The Sydney children's Hospitals Network
care, advocacy, research, education

STROKE: ACUTE MANAGEMENT IN THE EMERGENCY DEPARTMENT

PRACTICE GUIDELINE ©

DOCUMENT SUMMARY/KEY POINTS

- Childhood stroke is a rare but potentially devastating disease, which can be successfully treated if recognised early
- A child with an acute stroke requires immediate specialised investigation and management
- The recognition of paediatric stroke can be challenging
- Children presenting with possible acute stroke should be immediately identified and seen by a senior doctor
- If a child meets the criteria then the senior doctor will discuss the case with the CONSULTANT neurologist on call and confirm activation, imaging and management
- Clinical suspicion in first line assessment is crucial
- The challenge is differentiating the less common stroke from the more common stroke mimics
- Early referral of suspected stroke to Paediatric Neurology and early neuroimaging are key
- Optimal imaging is MRI, however, availability is limited. In selected children CT Angiogram is an appropriate alternative.
- At CHW, MRI is limited and CT/CT angiogram is the optimal imaging for patients
- Selected children will benefit from timely, acute reperfusion therapy: Alteplase (tPA) infusion or interventional radiologic clot retrieval or both

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	Executive Director Medical Services and Clinical Governance	
Date Effective:	1st January 2021	**Review Period:** 3 years
Team Leader:	Staff Specialist	**Area/Dept:** ED (CHW & SCH)

Related Information for SCH

- This document should be used in conjunction with Australian Childhood Stroke Advisory Committee 2017 document: "**The Diagnosis and Management of Childhood Stroke**" https://www.mcri.edu.au/sites/default/files/media/stroke_guidelines.pdf
- This resource provides clinical information highlighting predisposing factors linked to childhood stroke, relevant differential diagnoses, immediate supportive management guidelines, suggestions regarding acute neuroimaging and background information relevant to acute therapeutic interventions.
- Clinical Assessment and pathways to support time-critical decision making regarding urgent neuroimaging are essential for accurate and timely diagnosis
- Additionally, and Stroke flowsheet and external referral flowsheet are included together with useful contact numbers

CHANGE SUMMARY

- New document
- **11/07/23:** Minor review – updated stroke number on page 9 to 1800 4 787653 instead of 1800 478 653

READ ACKNOWLEDGEMENT

- All clinical nurses and medical staff must read and acknowledge they understand the contents of this document.

The Sydney children's Hospitals Network
care, advocacy, research, education

TABLE OF CONTENTS

Management Summary 4
Guideline 4
Nursing considerations 4
Medical considerations 5
Management 6
Code Stroke at CHW - Flow Chart 7
CHW Stroke Contact Numbers 8
Stroke Acute Management at SCH – Flow Chart 9
Figure 1: Paediatric acute ischaemic stroke pathway for thrombolysis and endovascular clot retrieval via Sydney Children's Hospital. 9
Figure 2: External site referral for Endovascular Clot Retrieval 10
SCH Randwick Stroke Contact Numbers 11
Initial Notification 11
Other useful numbers related to SCH R Stroke Code: 11

NSW GOVERNMENT

Management Summary

Paediatric stroke is a relatively rare presentation to the ED.

Due to the limited timeframe for thrombolysis and clot retrieval, early identification, imaging and senior decision making is a priority.

This document outlines the initial recognition of a possible paediatric stroke and the escalation process at CHW.

Early consultation with the on call neurology consultant is critical, and they will then guide imaging and further management

Guideline

Nursing considerations

Risk of stroke requiring urgent medical assessment

Sudden onset within the last 24 hours where there are ongoing symptoms/signs of:

a) **Focal weakness**
   - limb (or part of limb) weakness – not thought to be obviously secondary to pain or trauma
   - facial droop

b) **Visual or speech/language disturbances**
   - unequal pupils - new onset
   - loss of vision – not thought to be obviously secondary to pain or infection
   - slurred speech or incomprehensible speech or inability to speak

c) **Limb incoordination or ataxia**
   - unsteady gait or increased frequent falling – not thought to be obviously secondary to pain, medication or toxin ingestion, or trauma
   - sudden onset of incoordination of one limb

d) **Altered mental status** (use AVPU scoring)

e) **Headache** – Sudden and severe

f) **Symptoms and/or signs of raised intracranial pressure**
   - Consider this if the child has headache that is associated with nausea/vomiting and/or confusion and/or bradycardia

g) **Seizures with additional neurological symptoms** (any symptoms from above list a-f)

