Paediatric Stroke Clinical Care Guideline

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Amended for use at *name of hospital*	EDIT
Review Date (yearly)	EDIT

Version	Date	Changes	Reviewed by
1.0			James Beckett Vinnie Vijayakumaran
			EDIT THIS ROW WITH VERSION UPDATES

Scope and Purpose

- Stroke is a time dependent and life-threatening emergency in children.
- Urgent attention and rapid assessment are needed if a possible stroke is identified.
- Purpose of this guideline:
  - Ensure clear understanding of clinical ownership along with the roles and responsibilities of the different specialist teams involved in acute treatment of stroke in a child.
  - Also included are treatment recommendations based on current literature.

Roles and Responsibilities

Ages 18 or over = *an adult and are not included in this guideline*

Ages 16 – 17 = *a child/adolescent with physiology similar to an adult*

- The care will be led by the Acute Stroke Team unless the patient is known to the Paediatric Team or if this is an adolescent presentation of a Paediatric disease.
- In that case the Paediatric Team will need to help and guide the Acute Stroke Team or take responsibility on a case-by-case basis.

Ages <16 = *a child*

- Full clinical responsibility will be provided by the Paediatric Team.
- The Stroke Team will be present to provide expert advice and support for interpretation of neuroimaging and guidance of reperfusion therapy if appropriate.

Management of Stroke in Ages <16

Paediatric Team holds full clinical responsibility. Stroke Team advises on imaging and reperfusion

1) **Stroke pre-alert** made to Children's ED (CED) Team in resus, CED Team will alert the on-call paediatrician
2) **Paediatric Team** conducts review of patient, if diagnosis felt to be stroke, Paediatric Team/CED Team will contact Adult Stroke team for support (Stroke Nurse Specialist bleep 1788 **or** on-call Stroke Consultant via switchboard)
3) **Imaging modality:**
   In-hours (Mon-Fri 08:30-17:30)
   - Paediatric Team liaises with on-call Consultant Paediatric Radiologist (bleep 0018) to prepare for MRI/MRA if available/suitable for patient
   - If no answer from Consultant Paediatric Radiologist after 1x bleep, then contact on-call RAU Team (extension 5270) and organise CT brain + angiography
   - If MRI/MRA not available/suitable for the patient, then to organise CT brain +/- angiography

   Out-of-hours
   - Organise CT brain + angiography

Emphasis should always be to avoid delay of imaging

4) **Scans & SORT:** Paediatric/CED Team requests and reviews scans & contact SORT team
5) **Need for advanced imaging** (CTA/CTP perfusion scan):
   - On-call Stroke Consultant will review initial imaging and decide if advanced imaging required and will requests imaging
   - Paediatric Radiologist/on-call radiologist responsible for interpreting imaging in conjunction with the on-call Paediatric Neurologist at tertiary hospital/transport team.
   - If CTP scan needed, this will be interpreted clinically by Adult Stroke Consultant acutely, formal report not required (IRMER protocol).
6) **Conference call (made via SORT)** with Adult Stroke Team (Hospital), Paediatric Team (Hospital), on-call Paediatric Neurology (tertiary hospital), transport team (site) (once all imaging completed and reviewed as above) to decide if thrombolysis OR thrombectomy required
7) **If clinical indication for *thrombectomy*:** Hospital Stroke Team refer and liaises with tertiary hospital Stroke Team for referral for mechanical thrombectomy.
8) **If clinical indication for *thrombolysis*:**
   - Joint decision will be made between: Paediatric Team (Hospital), Stroke Team (Hospital), on-call Paediatric Neurologist (tertiary hospital/transport team).
   - Clinical decision will be consensus-based
   - Consent obtained by the responsible clinician (paediatric team).
9) **Thrombolysis**
   - ***Agent & dosing*:** joint decision between Paediatric team and the on-call Paediatric Neurologist
   - ***Prescribing*:** Paediatric Consultant
   - ***Administration*:** Stroke Team assists Paediatric Team drawing up medication, Paediatric team will administer the drug
10) **Monitoring & complications:** Paediatric Team provides physiological monitoring and treats medical complications.
11) **Transfer:** If transfer to UHS Paediatric Team required, PHUT Paediatric Team arranges referral and transport with SORT.

