Paediatric Stroke – Emergency management in children - Immediate Response Protocol

This document forms part of the statewide guideline for Paediatric Stroke – Emergency management in children

Checklist for Establishing a Standardised Immediate Response Protocol for Paediatric Acute Ischaemic Stroke in Emergency Departments

Implementation of a Standardised Immediate Response Protocol

It is recommended that a standardised immediate response protocol is developed for paediatric stroke that is hospital specific. Ideally this protocol should be agreed upon by all relevant parties at the local facility. Time efficiency is paramount - significant delay is likely to occur in situations where phone calls and negotiation occur on the day.

Components of this protocol need to consider:

- Triage: Cat 2 minimum
- Communication:
    - Plan for immediate access to paediatric neurologist and/or paediatric neurosurgical advice.
    - Plan for telehealth or other videoconferencing options if this is possible
- Activation of a standardised immediate response protocol should be made within minutes of assessment.
    - Clinical Pathways – need to be hospital specific
    - Activation Pathway
        - Pre-agreed roles and responsibilities – the QCH activation pathway was built on paediatric trauma attend; clearly other hospitals will have a process for adult stroke that will be useful as a system on which to build a paediatric code stroke process
        - Use of hospital switch notification processes
- Pathology: access to urgent pathology testing
- Radiology:
    - Pre-planning should occur regarding the urgent imaging modality that will be used (CT/MRI).
    - Pre-planning should occur regarding access to urgent radiology reporting
    - Pre-planning to facilitate transmission of radiology images for rapid tertiary advice
- Anaesthetics: Plan for urgent access to anaesthetic services if required
- Drugs: Pharmacy supplies, safe administration policies, appropriate administration equipment for a high-risk pharmacological agent and trained staff
- Retrieval: Early involvement of retrieval services

Triage

A process to facilitate identification at triage is important. This needs to be established at the local hospital level.

An option to consider is to use the statewide triage work instruction document.

Please see CHQ-WI- 00738 Triage of Children with suspected Acute Arterial Ischaemic Stroke

This can be both a quick reference point for triage staff and an education tool. An initial intensive education process for triage and resuscitation room staff is suggested. This should be followed by an education update process 4-6 times per year for triage, resus and medical staff.

Involvement of Neurologist Prior to Imaging

(Note this is for suspected ischaemic only – suspected haemorrhagic stroke should be imaged ASAP)

At QCH the QCH On-call Paediatric Neurologist must approve URGENT code stroke MRI imaging prior to the 555 call being placed by switch. The purpose:

- Neurology involvement at this point improves pre-test probability especially when accessing a limited resource (URGENT Neuroimaging)
- Ensures that the neurologist is available to review patient and is available to make decisions with the radiologist as soon as possible.

Inside and outside QCH, Neurology has requested that investigation and imaging DO NOT proceed for paediatric ischaemic stroke until a discussion with the Paediatric Neurologist has occurred and advice has been given to proceed.

It is recommended that external sites contact the Queensland Children's Hospital Consultant Neurologist (not the registrar or fellow) via switch on 3068 1111 unless there is a need for immediate critical care advice – in this situation phone RSQ 1300 799 127. Note Townsville University Hospital calls the TUH/QCH Paediatric Neurologist as per the TUH internal roster.

Clinical Pathway

Clinical pathways provide support for ED staff who are attempting to achieve imaging and access to treatment in the shortest possible time frames. The QCH Clinical Pathway may be of assistance as an example to copy/adjust in this regard.

Pathology

It is paramount that any site that could potentially be administering Alteplase is able to access urgent 24/7 pathology services. At minimum the following should be immediately available: Full blood count, biochemistry profile, coagulation profile, clottable fibrinogen, group and save.

Radiology – Process and Neuroimaging Choice

Sites external to QCH will need to determine which modalities of imaging are urgently available (e.g. CT or MRI) and have agreements in place with their radiological services how and when these can be used/activated.

