Scottish Perinatal Network – Maternal Medicine Group

Guideline for the Management of Suspected Stroke in Pregnancy

DOCUMENT CONTROL SHEET

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DISCLAIMER
The recommendations in this guideline represent the view of the Network, arrived at after careful consideration of the evidence available. When exercising their clinical judgement, healthcare professionals are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to follow the guideline recommendations and it remains the responsibility of the healthcare professional to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

Contents

Guideline for the management of suspected acute stroke in pregnancy: FAST positive* in a pregnant patient

People with suspected acute stroke (including people already in hospital) should be assessed for emergency stroke treatments by a specialist clinician without delay.

1.0 ASSESSMENT

- **Start** with the acute stroke pathway (including symptoms, onset, anticoagulation, blood pressure, blood glucose monitor (BM), National Institutes of Health stroke scale (NIHSS), swallow assessment and obtain intravenous access)

- **Request neuroimaging** – *urgent non contrast CT head is safe in pregnancy.*[1] CT angiogram and CT perfusion can be done in pregnancy if indicated – the fetus is not at any definitive risk from any IV iodine contrast administration.[1,2]

- **Review brain imaging** and the report ± discuss with a radiologist to determine if:
  - Intracerebral haemorrhage present
  - Imaging feature(s) of ischaemia in keeping with acute arterial stroke
  - Are there any features of venous sinus thrombosis such as venous infarct?
  - CTA/CTP fulfil criteria for thrombolysis or thrombectomy[3]

If intracerebral haemorrhage confirmed, please refer to Section 4.

2.0 CONSULTATION

- **Stroke:** All patients with a suspected stroke should be discussed with the stroke consultant to guide referral, treatment and placement decisions.

- **Interventional neuroradiology:** If considering CTA/CTP, if thrombectomy considered – thrombectomy may be preferred to thrombolysis in women where obstetric haemorrhage is a concern.

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* The FAST acronym (Face, Arms, Speech, Time) is a test to quickly identify if someone is having a stroke:
Face weakness: Can the person smile? Has their mouth or eye drooped?
Arm weakness: Can the person raise both arms?
Speech problems: Can the person speak clearly and understand what you say?
Time to call 999: if you see any of these signs

- **Obstetrics:** The obstetric team and obstetric anaesthetic team should be made aware of all patients with a suspected stroke in pregnancy.

- **Critical care:** If patient judged to have or be at risk of raised intracranial pressure, if conscious level falling or neurosurgery is needed or any acute deterioration in which a senior doctor feels critical care review or admission may be beneficial.

- **Neurosurgery:** If at risk of malignant middle cerebral artery syndrome / swelling from a cerebellar infarct

3.0 Acute Management of Ischaemic Stroke

- **IV thrombolysis**: pregnancy and the post-partum period are not an absolute contraindication to thrombolysis, but a multidisciplinary discussion is recommended with obstetric on call team.[2,4-5]

- **Thrombectomy:** Pregnancy is **not** a contraindication to thrombectomy. It is not reasonable to defer necessary management for a disabling stroke because of the pregnancy. Refer to local thrombectomy guidelines.[2,4-5]

- **Acute blood pressure lowering:** target blood pressure <160/110 mmHg if thrombolysis used for ischaemic stroke.[6] Consider target blood pressure of <140/90 mmHg if stroke due to pre-eclampsia.[7]

    - 1st line: Labetalol 200 mg po stat. If this is ineffective or the patient is vomiting then use Labetalol IV (5mg/ml) 50mg bolus (10 ml) over 2 minutes, and consider repeating after five minutes. If the target blood pressure is not reached, consider a maintenance IV infusion as per local policy.
    - Alternatives: Nifedipine 10mg po (not sublingual) or IV hydralazine (if hypertension is severe and labetalol contraindicated). Beta-blockers may be less effective in women of black or African or Caribbean family origin so Nifedipine or hydralazine should be considered first line.

Angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers are not recommended in the antenatal period.[8]

- **Analgesia if in pain:** paracetamol; avoid opiates.

- **If there is risk of airway compromise:** omeprazole 20mg orally 24 hourly.

- **Anti-emetic if nauseated or vomiting:** 1st line: cyclizine 50mg oral or intramuscular as required or up to three times daily; 2nd line prochlorperazine 12.5mg intramuscular three times daily or 10mg orally three times daily. Ondansetron can also be used.[9]

- **Placement:** Admission to be discussed between stroke and obstetrics team depending on the most pressing problem. If >20 weeks pregnant, aortocaval compression should be relieved at all times with 15-30 degrees of left lateral tilt or manual uterine displacement to enable venous return from the legs and avoid hypotension.