Medical considerations

Sudden onset within the last 24 hours where there are ongoing symptoms/signs of:

a) **Focal weakness**
   - limb (or part of limb) weakness – not thought to be obviously secondary to pain or trauma
   - facial droop - if this is an upper motor neurone facial nerve palsy ie unilateral facial nerve weakness with no involvement of forehead muscles – symmetrical eyebrow elevation
   - Excludes Lower Motor Neurone facial palsy ie facial weakness with involvement of forehead muscles

b) **Visual or speech/language disturbances**
   - unequal pupils – new onset
   - Exclude pre-existing pupillary asymmetry
   - Exclude recent use of pharmacological agents with sympathetic or parasympathetic activity
   - Exclude ocular trauma
   - loss of vision or change to normal vision
   - Excludes cases thought to be secondary to pain, ocular trauma or infection or to be functional
   - slurred speech or incomprehensible speech or inability to speak

c) **Limb incoordination**
   - unsteady gait or increased frequent falling
   - Exclude history suggestive of drug ingestion, poisoning, or metabolic disturbance and not thought to be obviously secondary to pain or trauma
   - sudden onset of incoordination of one limb

d) **Altered mental status** (use AVPU scoring)
   - Exclude history suggestive of drug ingestion, poisoning, or metabolic disturbance

e) **Severe headache** where the time to maximal symptoms occurs over seconds to minutes (e.g. thunderclap headache)
   - This needs to be interpreted cautiously in patients with a previous history of migraine. However if the headache has a different characteristic than the child's typical migraine and meets the above criteria then stroke should be considered.
   - The combination of headache and vomiting is most commonly caused by migraine but is also a common feature of stroke.

f) **Symptoms and/or signs of raised intracranial pressure**
   - Consider this if the child has headache that is associated with nausea/vomiting and/or confusion and/or bradycardia

- Excludes known intracranial mass lesions or hydrocephalus.

g) **Seizures with additional neurological symptoms** (any symptoms from above list a-f)

Management

- Call **CONSULTANT** neurologist on-call for any child meeting the criteria for possible stroke listed above
- Manage ABCs as required, seek and treat stroke mimics. Consider NAI and sepsis
- Once Code Stroke confirmed:
  - Confirm imaging modality with consultant neurologist
  - Likely to be CT / CTA initially.
  - If delay in contacting neurologist then proceed to CT Brain initially.
  - Arrange imaging
  - IV ACCESS – Bloods; FBC, EUC, LFT, COAGS, Group and Hold, serology hold
  - Keep patient nil by mouth
  - Inform anaesthetics – consider review in ED
  - Inform Intensive Care team

The Sydney children's Hospitals Network
care, advocacy, research, education

Code Stroke at CHW - Flow Chart

The recognition and initial management of a patient with potential stroke presenting to the ED – Code Stroke CHW

TRIAGE

Nursing considerations – Risk of stroke requiring urgent medical assessment

Sudden onset within the last 24 hours where there are ongoing symptoms/signs of:

a) **Focal weakness**
b) **Visual or speech/language disturbances**
c) **Limb incoordination or ataxia**
d) **Altered mental status (use AVPU scoring)**
e) **Headache** – Sudden and severe
f) **Symptoms and/or signs of raised intracranial pressure**
g) **Seizures with additional neurological symptoms** (any symptoms from above list a-f)

Refer to Triage guidelines and text in this document for more information

MEDICAL ASSESSMENT

Sudden onset within the last 24 hours where there are ongoing symptoms/signs of:

a) **Focal weakness**
- limb (or part of limb) weakness – not thought to be obviously secondary to pain or trauma
- facial droop - if this is an upper motor neurone facial nerve palsy ie unilateral facial nerve weakness with no involvement of forehead muscles – symmetrical eyebrow elevation
    - i. Excludes Lower Motor Neurone facial palsy ie facial weakness with involvement of forehead muscles

