

# UKNG Guidance Document for Paediatric Mechanical Thrombectomy

## Introduction

With the increasing numbers of adult mechanical thrombectomy being performed within the UK and better networks and pathways for referral exist. Whilst still rare, paediatric acute stroke is a diagnosis which will be more frequently made. This guidance document is to help with the complex decision making in this patient group. Where it exists locally, the assistance of paediatric neurology, haematology and importantly anaesthetics can be useful.

There are several issues to consider:

- Due to a large number of stroke mimics in children, the diagnosis is often delayed. RCPCH guidelines suggest immediate imaging with ideally MRI/MRA in any child presenting with a stroke syndrome, but CT/CTA should be performed if MRI is not immediately available.
- There are no data about CT/MR perfusion in children. Suffice it to say, that younger children may have more plasticity to recover from larger infarct volumes.
- Similarly, a pragmatic approach to paediatric mechanical thrombectomy in terms of timing post onset of symptoms should be employed. In particular, paediatric patients presenting with large vessel occlusion >6 hours from onset of symptoms may still benefit from mechanical thrombectomy. In these patients Advanced Brain Imaging (preferably with MRI due to radiation dose considerations) would be recommended.
- In a non-cardiac paediatric patient, the most common cause of anterior circulation stroke is a vasculopathy. Atheroma is very rare as a cause of large vessel occlusion. In the posterior circulation, dissection is more common than arteriopathy as a cause of stroke.
- Due to these differences in aetiology, consider all possibilities prior to undertaking thrombectomy. Mid segment (e.g. mid M1 or mid basilar) occlusions are more likely to be vasculopathy as the primary cause rather than isolated thrombus.

Procedural recommendations are listed below:

- General anaesthetic is recommended for all paediatric patients.
- The outcomes after paediatric stroke may be correlated with age and size of infarct, with a large stroke in a young paediatric patient not surprisingly correlated with a poorer outcome. The ability to improve this outcome with MT is not proven.
- Perinatal stroke is virtually always diagnosed late and usually presents with seizures or weakness. The main aetiological factors being placento-embolic through the foramen ovale, venous infarction or cervical artery traction injury.

- **In young children <2 years of age, the balance of risk of MT vs. benefit vs. non embolic aetiology make MT less likely to be of benefit.** The rare exception to this may be the cardiac paediatric patient with a known source of embolism.
- **Caution should also be observed in performing MT in young paediatric stroke patients <5 years.** Careful decision making after advanced brain imaging with paediatric neurology would be advised. Once again, a cardiac paediatric patient might be considered.
- For older children >5 years the size of the brain arteries approaches 95% that of adult patients. The groin arteries are still relatively small, but a 5F sheath should be tolerated. Intermediate catheters are useful adjuncts in these younger age groups.
- In all age groups, the INR team should be aware of vasculopathy as a potential cause, particularly in occlusions which are resistant to standard mechanical thrombectomy techniques. **Avoid intracranial stenting of these lesions where possible.**

Full UK guidelines, which include detailed medical management of paediatric stroke patients, including thrombolysis, are available on the RCPCH website.

<https://www.rcpch.ac.uk/resources/stroke-childhood-clinical-guideline-diagnosis-management-rehabilitation>

To summarise:

- Do consider all causes of paediatric stroke, with vasculopathy being common
- Perform MT on <5 years with caution
- In younger children <10yrs use smaller devices (5F guider and intermediates)
- Consider methods to reduce radiation (frame rate, magnification, coning), but total contrast dose is generally not a concern
- Given often an unknown aetiology and more fragile vessels, do accept angiographically sub-optimal results, particularly if an overall improvement in the cerebral perfusion is achieved.

*Dr Adam Rennie*

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Bhatia et al. Mechanical thrombectomy in pediatric stroke: systematic review, individual patient data meta-analysis and case series. J Neurosurg Pediatr 2019 Aug 9;1-14

Sun et al. Mechanical Thrombectomy for Acute Ischaemic Stroke. Considerations in Children. Stroke Oct 2020. Vol 51:10;3174-3181