIb/IIIa inhibitor, or lysine-acetylsalicylate; this therapy was instituted within 6 h of signs and symptom presentation, as scheduled in the study protocol.

During hospitalisation the patient showed progressive clinical improvement. On the third hospital day he presented only mild hyposthenia of the left arm and mild inferior left VII cranial nerve palsy, whereas dysarthria had completely resolved, NIHSS score was 3 and brain CT performed 72 h after presentation revealed a small

ischaemic lesion of the anterior arm of the right internal capsule and part of the homolateral caudatum and lenticular nuclei (Fig. 1). Ultrasound studies were done on the same day: transthoracic echocardiography showed normal findings without evidence of possible cardiac sources of emboli; carotid ultrasonography did not show atherosclerotic lesions of the carotid tree on either side but revealed signs of increased resistance of the right internal carotid artery; transcranial Eco-Colour Doppler revealed absence of flow in the right middle cerebral artery (MCA), with increased and normally directed flow of the right anterior cerebral artery; the left MCA was easily visualised and showed normal flow. This pattern was compatible with right MCA occlusion at its origin (Fig. 2).

On the fourth hospital day brain angio-MR confirmed occlusion of the right MCA (Fig. 3) and an angiographic study was scheduled. Cerebral angiography, performed on the sixth day, showed leptomeningeal collateral circle with revascularisation by inverted flow of the MCA at the M2 tract by the right anterior cerebral artery (Fig. 4); occlusion of the M1 tract of right MCA was complete and mechanical revascularisation was not feasible.

On the seventh day the patient showed further clinical improvement, presenting only mild inferior VII cranial nerve palsy and a NIHSS score of 1. The patient was discharged with oral acetylsalicylic acid (325 mg/day) and perindopril (2 mg/day).



Fig 1 Brain CT performed 72 h after stroke signs and symptoms onset revealed a small ischaemic lesion of the anterior arm of the right internal capsule and part of the homolateral caudatum and lenticular nuclei

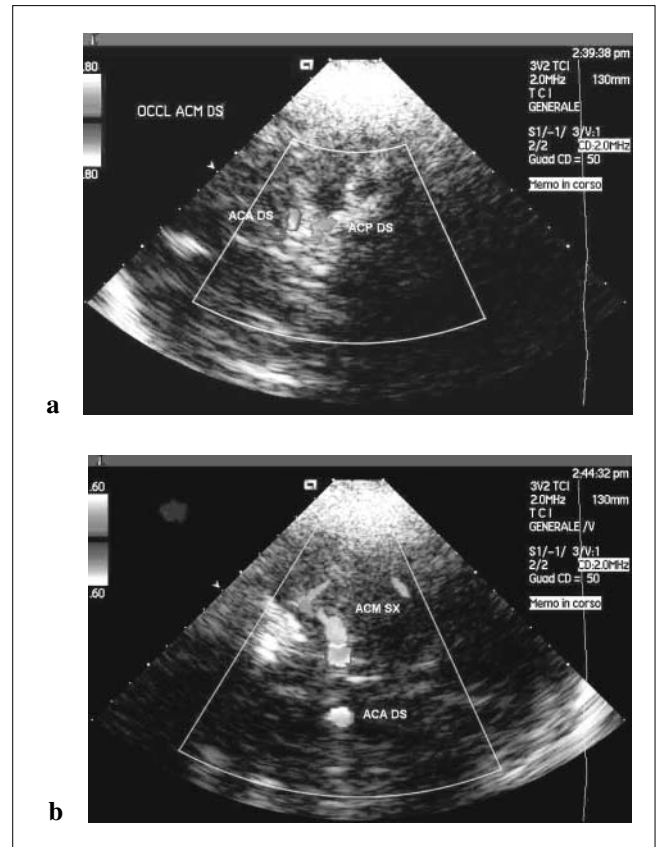


Fig 2a,b Transcranial Eco-Color Doppler. **a** Right trans-temporal window revealed absence of flow in the right middle cerebral artery (*white arrow*), with increased and normally directed flow of the right anterior cerebral artery, a pattern compatible with right middle cerebral artery (MCA) occlusion at its origin. **b** Left trans-temporal window showed normal left MCA