b) **Visual or speech/language disturbances**
- unequal pupils – new onset
    - i. Exclude pre-existing pupillary asymmetry
    - ii. Exclude recent use of pharmacological agents with sympathetic or parasympathetic activity
    - iii. Exclude ocular trauma
- loss of vision or change to normal vision
    - i. Excludes cases thought to be secondary to pain, ocular trauma or infection or to be functional
- slurred speech or incomprehensible speech or inability to speak

c) **Limb incoordination**
- unsteady gait or increased frequent falling
    - i. Exclude history suggestive of drug ingestion, poisoning, or metabolic disturbance and not thought to be obviously secondary to pain or trauma
- sudden onset of incoordination of one limb

d) **Altered mental status (use AVPU scoring)**
- i. Exclude history suggestive of drug ingestion, poisoning, or metabolic disturbance

e) **Severe headache** where the time to maximal symptoms occurs over seconds to minutes (eg thunderclap headache)
- i. This needs to be interpreted cautiously in patients with a previous history of migraine. However if the headache has a different characteristic than the child's typical migraine and meets the above criteria then stroke should be considered.
- ii. The combination of headache and vomiting is most commonly caused by migraine but is also a common feature of stroke.

f) **Symptoms and/or signs of raised intracranial pressure**
- Consider this if the child has headache that is associated with nausea/vomiting and/or confusion and/or bradycardia
    - i. Excludes known intracranial mass lesions or hydrocephalus.

g) **Seizures with additional neurological symptoms** (any symptoms from above list a-f)

MANAGEMENT

- **Call CONSULTANT neurologist on-call for any child meeting the criteria for possible stroke listed above**
- **Manage ABCs as required, seek and treat stroke mimics. Consider NAI and sepsis**
- **Once Code Stroke confirmed:**
    - **Confirm with consultant neurologist initial imaging – likely to be CT / CTA**
    - **Arrange imaging**
    - **IV ACCESS** – Bloods; FBC, EUC, LFT, COAGS, Group and Hold, serology hold
    - **Keep patient nil by mouth**
    - **Inform anaesthetics – consider review in ED Page 6008 (reg) or 6777 (consultant)**
    - **Inform Paediatric Intensive Care Outreach Service (PICOS) – Page 6664**