Note: Imaging and reperfusion choices must not delay treatment.

SOP approved by TVW PCC ODN and South Paediatric Neurosciences ODN – March 2026

Management of Stroke in ages ≤16 Guideline

1. Stroke pre-alert to Children's ED (CED) Team (extension 3366/5203/3367) in resus
2. CED Team fast bleep on-call Paediatric SpR (bleep 1300) to attend CED
3. Paediatric Team conduct review, if stroke suspected then Paediatric/CED Team contact Adult Stroke Team (Stroke Nurse Specialist bleep 1788/on-call Stroke Consultant via switchboard) for support
4. Decide on imaging modality to investigate for suspected stroke

IN-HOURS

Liaise with on-call Consultant Paediatric Radiologist (bleep 0018) to organise MRI/MRA

- If no answer after 1x bleep then contact RAU Team (extension 5270) to organise CT brain + angiography
- If MRI/MRA not available/suitable then organise CT brain + angiography

OUT-OF-HOURS

CT brain + angiography

Emphasis to AVOID DELAY of imaging

5. Paediatric Team requests and reviews scans with stroke team, Paediatric/CED Team contact SORT (023 8077 5502)
6. On-call Stroke Consultant reviews initial imaging and request additional imaging if advanced imaging (CTA/CTPerfusion) required

On-call Paediatric Neurologist Hospital responsible for interpreting imaging in conjunction with on-call Paediatric Neurologist Tertiary Hospital (bleep 2877)/transport team

If CTP needed, this will be interpreted clinically by Adult Stroke clinicians (formal report not required)

7. Conference call via SORT with *Adult Stroke Team, Paediatric Team, on-call Paediatric Neurologist* and *SORT* once necessary imaging reviewed to decide if thrombolysis/thrombectomy required

THROMBECTOMY

Hospital Stroke Team refer and liaise with Tertiary Hospital Stroke Team

THROMBOLYSIS

Clinical decision consensus-based, shared equally between Paediatric Team, Stroke Team and on-call Paediatric Neurologist Tertiary hospital/transport service

Consent: obtained by responsible clinician (Paediatric Team)

Prescribing: Paediatric consultant

Agent and dosing: joint decision between Paediatric Team and on-call Paediatric Neurologist

Administration: Stroke Team assist Paediatric Team drawing up medication, Paediatric Team administer medication

Dosing for thrombolysis *(adult dosages should be used)*:

Alteplase: 0.9mg/kg (max 90 mg)
OR
Tenecteplase: 0.25mg/kg (max 25 mg)

8. Paediatric Team responsible for physiology monitoring and treating any medical complications
9. Paediatric Team arrange referral and transport with transport service to Tertiary hospital if transfer to Tertiary hospital Paediatric Team required

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Thames Valley and Wessex PAEDIATRIC CRITICAL CARE Operational Delivery Network

South PAEDIATRIC NEUROSCIENCES Operational Delivery Network

Management of Stroke in Ages 16 – 17

Acute Stroke team led care (with paediatric support when indicated). Recovery and rehabilitation on the Adult Stroke HASU.

1) **Stroke pre-alert:** PHUT Stroke Team notified; patient identified as 16–17.
2) **Initial assessment in ED:** Stroke Team attends and performs stroke assessment.
3) **Paediatric involvement decision:** If known/suspected paediatric disease then fast bleep Paediatric SpR/Consultant to ED for assistance. Otherwise continue under Acute Stroke Team.
4) **Neuroimaging:** Stroke Consultant requests and interprets all neuroimaging (CT/MRI/CTA as indicated).
5) **Intravenous thrombolysis:** Stroke Team obtains consent, prescribes and administers IV thrombolysis when indicated.
6) **Mechanical thrombectomy:** PHUT Stroke Team liaises with Southampton Stroke Team for referral; Stroke Team organises transfer if required.
7) **Ongoing physiological care (if paediatric disease present):** Paediatrician continues physiological care; consider SORT where appropriate.

Note: Neuroimaging (4) and IV thrombolysis (5) remain Stroke Team responsibilities even when Paediatrics are involved.

