Ashford and St. Peter's Hospitals
NHS Foundation Trust

Management of Acute Stroke in Children

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Guideline History		
Date	**Comments**	**Approved By**
April 2009	Updated and reviewed	Dr Bozhena Zoritch
February 2014	Reviewed	
February 2017	Reviewed	
December 2021	Reviewed and updated in line with NICE guidelines	Paediatric Guidelines Group

Patients first • Personal responsibility • Passion for excellence • Pride in our team

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1.

Management of Acute Stroke in Children

Introduction

This guideline outlines the management of acute stroke in children. The most recent update incorporates NICE guideline [NG128] Published: 01 May 2019

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

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. Only give supplemental oxygen if sats <95% in air

Normalise blood sugar levels and maintain hydration.

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

Supporting References

Stroke and transient ischaemic attack in over 16s: diagnosis and initial management

NICE guideline [NG128] Published: 01 May 2019

https://www.rcpch.ac.uk/resources/stroke-in-childhood-clinical-guideline

2. **Supporting relevant trust guidelines**

   None available

2. Guideline Governance

a. Scope

This guideline is relevant to all staff caring for all children from 0-18 years old across the emergency department, inpatient ward and outpatient department.

b. Purpose

i. This guidelines aims to facilitate a common approach to the management of children. At times deviation from the guideline may be necessary, this should be documented and is the responsibility of the attending consultant.

ii. This guideline is subject to regular review to ensure ongoing evidence based practice.

c. Duties and Responsibilities

All healthcare professionals responsible for the care of all children 0-18years should be aware of practice according to this guideline.

d. Approval and Ratification

This guideline will be approved and ratified by the Paediatric Guidelines Group.

e. Dissemination and Implementation

i. This guideline will be uploaded to the trust intranet 'Paediatric Guidelines' page and thus available for common use.
ii. This guideline will be shared as part of ongoing education within the Paediatric Department for both medical and nursing staff.
iii. All members of staff are invited to attend and give comments on the guideline as part of the ratification process.

f. Review and Revision Arrangements

a. This policy will be reviewed on a 3 yearly basis by the appropriate persons.
b. If new information comes to light prior to the review date, an earlier review will be prompted.
c. Amendments to the document shall be clearly marked on the document control sheet and the updated version uploaded to the intranet. Minor amendments will be ratified through the Paediatric Guidelines Group. A minor amendment would consist of no major change in process, and includes but is not limited to, amendments to documents within the appendices.

g. Equality Impact Assessment

Background • Who was involved in the Equality Impact Assessment
Author and the supervising consultants.
Methodology • A brief account of how the likely effects of the policy was assessed (to include race and ethnic origin, disability, gender, culture, religion or belief, sexual orientation, age) • The data sources and any other information used • The consultation that was carried out (who, why and how?)
All groups of staff and patients were taken into consideration and there is no bias towards or against any particular group.
Key Findings • Describe the results of the assessment • Identify if there is adverse or a potentially adverse impacts for any equalities groups
There is no evidence of discrimination.
Conclusion • Provide a summary of the overall conclusions
There is no evidence of discrimination.
Recommendations • State recommended changes to the proposed policy as a result of the impact assessment • Where it has not been possible to amend the policy, provide the detail of any actions that have been identified • Describe the plans for reviewing the assessment
This guideline is appropriate for use.

h. Document Checklist

To be completed (electronically) and attached to any document which guides practice when submitted to the appropriate committee for approval or ratification.

Title of the document:

Policy (document) Author:

Executive Director: N/A

		Yes/No/ Unsure/NA	Comments
1.	**Title**		
	Is the title clear and unambiguous?	**Yes**	
	Is it clear whether the document is a guideline, policy, protocol or standard?	**Yes**	
2.	**Scope/Purpose**		
	Is the target population clear and unambiguous?	**Yes**	
	Is the purpose of the document clear?	**Yes**	
	Are the intended outcomes described?	**Yes**	
	Are the statements clear and unambiguous?	**Yes**	
3.	**Development Process**		
	Is there evidence of engagement with stakeholders and users?	**Yes**	
	Who was engaged in a review of the document (list committees/ individuals)?		**Paediatric Guidelines Group**
	Has the policy template been followed (i.e. is the format correct)?	**Yes**	
4.	**Evidence Base**		
	Is the type of evidence to support the document identified explicitly?	**Yes**	

		Yes/No/ Unsure/NA	Comments
	Are local/organisational supporting documents referenced?	**Yes**	
5.	**Approval**		
	Does the document identify which committee/group will approve/ratify it?	**Yes**	
	If appropriate, have the joint human resources/staff side committee (or equivalent) approved the document?	**Yes**	
6.	**Dissemination and Implementation**		
	Is there an outline/plan to identify how this will be done?	**Yes**	
	Does the plan include the necessary training/support to ensure compliance?	**Yes**	
7.	**Process for Monitoring Compliance**		
	Are there measurable standards or KPIs to support monitoring compliance of the document?	**Yes**	
8.	**Review Date**		
	Is the review date identified and is this acceptable?	**Yes**	**December 2024**
9.	**Overall Responsibility for the Document**		
	Is it clear who will be responsible for coordinating the dissemination, implementation and review of the documentation?	**Yes**	
10.	**Equality Impact Assessment (EIA)**		
	Has a suitable EIA been completed?	Yes	

Committee Approval (Paediatric Guidelines Group)			
If the committee is happy to approve this document, please complete the section below, date it and return it to the Policy (document) Owner			
Name of Chair	**Dr Claire Mitchell**	**Date**	December 2021
Ratification by Management Executive (if appropriate)			
If the Management Executive is happy to ratify this document, please complete the date of ratification below and advise the Policy (document) Owner			
Date: n/a			