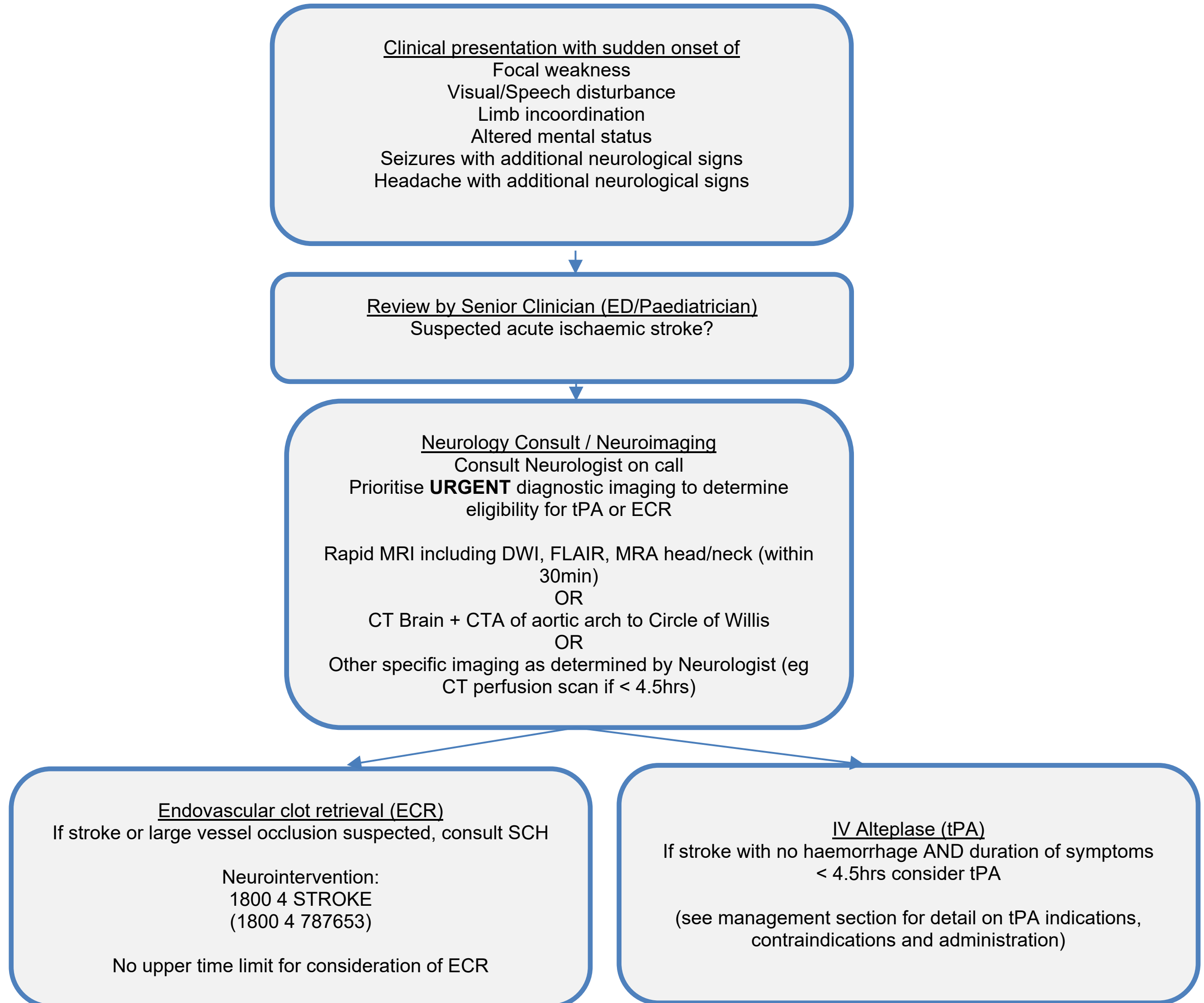
CHW Stroke Contact Numbers

CHW ED Medical Team Leader	9845 2454
CHW ED Nursing Team Leader	9845 2437
Neurology team on-call	call switch and available by mobile
Radiology on-call	call switch and available by mobile
Paediatric Duty Anaesthetist	Pager 6008 (Reg) or 6777
PICU Outreach	Pager 6664
ED On Call Social Worker	call switch and available by mobile

This Guideline may be varied, withdrawn or replaced at any time.

Stroke Acute Management at SCH – Flow Chart

Figure 1: Paediatric acute ischaemic stroke pathway for thrombolysis and endovascular clot retrieval via Sydney Children's Hospital.



<u>Stroke Mimics</u>

Common: Migraine, seizures with Todd's paresis, Bell's Palsy, Functional Disorders

Others include but are not restricted to: Cerebellitis, infection, ADEM, brain tumours