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Management of Stroke in ages 16 -17 Guideline

1. Stroke pre-alert to Adult Stroke Team (Stroke Nurse Specialist bleep 1788/on-call Stroke Consultant via switchboard), patient identified as aged 16 – 17

2. Stroke Team attends patient in ED and performs assessment

Known or suspected Paediatric disease?

YES

Fast bleep Paediatric SpR (bleep 1300)/on-call Consultant (via switchboard) to ED for assistance

Paediatric Team guides Acute Stroke Team, leadership case-by-case

NO

Continue under Acute Stroke Team pathway

3. Stroke Consultant request and interpret neuroimaging (CT/MRI/CTA)

4. Stroke Team obtains consent and administers IV thrombolysis if indicated

5. QA Stroke Team liaises with UHS Stroke Team (via switchboard) for mechanical thrombectomy, organise transfer if required

6. Rehabilitation and recovery on Adult Stroke HASU

If known/late presentation of Paediatric disease: Paediatrician continues physiological care. Consider Transport Team (call 023 8077 5502) if appropriate.

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Acute Ischaemic Stroke – Summary of Evidence for Thrombolysis and Thrombectomy

There is a lack of clinical trials and evidence for the use of tissue plasminogen activator (tPA) for thrombolysis of acute ischaemic stroke in infants and children.

Below is a list of key points summarised from the 2017 Stroke in Children guideline and a 2023 literature review.

Age criteria

- tPA is licenced for ages 16 and over.
- Off label use of tPA can be considered in children aged between 8 – 16.
- Children aged 2 – 8 the guideline states that tPA may be considered on a case-by-case basis.
- tPA must not be used in children under 2.

Use of Advanced Imaging

- CT brain should always be carried out to exclude haemorrhage or other cause of neurological deficit.
- Onset time, age, compliance, and clinical severity should be considered when deciding to use MRI or CT Perfusion.
- ASPECT Score in children has not been validated.
- CT Perfusion in children aged 8 and under should not be used due to the altered intracranial vascular physiology.
- There are no trials in the use of extended thrombolysis in children, it can be considered therefore on a case-by-case basis.

Dose of thrombolysis

- The adult dosing of Alteplase (0.9mg/kg) or Tenecteplase (0.25mg/kg) should be used.
- There is insufficient data or trials that would indicate the need for dose adjustment for children.

Risk and Benefit

- In adults we quote a 50% chance of reducing damage from stroke. This would be fair to say in children.
- The case studies to date of the literature review published incorporate TIPS (2010) and a 2012-15 retrospective multicentre study. 54 children had received Alteplase within 4.5 hours of symptom onset of confirmed stroke. There were no reports of haemorrhage or haemorrhagic transformation after treatment.
- There is no data in the bleeding risk of Tenecteplase or extended thrombolysis in children.

Mechanical Thrombectomy

- Like adults, the use of modern devices and techniques for mechanical thrombectomy in children yields favourable outcomes with low complication rates.
- All confirmed large and medium vessel occlusions should be discussed with the Stroke team in Southampton and reviewed by an Interventional Neuroradiologist.

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Acute Haemorrhagic Stroke – Summary of Evidence for Treatment

75% of non-traumatic intracerebral haemorrhages in children are due to a structural or vascular abnormality. Early CT Angiography or MRI imaging is needed to establish any underlying lesions.

- CT Angiography should be requested as soon as a Haemorrhage is identified.
- Maintaining normoglycaemia and normothermia has been associated with favourable outcomes.
- There is no evidence or data for rapid blood pressure lowering like with adults. Blood pressure lowering should be considered on a case-by-case basis on discission with the Neurosurgical team in UHS.
- Be vigilant for seizure activity and treat accordingly, but there is no evidence of benefit for prophylactic anticonvulsants.
- Correct any haematological abnormality.
- All haemorrhagic strokes in children need to be discussed early with Wessex Neurosurgical team in Southampton. Bleep 2877.

Review of Process

The Stroke Team and Paediatric team will review this process once per year to ensure there has been no new trials or changes in practice that would impact this guideline.

Point of Contact	Details
Stroke Doctor	FILL WITH EMAIL CONTACT
Paediatrician	FILL WITH EMAIL CONTACT

References

Stroke in Childhood Guideline. RCPCH. May 2017. Available at (Stroke in childhood - clinical guideline for diagnosis, management and rehabilitation | RCPCH)

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