Novel treatment (new drug/intervention; established drug/procedure in new situation)

Interventional treatment for acute ischaemic stroke in an 86-year-old

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Summary

An 86-year-old lady presented to the accident and emergency department with a 90 min history of receptive and expressive dysphasia. There were no motor symptoms or visual symptoms reported. A partial anterior circulation stroke was diagnosed. On examination, she had a National Institutes of Health Stroke Scale of 6. CT angiography showed an occlusive thrombus within the left internal carotid artery extending into the left M1 segment of the middle cerebral artery and the proximal A1 segment of the anterior cerebral artery. Intra-arterial thrombectomy was preformed. Full recovery was achieved.

BACKGROUND

In the UK, 30 000 people aged 80 and over present with ischaemic stroke, with this number being expected to increase as the proportion of elderly patients reaching advanced age is increasing. Little information is available regarding the use of interventional therapy for stroke in this advanced age group. While age is one factor to be considered in patient selection for interventional therapy for acute ischaemic stroke, we believe that age alone should not be a contraindication to this therapy.

CASE PRESENTATION

We present the case of an 86-year-old lady who presented to accident and emergency department with a 90 min history of sudden loss of speech witnessed by her husband. She had a medical history of a non-ST elevation myocardial infarction in 2005, renal carcinoma and right nephrectomy in 1997, hypertension, hysterectomy, dyslipidaemia, previous infarction of the left frontal lobe with no residual deficits and one documented episode of atrial fibrillation. She had previously been prescribed warfarin, which had been discontinued as a result of haematuria. Medications at the time of admission included aspirin 75 mg, perindopril 5 mg, bisoprolol 10 mg, atorvastatin 80 mg, isosorbide mononitrate 30 mg, folic acid 5 mg and glucosamine. Prior to admission she was independent of all activities of daily living and actively involved in the community. She required no physical aids, home help and had no cognition problems.

INVESTIGATIONS

On examination her National Institutes of Health Stroke Scale (NIHSS) score was 6. She had both a receptive and expressive dysphasia. There were no visual field deficits or motor weakness. A partial anterior circulation stroke was diagnosed. An ECG confirmed sinus rhythm. Admitting blood pressure was 149/61, oxygen saturations were 100% and her pulse was regular. CT brain (figure 1) performed at 105 min postsymptom onset demonstrated a hyperdensity

within the left supraclinoid internal carotid artery extending into the left middle cerebral artery (MCA), which was suspicious for thrombus. A CT angiography (figure 2) demonstrated an occlusive thrombus within the left supraclinoid internal carotid artery extending into the left M1 segment of the MCA and also the proximal A1 segment of the anterior cerebral artery.

TREATMENT

A bolus of alteplase, 6.1 mg, was given (10% of 0.9 mg/kg body weight) 140 min from symptom onset. Due to the thrombus burden a decision was made to perform a cerebral angiogram and consider intra-arterial thrombectomy. The potential benefits and risks of this therapeutic intervention were explained to the patient's husband. As the

Figure 1 Dot sign indicative of thrombus in the middle cerebral artery.

Figure 2 Coronal CT angiography demonstrating clot in the middle cerebral artery.

patient did not have the capacity to consent herself due to her dysphasia, informed consent was obtained from the patient's husband. Angiography was performed 150 min from symptom onset. The procedure lasted approximately 2 h and a large clot was retrieved using a trevo stent retriever (figure 3). Recanalisation was achieved (figure 4, preprocedure and figure 5 postprocedure). Following the procedure the patient was transferred to a stroke unit for close monitoring.

OUTCOME AND FOLLOW-UP

Twelve hours following the procedure, the patient had an NIHSS score of 2. She was able to follow one-step and two-step commands and answers questions appropriately. There was some mild residual expressive dysphasia. She remembered what had occurred in the accident and emergency department the night before. She had been aware that something serious was going on and that she could not understand all that was being said to her. She was extremely happy to be able to communicate again. Her pulse remained regular and her blood pressure was 120/60. A CT scan repeated at 24 h postprocedure showed an

Figure 3 Clot retrieved.

Figure 4 Angiography preintervention.

asymptomatic haemorrhage within the left posterior perisylvian cortex and sub cortical white matter extending into the left posterior frontal lobe (figure 6). At day 7 her Modified Rankin Score was 1 and her NIHSS was 0. She was discharged from hospital 13 days after admission with minimal deficits. At day 30 her Modified Rankin Score was 0 and her NIHSS was 0.

DISCUSSION

Early reperfusion therapy is the most effective therapy for acute ischaemic stroke. Intravenous tissue plasminogen activator (tPA) has been shown to be of benefit in selected patients with ischaemic stroke within 4.5 h from symptom onset. However, the benefit declines substantially over time from symptom onset. Intravenous tPA

Figure 5 Angiography postintervention.