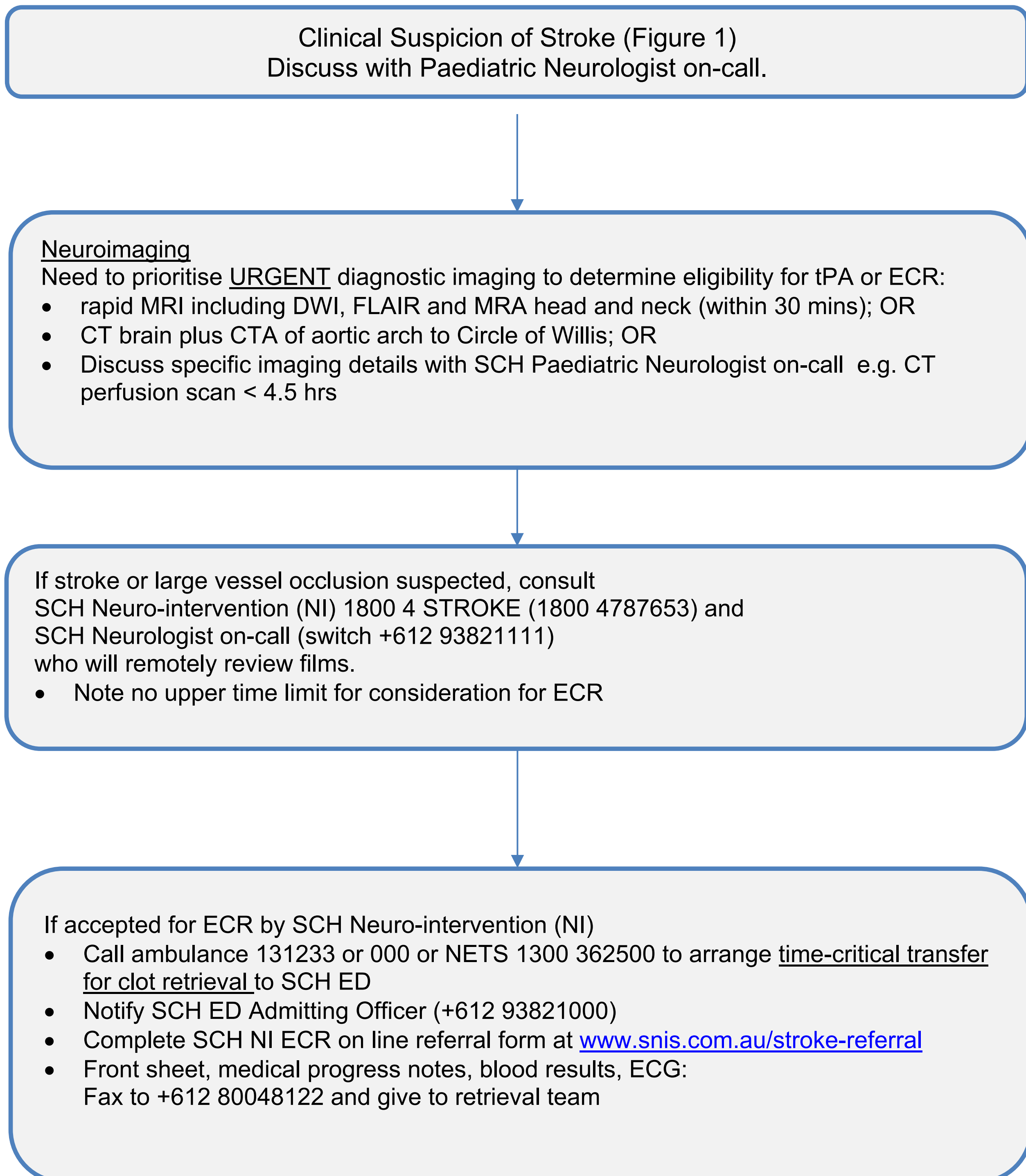
<u>Aetiology</u>

Blood work up
Consider echocardiography

<u>Ongoing Care</u>

Parent and patient information
Admission under ICU or Paediatric Neurology

Figure 2: External site referral for Endovascular Clot Retrieval



The Sydney children's Hospitals Network
care, advocacy, research, education

SCH Randwick Stroke Contact Numbers

SCH ED Medical Team Leader	9382 1000
SCH ED Nursing Team Leader	9382 0028
Neurology fellow on-call	call switch and available by mobile
Neurology consultant on-call	call switch and available by mobile
Neurointerventional Radiologist on call	1800 4 787654 [1800 4 STROKE]
Radiology registrar on-call	In Hours: 9382 3491 After Hrs: pager 44454
Radiology Consultant on-call	call switch and available by mobile
MRI Suite	8am-9pm Mon-Fri 9382 2312
Paediatric Duty Anaesthetist	+61429862782
CICU first on-call	+61484609156
ED On Call Social Worker	Pager: 45420 Phone: 9382 1021 / 9382 1022 (in hrs) Switchboard after hours

Initial Notification

- Suspected stroke:
  - ED
  - Neurology
- Confirmed Stroke: above plus
  - CICU
  - Bed Manager
  - Senior On Site Registrar (after hrs)
  - (+/- Neurointerventional Radiology / MRI / Anaesthesia / Social Work)

Other useful numbers related to SCH R Stroke Code:

NETS	1300 36 2500
NSW Ambulance	1300 233 500
Urgent anaesthetic contact	+61429862782 or OT extension 20500

NSW GOVERNMENT

Copyright notice and disclaimer:

The use of this document outside Sydney Children's Hospitals Network (SCHN), or its reproduction in whole or in part, is subject to acknowledgement that it is the property of SCHN. SCHN has done everything practicable to make this document accurate, up-to-date and in accordance with accepted legislation and standards at the date of publication. SCHN is not responsible for consequences arising from the use of this document outside SCHN. A current version of this document is only available electronically from the Hospitals. If this document is printed, it is only valid to the date of printing.