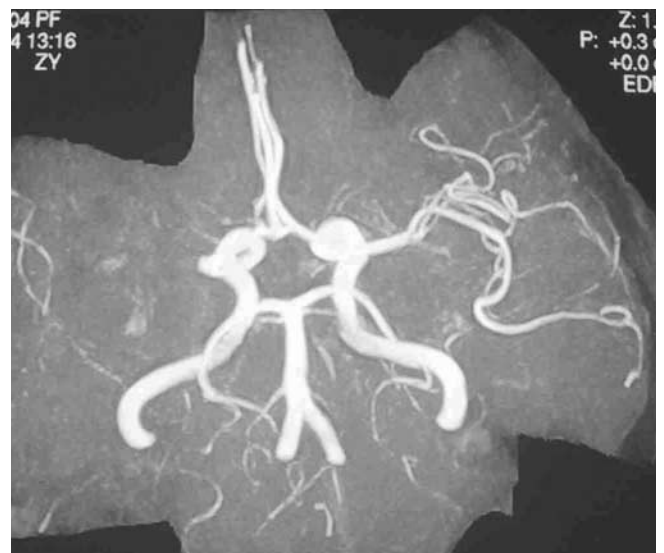


Fig 3 Brain angio-MR confirmed occlusion of the right middle cerebral artery

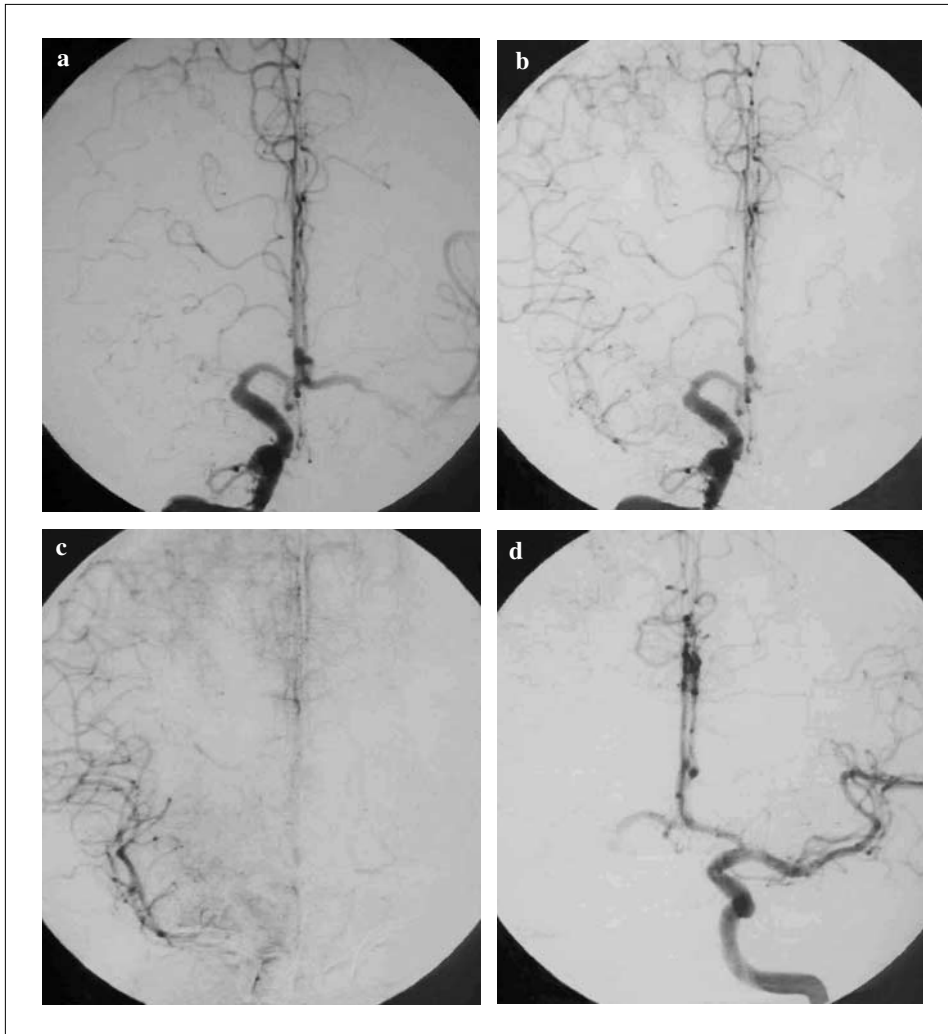


Fig 4a-d Cerebral angiography. **a** Injection of contrast in right carotid tree showed occlusion of right MCA and leptomeningeal collateral circle with revascularisation by inverted flow of the middle cerebral artery (MCA) at the M2 tract by the right anterior cerebral artery. **b** A following phase showed collateral circles. **c** Revascularisation by inverted flow of the MCA at the M2 tract by the right anterior cerebral artery. **d** Injection of contrast in left carotid tree showed normal left MCA and occlusion of right MCA

