Guideline for the initial management of suspected ischaemic stroke in pregnancy \spreg

Use this guideline for acute ischaemic stroke. Do not use for patients with intracranial haemorrhage or suspected cerebral venous sinus thrombosis

Suspicion of acute stroke in pregnancy: FAST positive in a pregnant patient

URGENT ASSESSMENT

- **Start** with p.1 acute stroke pathway (symptoms, onset, anticoagulation, BP, BM, NIHSS, swallowand obtain IV access (Slide 1 (scot.nhs.uk))

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

- **Review brain imaging** and report ± discuss with a radiologist todetermine if:

Intracranial haemorrhage present (*if yes, consider secondary causes of ICH)*	Y	N
Imaging feature(s) of ischaemia in keeping with acute arterial stroke	Y	N
Are there any features ofvenous sinus thrombosissuch as venous infarct?	Y	N
CTA/CTP fulfil criteria for thrombolysis or thrombectomy (if applicable)	Y	N

CONSULTATION (guided by your assessments above)

- ***Stroke*** Y N

  All patients with a suspected strokeshould be discussed with the stroke consultant to guide referral, treatment and placement decisions.

- **Interventional neuroradiology** Y N

  If considering CTA/CTP, ifthrombectomy considered – thrombectomy may be preferred to thrombolysis in women where obstetric haemorrhage is a concern

- **Obstetrics** Y N

  The obstetric team(registrar bleep RIE: 1616; SJH: 3558 /consultant RIE: bleep 1617; SJH: 3898) and obstetric anaesthetic team should be made aware of all patients with a suspected stroke in pregnancy.

- **Criticalcare** Y N

  If patient judged to have or be at risk of raised ICP, GCS fallingor neurosurgery is neededor any acute deterioration in which a senior doctor feels critical care review or admission may be beneficial.

- **Neurosurgery** Y N

  If at risk of malignant middle cerebral artery syndrome

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ACUTE TREATMENT

- **IV thrombolysis:** pregnancy and the post partum period are **not** an absolute contraindication to thrombolysisbut a multidisciplinary discussion is recommended with obstetric on call team.

Y		N	

- **Thrombectomy:** refer to thrombectomy guideline:Slide 1 (scot.nhs.uk)

Y		N	

- **Acute blood pressure lowering:** target BP <140/90 if thrombolysis used for ischaemic stroke in pregnancy as per eclampsia guideline. (Microsoft Word - Eclampsia Severe Pre-eclampsia (scot.nhs.uk))

Y		N	

  1st line: Labetalol200 mgpo stat.
  Alternatives:Nifedipine 10mg po (not sublingual) or IV hydralazine (if hypertension is severe and labetalol contraindicated)

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

Y		N	

- **If there is risk of airway compromise:** omeprazole 20mg po 24 hrly

Y		N	

- **Anti-emetic if nauseated orvomiting:**

Y		N	

  1st line: cyclizine 50mg po/IM prn/tds
  2nd line prochlorperazine 12.5mg IM tds or 10mg potds

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.

SECONDARY PREVENTION

BP lowering: If long term BP lowering needed consider Nifedipinepo or Labetalol po.
ACE inhibitors and Angiotensin-2 receptor blockers are contraindicated.

Hypercholesterolaemia:
Cholesterol and triglycerides are elevated in pregnancy and should not be measured.
Statins are contraindicated in pregnancy, and should be stopped if taken previously.

Antiplatelet therapy:
Aspirin 75mg od can be started or continued during pregnancy and breastfeeding.
Clopidogrel for special indications can be continued during pregnancy but should be withdrawn 7 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: risk of skeletal defects and intracranial haemorrhage in the 1st trimester.
Direct oral anticoagulants: not recommended due to lack of data.
Planned delivery is necessary.

SPECIAL CONSIDERATIONS

1) Mode of delivery:

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

2) Risk of recurrent stroke in future pregnancies:

The overall rate of recurrence of stroke associated with a subsequent pregnancy is small.
Women who are taking aspirin following an initial stroke can be reassured that they may continue taking this in any future pregnancy.

3) Further secondary prevention will depend on the cause.

Hypertensive disorders will likely need long term antiplatelet treatment
Remember to advise on modifiable risk factors
Future pregnancies are possible but will need antiplatelet treatment

4) Risk factors for ischaemic stroke in pregnancy:

-Older age (>35)
-African American race
-Heart disease
-Thrombophilias
-Rheumatological disorders
-Sickle cell disease
-Pregnancy specific factors (endothelial dysfunction, impaired autoregulation, gestational diabetes, severe postpartum haemorrhage, caesarean section)

5) Ischaemic stroke in Pregnancy and the post partum period – causes to consider

-Less commonly associated with traditional vascular risk factors (AF, large vessel arteriosclerosis, cerebral small vessel disease)
-Carotid/Vertebral dissection
-Paradoxical embolism and PFO
-Reversible cerebral vasoconstriction syndrome
-Pre-existing heart disease (due to cardiac remodelling)
-Pre-eclampsia and eclampsia
-Pregnancy associated cardiac dysfunction worse in preeclampsia
-Active migraine with aura (risk factor)
-Endothelial dysfunction (Thrombotic thrombocytopenic purpura/haemolytic uraemic syndrome)

Evidence informing this guideline

Cauldwell M, Rudd A, Nelson-Piercy C. Management of stroke and pregnancy. *European Stroke Journal*2018;3(3):227-236.
Wiles R, Hankinson B, Benbow E, Sharp A. Making decisions about radiological imaging in pregnancy. *BMJ* 2022 377:e070486
Brown MA, Magee LA, Kenny LC, et al.; International Society for the Study of Hypertension in Pregnancy (ISSHP). Hypertensive disorders of pregnancy: classification, diagnosis and management recommendations for international practice. *Hypertension* 2018; 72: 24-43.

Consensus with colleagues in NHS Lothian including Stroke physicians, Obstetrics (Lead clinician: Dr Mary), Obstetric anaesthesia (Dr Rosamunde Burns) Interventional neuroradiology (Dr Nania), Critical Care (Dr Kefala, Dr Service) and Neurosurgery (Mr P Brennan).
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