4.0 Acute Management of the Intracerebral Haemorrhage (ICH)

- **If an ICH is confirmed, review brain imaging with a radiologist** to determine if there are imaging features to suggest a macrovascular cause and to consider whether delayed brain imaging is needed. Imaging features suggestive of a macrovascular cause are: enlarged vessels or calcifications along the margins of the ICH, hyperattenuation within a dural venous sinus or cortical vein along the presumed venous drainage path of the ICH, or ICH±SAH close to aneurysm locations (e.g. circle of Willis, middle cerebral artery in the Sylvian fissure).[10,11]

- **CT angiogram or time-of-flight magnetic resonance angiography can be done** in pregnancy if indicated.[2,12]

- **Acute blood pressure lowering for spontaneous ICH not known to be due to an underlying macrovascular cause[3]:** Lower blood pressure to a target systolic of 130-139 mmHg within 1 hour and for ≥7 days unless immediate surgery to evacuate the ICH is planned or systolic blood pressure >200 mmHg (in which case consider a less intensive target as reductions of >60mmHg in one hour are associated with harm) or there is another contraindication to acute blood pressure treatment.

- **For management of ruptured aneurysms of arteriovenous malformations,** the management should be based upon the best available option(s) for the patient, regardless of her pregnancy. An inter-disciplinary approach is likely to be needed including neurologists with expertise in intracerebral haemorrhage, obstetricians, interventional neuroradiologists, neurosurgeons and anaesthetists.

5.0 Secondary Prevention

- **Blood pressure lowering[8]:** If long term blood pressure lowering needed after completion of pregnancy, consider an angiotensin converting enzyme (ACE) inhibitor such as Enalapril orally in the first instance or Labetalol orally. For women of black or African or Caribbean family origin, consider Nifedipine or Amlodipine if the woman has used this before to control her blood pressure. Where possible avoid using diuretics or angiotensin receptor blockers to treat hypertension in women in the postnatal period who are breastfeeding or expressing milk.

- **Hypercholesterolaemia[5,6]:** Cholesterol and triglycerides are elevated in pregnancy and should not be measured. Statins are currently considered contraindicated in pregnancy, and should be stopped if taken previously.

- **Antiplatelet therapy[5]:** Aspirin 75mg orally can be started or continued during pregnancy and breastfeeding. Clopidogrel for special indications can be continued during pregnancy but should be withdrawn seven days prior delivery to allow regional analgesia and anaesthesia.

- **Anticoagulation:** Low molecular weight heparin is the preferred anticoagulant agent. Unfractionated heparin is also safe during pregnancy. Warfarin crosses the placenta and can cause embryopathy and intracranial haemorrhage in the first trimester. Direct oral anticoagulants are not recommended due to lack of data. Planned delivery is necessary.

6.0 Special Considerations

Mode of delivery

Vaginal delivery can be encouraged provided there are no obstetric contraindications.
Epidural anaesthesia and a shortened second stage may reduce fluctuations in maternal blood pressure.

Risk of recurrent stroke in future pregnancies

After a pregnancy associated stroke the rate of stroke recurrence in a subsequent pregnancy is 1%.[13] Women who are taking aspirin following an initial stroke can be reassured that they may continue taking this in any future pregnancy.
Further secondary prevention will depend on the cause. Hypertensive disorders will likely need long term antiplatelet treatment and modifiable vascular risk factors should be managed.

Risk factors for ischaemic stroke in pregnancy [5,6]

-older age (>35)
-African American ethnicity
-'traditional' vascular risk factors – hypertension, diabetes
-thrombophilias, for example, antiphospholipid syndrome
- active migraine with aura
-rheumatological disorders, for example, systemic lupus erythematosus
-sickle cell disease
-pregnancy specific factors (gestational diabetes, severe postpartum haemorrhage, caesarean section)

Possible causes of ischaemic stroke in pregnancy and the post-partum period [5,6]

-carotid or vertebral artery dissection
-heart disease including patent foramen ovale or atrial septal defect. For patients with mechanical heart valves the risk of ischaemic stroke increases when the anticoagulation regime is converted

from vitamin K antagonists to low molecular weight heparin to reduce the risk of warfarin embryopathy.
-reversible cerebral vasoconstriction syndrome
-pre-eclampsia and eclampsia
-thrombotic thrombocytopenic purpura and haemolytic uraemic syndrome

Risk factors for intracerebral haemorrhage in pregnancy [6,14]

-increasing maternal age
-non-white ethnicity
-chronic hypertension
-smoking

Causes of intracerebral haemorrhage in pregnancy [14,15]

-hypertensive disorders of pregnancy (eclampsia and pre-eclampsia)
-ruptured arteriovenous malformation
-ruptured intracranial aneurysm
-cerebral venous sinus thrombosis
-reversible cerebral vasoconstriction syndrome (most cases occur in the post-partum period)

APPENDIX- EVIDENCE INFORMING THIS GUIDELINE

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