Discussion

It is generally known that MCA occlusion is associated with severe stroke presentation and poor prognosis [1], however recent studies suggest that this is not always true. Coutts et al. reported a good long-term prognosis in five patients with MCA occlusion who presented with mild neurological symptoms (NIHSS<3); in this study patients were not submitted to angiography or other neurovascular imaging but it is possible that pre-existing collaterals have preserved them from severe stroke [2]. In fact, it was previously shown by Schramm et al. that the presence of good collaterals is associated with a minor risk of infarct expansion and a better prognosis [3]; in this study the authors described five patients with MCA occlusion, mild to moderate symptoms at presentation (NIHSS 8–13), presence of good collaterals at CT angiography and good long-term prognosis, whereas another five patients with MCA occlusion and poor collaterals presented with more severe stroke (NIHSS 6–21) and had a worse prognosis. Moreover, a recent study by Lee et al. showed that perforating artery

infarcts are lesion patterns specific for MCA disease and in this series 50% of patients with MCA disease presented with clinical lacunar syndrome [4].

The patient described in our report is an example of MCA occlusion and mild stroke signs and symptoms.

It is possible that patients presenting with minor stroke and major vascular occlusion represent a peculiar population of stroke patients in whom, due to the presence of good collaterals, the ischaemic lesion does not progress to a large infarct. The real dimension of this population is not known because patients with mild to moderate symptoms are not generally submitted to imaging of the main intracerebral arteries. As a consequence, the optimal treatment and the prognosis are also not known. Our patient was diagnosed with the use of transcranial Eco-Colour Doppler; this exam is not as accurate as the more sophisticated imaging techniques and could require a particular operator skill and long execution time, but is non-invasive, inexpensive, and instruments are largely available. We think that an effort should be made for a more extensive study of intracranial circulation in patients with stroke,

especially when an extracranial or cardioembolic cause is not found.

From a clinical point of view the identification of an intracranial circulatory condition such as that found in our patient is crucial. We suppose that in the reported case MCA occlusion developed before (in a non-quantifiable amount of time) the stroke presentation and it was asymptomatic for the presence of collateral circles. In our patient, perforant branches of the M1 tract of the MCA were therefore terminal branches of a long collateral circle, so that a transient reduction in cerebral perfusion could have caused the infarction of the internal capsule. In our opinion the reduction of systemic blood pressure caused by the start of doxazosin therapy could have reduced the flow reserve in the collateral circle, thus causing the stroke.

For these reasons we suspended doxazosin therapy and recommended a careful prevention of hypotension [5].

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Sommario *L'occlusione dell'arteria cerebrale media di solito determina un ictus cerebrale grave con pessima prognosi; sono comunque stati descritti pazienti che presentano segni e sintomi lievi o moderati e mostrano una regressione del deficit neurologico a lungo termine. Un uomo di 66 anni giunse in PS per ipostenia dell'emisoma sinistro e disartria (NIHSS score 7) che si sono progressivamente risolte in pochi giorni: la TC cerebrale a 72 ore ha docu-*

mentato una lesione ischemica del braccio anteriore della capsula interna destra. Il ColorDoppler Transcranico ha rivelato l'assenza di flusso a livello dell'arteria cerebrale media destra; l'occlusione è stata confermata dall'angiografia che ha documentato la presenza di collaterali leptomeningee che determinavano la rivascolarizzazione retrograda del vaso sino a M2. Lo studio non invasivo del circolo cerebrale permette di individuare lesioni vascolari clinicamente significative anche in pazienti che si presentano con ictus di entità lieve o moderata. Potrebbe essere utile identificare questi pazienti per determinarne la prognosi ed il miglior trattamento.

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