Figure 6 Haemorrhage demonstrated in the left posterior frontal lobe.

improves the outcome of 1 in 3 patients treated between 1 and 3 h from onset and of 1 in 6 patients treated within the 3–4.5 h time frame.¹ Furthermore, the odds of a favourable outcome reduce by a factor of 2 in each 90-minute period from onset of symptoms. A later onset to the start of treatment (more than 4.5 h from onset) is also associated with increased mortality.² In a meta-analysis, recanalisation rates with intravenous fibrinolysis was found to be 46.2%, while with intra-arterial fibrinolysis recanalisation rates were 63.2%. Highest recanalisation rates were observed with mechanical thrombolysis at 83.6%.³ Another thrombolytic agent, tenecteplase may offer an advantage over alteplase with the possibility of a longer therapeutic window and greater recanalisation rate and while early results are encouraging in selected patients, its efficacy compared with tPA needs to be established.⁴

Direct catheterisation of an occluded artery and local administration of a thrombolytic agent and/or mechanical clot retrieval are alternative reperfusion strategies. It has been suggested that the upper limit for reperfusion to provide benefit for successfully recanalised endovascular-treated patients may be longer (up to 6–7 h⁵). Intra-arterial thrombolysis has been shown to improve reperfusion rates and clinical outcome in those with a confirmed MCA occlusion administered within 6 h of symptom onset.⁶ Mechanical clot disruption using percutaneous stenting and/or thrombus retrieval devices are being increasingly used, although there is little randomised trial evidence to suggest superiority over placebo. The recent Interventional Management of Stroke-3 study, which compared intravenous thrombolysis with combined intravenous tPA and intra-arterial therapy using either intra-arterial/tPA or mechanical thrombectomy, was recently suspended after crossing prespecified interim analysis thresholds. However, mechanical strategies may still have a role and registry data suggest favourable outcomes and further trial data are emerging. Eighty-three per cent of patients achieved reperfusion with the SOLITAIRE clot retrieval device with a favourable outcome being achieved in 58% of patients.⁷ In the UK, 30 000 people aged 80 and over present with

ischaemic stroke with this number likely to increase as the proportion of elderly patients reaching advanced age expected to increase. Until recently, little data were available on the safety of thrombolysis in older patients. Recombinant-tPA use for ischaemic stroke has been licensed in Europe in adults older than 18 years up to 75 years of age and recently the license was extended to 80 years. The recent Third International Stroke Trial (IST-3) included 1617 patients over the age of 80, and confirmed the benefit of thrombolysis in this group of patients.⁸ Less information is available for the use of interventional therapies in the elderly population. While the Mechanical Embolus Removal in Cerebral Ischemia (MERCI) and Multi MERCI trials had no upper age limit, the mean age of their patients was 67 and 68 years, respectively.⁹ A recent study of multimodal reperfusion therapy in octogenarians comparing 14 patients over 80 with 66 patients younger than 80 and concluded that very old patients had a higher mortality compared with younger patients (43% vs 17%, respectively) and a lower probability of achieving functional independence in comparison to their younger counterparts (14% vs 45%).¹⁰ A recently published prospective study, looking at outcomes after intra-arterial therapy, showed that despite a comparable rate of reperfusion and significant haemorrhage between the elderly (≥ 80) and non-elderly (<80), older patients had a poorer outcome (4% vs 7%, respectively, p value <0.0001) and a higher mortality (59% vs 24%, respectively, p value <0.0001). It was suggested that the difference may relate to the older cohort's poorer clinical baseline and emphasised the need for careful patient selection.¹¹ Another recent study has demonstrated the new TREVO stent-like retriever to be safe and effective with successful recanalisation rates being achieved in 73.3% of cases and 45% of the treated patients achieving a good outcome at 3 months despite suffering a severe stroke on admission (median NIHSS of 18¹²).

We believe this is the first case report of a successful mechanical intervention for stroke in an 86-year-old. While age is but one factor which will influence the decision to use a particular therapeutic approach, further research is required regarding careful patient selection (such as employing risks scores and neuroimaging techniques to identify salvageable brain⁴) in patients for this emerging therapeutic option for ischaemic stroke.

Learning points

- ▶ Advanced age should not be a contraindication to interventional treatment of ischaemic stroke.
- ▶ Intracranial haemorrhage is a known complication of this therapy but may be asymptomatic as illustrated by our case.
- ▶ The population is ageing and doctors will face the above clinical scenario more in the future. Further studies are required in the advanced elderly population to guide this important therapeutic option.

Competing interests None.

Patient consent Obtained.

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