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Case Report

Acute Ischemic Stroke in Pregnancy

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Abstract
Stroke is an uncommon but serious potential complication of pregnancy. The management of acute ischemic stroke in pregnant women remains a complex challenge that extends beyond the limits of clinical trial evidence. Patient 1 was a 29-year-old woman 27 weeks into her first pregnancy, without remarkable past medical history or vascular risk factors. She was admitted 1 h after sudden onset of a left total anterior circulation syndrome (National Institute of Health Stroke Scale [NIHSS] score of 23). CT and angio-CT scans were normal. Thrombolysis was performed, with mild clinical improvement. Brain MRI showed multi-territorial embolic events. Extended blood panel, cervical-transcranial ultrasound, 48-h ECG monitoring, and transthoracic echocardiogram were unremarkable. She was started on aspirin and low-molecular-weight heparin (LMWH), giving birth to a healthy child 10 weeks later. Patient 2 was a 45-year-old woman 34 weeks into her pregnancy, without remarkable past medical history or vascular risk factors. She was admitted 30 min after sudden onset of a left partial anterior circulation syndrome, already partially recovered (NIHSS score of 4). The CT scan showed only a subacute right incidental middle cerebral artery infarct, while the angio-CT confirmed a left M3 branch occlusion. Thrombolysis and thrombectomy were contraindicated by the recent contralateral infarct, mild deficits, and distal occlusion site. Brain MRI also suggested an embolic etiology and LMWH was started. Extended blood panel, 48-h ECG monitoring, and transthoracic echocardiogram were normal. She gave birth to a healthy baby 4 weeks later. These cases

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emphasize the growing real-world evidence of the emergent use of CT, IV contrast, and recombinant tissue plasminogen activator in pregnant women with acute stroke, while also illustrating the importance of an individualized management, accounting for the safety of both mother and child.

Introduction

Stroke is an uncommon but serious potential complication of pregnancy and puerperium [1, 2]. According to the recent American Heart Association/American Stroke Association (AHA/ASA) guidelines, the treatment of acute ischemic stroke with intravenous alteplase during pregnancy may be considered when the anticipated benefits of treating moderate to severe stroke outweigh the anticipated increased risks of uterine bleeding (Class IIb) [3]. Several case reports have documented successful reperfusion, in addition to satisfactory maternal and fetal outcomes [4]. However, management of an acute ischemic stroke during pregnancy remains a clinical challenge concerning the safety of both the mother and the unborn child [5].

Herein, we present two clinical cases of stroke in pregnant women with different individualized therapeutic approaches.

Patient 1

Patient 1 was a 29-year-old woman 27 weeks into her first pregnancy, without remarkable past medical history or known vascular risk factors. Recently emigrated from Brazil, she was admitted to the emergency department 1 h after sudden onset of mutism and right-sided motor deficit. On initial neurological examination, she had global aphasia, left gaze deviation, right homonymous hemianopsia, a right-sided hemiplegia and hypoesthesia with facial involvement, and a right Babinski sign, suggesting a left total anterior circulation syndrome. A noncontrast CT scan was normal. She was clinically diagnosed with an acute ischemic stroke in the left middle cerebral artery (MCA) territory, with a National Institute of Health Stroke Scale (NIHSS) score of 23. No contraindications to intravenous recombinant tissue plasminogen activator (rtPA) were identified, so the bolus was administered on the CT table with 15-min door-to-needle time. CT angiogram was then performed, excluding large-vessel occlusion or stenosis, cerebral venous thrombosis, or arterial dissection. The rtPA perfusion was completed without complications. A mild improvement of her right hemiparesis was observed in the first 24 h, but the aphasia and right hemianopsia persisted. We were not able to perform a CT perfusion or an MRI angiography in the acute phase because these technologies are not available in our stroke unit.

The control CT scan at 24 h showed an established left MCA infarct, with apparent involvement of the ipsilateral anterior cerebral artery (ACA). Brain MRI, performed 5 days after the stroke, confirmed an extensive recent ischemic lesion in the left MCA and left ACA territories, with interhemispheric extension through the genu of the corpus callosum. Angio-MRI revealed complete occlusion of the proximal left MCA and partially recanalized bilateral ACA thrombosis, suggesting recurrent multi-territorial embolism after the initially unremarkable angio-CT. She was started on aspirin 100 mg/day about 24 h after thrombolysis and low-molecular-weight heparin (LMWH) 60 mg b.i.d. only 12 days after stroke because of the extension of the ischemic lesion and the high NIHSS score.

