Guidelines for management of stroke in childhood

"A clinical syndrome typified by rapidly developing signs of focal or global disturbance of cerebral functions, lasting more than 24 hrs or leading to death, with no apparent causes other than of vascular origin". WHO definition

2 categories of stroke: Haemorrhagic
Ischaemic (arterial, venous).

ALL children presenting with symptoms or signs of a stroke need **urgent** neuro – imaging.
First choice is MRI/MRA.
CT is reasonable if there will be a delay in obtaining MR.

Haemorrhagic stroke –
Refer straight to neuro-surgical team at SGH.
Transfer will usually be by our anaesthetists. Do not wait for STRS.

Ischaemic stroke –
Does the child have sickle cell disease?
YES:
The child will need urgent exchange transfusion to reduce the HbS to <30%. Discuss with paediatric haematology at SGH via Pinckney ward.
If there will be a delay in exchange transfusion of more than 4 hrs give urgent top-up transfusion to raise Hb to 10 – 12.5g/dl.

NO:
If deteriorating or fluctuating conscious level transfer straight to paediatric neurology at SGH. The transfer must be by a retrieval team. Contact our anaesthetists, while retrieval team awaited, for airway management.

All others admit to HDU on Ash Ward.
Discuss with paediatric neurologists at SGH (Antonia Clarke, Penny Fallon or Tim Kerr) within 24 hrs.

Acute care:
15 min neuro obs 1st 24 hrs.
Maintain temp at normal limits.
Maintain oxygen sats at normal limits.

Medical management:
Aspirin 5mg/kg/day except sickle cell disease or intracranial haemorrhage.

Consider anticoagulation in confirmed extracranial arterial dissection and cerebral venous sinus thrombosis.

Investigations:
Imaging (MRA) of the cervical and proximal intracranial vasculature to exclude arterial dissection within 48 hrs.

Transthoracic cardiac echocardiography within 48 hrs.

Blood tests
On arrival : FBC, UEC, LFT, Glucose, CRP, ESR, TFT, NH3, Lactate

When stabilised:
- Plasma amino acids
- Autoimmune profile
- Varicella IgM + IgG
- Viral serology (HSV, Enteroviruses, EBV, CMV, Parvo)
- Lyme serology
- Mycoplasma titres
- Thrombophilia screen (*must be discussed with consultant -3 months after event*)

Urine tests
Organic and amino acids

CSF (ONLY when stable)
Opening pressure
MC+S
Glucose
Lactate
PCR

Longer term care:
Transfer to main ward when stable
Needs assessment of the following within 72 hours:
- Swallow (SALT via community)
- Feeding and nutrition (dietitian)
- Pain (paed team using validated pain score)
- Moving and handling requirements (physio)
- Positioning requirements(physio)
- Risk of pressure sores (nursing staff)

Refer to the community nursing team for health needs assessment
Refer to social services for social needs assessment
Refer for CAS assessment
Inform Dr Kari as designated doctor for schools

Refer to hospital school
Refer to CAMHS if low mood

Consider referral for rehabilitation at Tadworth or Chailey heritage

Secondary prevention:
Continue aspirin 1-3mg/kg/day
Consider oral anticoagulant in:

- Arterial dissection until vessel healed
- Recurrence despite aspirin
- Cardiac sources of embolism
- Venous sinus thrombosis until recanalised

Annual BP to screen for HPT
Discuss diet, exercise and smoking.

Sickle cell disease:
Refer to SGH for blood transfusion programme
When set up it could be done here.

APPENDIX 1

Genetic causes of stroke

Hereditary dyslipoproteinaemia *lipid profile*
Disorders of connective tissue *miscellaneous*
Organic acidaemias *urinary organic acids*
Mitochondrial myopathies *paired blood CSF lactate; MRI*
Some of the amino acidaemias *plasma and urine amino acids*

Causes of hypercoagulable states that could lead to stroke
PRIMARY
Antithrombin deficiency
Protein C deficiency
Protein S deficiency
Activated protein C resistance
Prothrombin gene mutation G20210A
MTHFR mutation
Anticardiolipin antibodies and lupus anticoagulant
Factors VII, VIII elevation
Factor XII deficiency
thrombophilia screen to investigate all above

SECONDARY
Malignancy
Oral contraceptives
Nephrotic syndrome *albumin*
Essential thrombocytopenia *FBC*
Diabetes *glucose*
Hyperlipidaemia *lipid profile*
Sickle cell disease *FBC*

Causes of cerebral vasculitis that could lead to stroke

Infectious; bacterial, viral, fungal, spirochetal, mycobacterial *infection screen blood, CSF*
Collagen vascular disease *autoimmune screen*
Other systemic diseases e.g. UC, sarcoid
Henoch-Schonlein purpura
Kawasaki *FBC*

Cerebral vasculopathies that could lead to stroke

Arterial dissections
Moyamoya
Vasculitis
Arteriopathy
Migrainous infarction
Traumatic cerebrovascular disease
MRI/MRA scans

APPENDIX 2

Thrombophilia screen
Protein C
Protein S
Protein C resistance
Lipoprotein A
Factor V leiden
Prothrombin G0210A mutation
MTHFR mutation
Antiphospholipid antibodies
Anticardiolipin antibodies
Lupus anticoagulant
Plasma homocysteine

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