TABLE 1: Site dependent Neuroimaging	
Site without access to CT or MRI	For imaging decision advice about possible ischaemic stroke call the Paediatric Neurologist via QCH switch (07) 3068 1111. **For immediate critical care clinical support call RSQ (1300 799 127).**
Site with access to CT **(no access/no immediate access to MRI)**	Where there is immediate high suspicion of haemorrhagic stroke clinicians should pursue CT head (+/- CTA) looking for evidence of cerebral haemorrhage. See Table 2 (below) - Differentiation of Stroke Types For imaging decision advice about possible ischaemic stroke call: ➢ Paediatric Neurologist via QCH switch (07) 3068 1111 ➢ Townsville University Hospital calls the TUH/QCH Paediatric Neurologist as per the TUH internal roster **Perform CT/CTA head** Additional Tests **ONLY** if advised by paediatric neurologist and/or interventional neuroradiologist • CT/CTA neck • CT perfusion • Children might require low dose paediatric specific CT perfusion protocols. • Perfusion imaging should only ever be considered if stroke is demonstrated on MRI (or occlusion is demonstrated on CTA), and the perfusion imaging is required to assist with reperfusion decisions. • Perfusion imaging might be required to extend time windows for treatment. Children with ongoing neurology but negative CT/CTA should be discussed with the paediatric neurologist - MRI still likely required (retrieval/transfer). **For immediate critical care clinical support call RSQ (1300 799 127).**
Site with immediate access to CT and MRI	Where there is immediate high suspicion of haemorrhagic stroke clinicians should pursue CT head (+/- CTA) looking for evidence of cerebral haemorrhage. See Table 2 (below) - Differentiation of Stroke Types If the results are negative consider progress to ischaemic investigation pathway. For imaging decision advice about possible ischaemic stroke call the • Paediatric Neurologist via QCH switch (07) 3068 1111 • Townsville University Hospital calls the TUH/QCH Paediatric Neurologist as per the TUH internal roster Where there is suspicion of ischaemic stroke clinicians should consult the Paediatric Neurologist and then if instructed pursue MRI/MRA brain as the first investigation where possible. MRA neck vessels and MRI perfusion might be indicated. **If immediate critical care clinical support is required and not available on site call RSQ (1300 799 127).**

TABLE 2: Differentiation of Stroke Types
Consider Haemorrhagic over Ischaemic Stroke When Sudden changes: • New onset unequal pupil • Thunderclap headache (a severe headache that reaches maximal intensity over seconds to minutes) Evidence of mild to moderate raised intracranial pressure: • Severe, persistent headache associated with vomiting • Altered conscious state Evidence of severe raised intracranial pressure with brain herniation: • Severe altered conscious state - unresponsive • Cushing's triad – bradycardia, hypertension and irregular respirations • Widened pulse pressure • Decerebrate or decorticate posturing • Unequal pupils, dilated or fixed, non-reactive pupil/s • Restricted eye movements - sixth nerve palsy

Radiology Workflow

Please see: Radiology Workflow for imaging performed external to QCH

Alteplase Prescription

Alteplase is a potentially lethal drug if a 10x calculation error occurs. It is suggested that uninterrupted prescribing occurs during the period when imaging is being performed. There should be a clinician checking the prescription. This can be cancelled if lysis is not required.

Alteplase is an expensive drug. Five 10mg vials is more expensive than a 50mg vial. However, expense also occurs when the drug expires due to non-use. Local planning and decisions need to be made about stock management. Some centres use a rotation process from a larger centre to prevent expiry issues.

Enquiries have been made about transition to tenecteplase to mirror adult stroke management – at this time tenecteplase has NOT been approved for use in children by the national body. It has been raised as an issue especially with regards to Alteplase stock in small centres. This guideline will be updated to reflect a change from Alteplase to Tenecteplase if this change occurs and EDs will also be notified.

Due to cost, the medication is drawn up after the neurologist confirms that lysis is required.

Protection from interruptions for the person drawing up the medication should occur with this high-risk medication.

CREDD principles and design have been used in the prescription section of this guideline for consistency with other emergency drugs. The safety features of CREDD have also been instituted. CREDD will contain prescribing information when the next version is published.

Access to Flowcharts/Word Documents

Any flowchart or other document available in this guideline is also available as an individual JPEG or word document. For access, contact QCH ED Director and this will be delegated to the appropriate person to assist you.