An extended blood panel was unremarkable for thrombophilia, autoimmune diseases, occult neoplasia, hemoglobinopathies, HIV, malaria, dengue, or drugs. Cervical-transcranial ultrasound, 48-h ECG monitoring, and transthoracic echocardiogram were normal, except for persistent left M1 occlusion. A search for patent foramen ovale, monitoring for shunted air-microbubbles with transcranial Doppler, was negative. Serial obstetric ultrasonography also showed no signs of placental displacement or obstetric complication consistent with amniotic embolism.

At the time of discharge, 44 days after the vascular event, she had recovered from the initial comprehension deficits, agraphia, and hemianopsia. While motor aphasia and right hemiparesis persisted, she was already capable of gait with bilateral support, scoring NIHSS 14. She gave birth to a healthy child 10 weeks after the stroke, by cesarean delivery.

Patient 2

Patient 2 was a 45-year-old woman at 34 weeks' gestation, G2P1, without remarkable past medical history or known vascular risk factors. She was admitted to the emergency department 30 min after sudden onset of slurred speech, facial asymmetry, and weakness of the right arm. She reported partial spontaneous improvement during the transportation to the hospital. Neurological examination on admission detected only mild anomic aphasia, slight dysarthria, and right supranuclear facial palsy, scoring NIHSS 4. A noncontrast brain CT scan revealed a subacute infarct in the right MCA territory, without acute signs of left hemispheric ischemia. CT angiogram, however, confirmed a left M3 segment occlusion. Considering the presence of a subacute infarct and the minor deficits, thrombolysis was not performed. The distal branch occlusion of the left MCA was deemed inaccessible to endovascular treatment.

Brain MRI and angio-MRI, done 2 days later, confirmed both the acute infarct in the left inferior frontal gyrus and the subacute infarct in the right fronto-insular cortex, with an occlusion of the insular branch of the left MCA. The multiple infarcts in different vascular territories, suggesting a central embolic etiology, and the small extension of the acute stroke supported the decision to start a therapeutic dose of LMWH (60 mg b.i.d.) 3 days after the stroke.

An extended blood panel workup revealed only mild anemia (Hb 10.3 g/dL) and dyslipidemia (total cholesterol 224 mg/dL, LDL 115 mg/dL, HDL 41 mg/dL), without other relevant changes. Serum markers for thrombophilia, autoimmune diseases, and occult neoplasia were negative. ECG monitoring and transthoracic echocardiogram were also normal. Serial obstetric ultrasonography was unremarkable.

She remained neurologically stable and was discharged home 1 week after admission, completely recovered except for very mild anomic aphasia, corresponding to an NIHSS score of 1. She gave birth to a healthy baby 4 weeks after the stroke, by eutocic delivery.

Discussion

There are only limited data comparing the therapeutic approaches and clinical outcomes of pregnant with nonpregnant women of the same age range. Pregnancy was an exclusion criterion in all clinical trials that assessed the use of alteplase in acute stroke, so our knowledge about its efficacy and safety comes exclusively from case reports and case series [6, 7]. According to the recent AHA/ASA guidelines, the use of intravenous alteplase seems to be

relatively safe during pregnancy and can be considered in acute stroke cases with moderate to severe deficits [3].

In most patients, the evaluation and treatment of stroke during pregnancy should, thus, be the same as in the nonpregnant state [3, 8]. Whenever stroke is suspected in a pregnant woman, the stroke protocol should be activated immediately, considering the currently available time-dependent treatments.

Both our patients performed an acute-phase CT and CT angiogram, which were essential to support the diagnosis and the therapeutic decisions. Despite the theoretical risks of ionizing radiation and IV contrast for the fetus, it is important to demystify its use in acute stroke, since delayed diagnosis precludes an effective treatment and can lead to worse outcomes for both mother and child. Additionally, the fetal irradiation risk can be minimized by the use of a lead apron.

In our first patient, the stroke team decided to perform thrombolysis, considering the potential benefits of treatment seemed to outweigh the risks of uterine bleeding. In the second patient, the mild deficits and the presence of an established subacute contralateral infarction led to a more conservative attitude.

These cases emphasize the importance of a careful and individualized management of stroke in pregnant women, since it is a very complex process that extends beyond the limits of clinical trial evidence. It is important that further cumulative real-world evidence can be gathered and that specific clinical guidelines are developed on this topic, to reduce the morbidity associated with this potentially devastating event.

Statement of Ethics

The authors have no ethical conflicts to declare.

Disclosure Statement

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