

# A Case Report on Acute Ischemic Stroke in Young Child

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**Abstract:** *Acute ischemic stroke in the paediatric population is rare. If untreated it carries lasting and often lifelong morbidity. There are many strategies (like Thrombolysis and mechanical thrombectomy) for care in adults, yet there is very little evidence for these treatments in children. We present the case of an 18 months female child born out of non consanguineous parentage who was delivered by normal vaginal delivery without any perinatal complications. She was presented with complaints of sudden onset of weakness of left side of body of 12 hrs duration. Child was apparently normal until the symptoms started. Complete Stroke in young workup was done. Her MRA brain S/o – Acute infarct in right corona radiata and posterior limb of internal capsule. Her hemogram showed Microcytic hypochromic anaemia (Hb 8.9gm) because she was presented out of window period and hence thrombolysis was deferred. Patient was managed conservatively with Ecosprin, Hematinics and Neuroprotective medications and with regular physiotherapy care.*

**Keywords:** Acute ischemic stroke, Childhood, Anaemia, Thrombolysis, Hematinics, Physiotherapy

## 1. Background

Stroke is a neurological injury which is caused by the occlusion or rupture of cerebral blood vessels. Stroke can be ischemic, hemorrhagic, or both. Ischemic stroke is more frequently caused by arterial occlusion, but sometimes it may also be caused by venous occlusion of cerebral veins or sinuses. Hemorrhagic stroke is the result of bleeding from a ruptured cerebral artery or from bleeding into the site of an acute ischemic stroke (AIS)<sup>1,2</sup>. AIS accounts for about half of all strokes in children, in contrast to adults in whom 80–85% of all strokes are ischemic. Children also have a more diverse and larger number of risk factors for stroke that differ significantly from adults which are predominated by hypertension, diabetes, and atherosclerosis.

## 2. Introduction

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Acute ischemic stroke (AIS) in the paediatric population is a rare event with an estimated incidence of 1.6 per 100,000 per year. [3] although most children who experience stroke do not die of the acute disorder; the consequences of the brain injury persist during their life-span.[4] Challenges in treating children and young people with stroke include delays in recognition,[5] the logistic challenges of timely investigation and imaging, a wide differential diagnosis, diverse stroke etiologies, and the lack of trial-based evidence for hyperacute treatments. In childhood there are

also a large number of stroke mimics which account for up to one third of diagnosed cases and which are very important to exclude before treatment strategies are considered.

## 3. Discussion

We described the management of paediatric AIS in an 18 months old girl child with an Acute infarct in right corona radiata and posterior limb of internal capsule. We did not report any complication attributable to the diagnostic or therapeutic approach. First neuroimaging was at 1 hr after symptom onset. The first neuroimaging (non-contrast brain CT) was not diagnostic of AIS. Only the MRA brain allowed confirming our suspicion after 12 hrs, but within 15 mins of arrival to the hospital. Child had good initial improvement in symptoms after Ecosprin. The presenting features in this case (hemiparesis) are similar to those seen in adults with stroke in whom such clinical features are considered a neurological emergency prompting urgent neuroimaging. In one report, 19 out of 45 children with a stroke did not receive a correct diagnosis until 15 hours to 3 months after initial presentation.[5] Another study demonstrated up to a 28-hour delay in seeking medical attention from the onset of symptoms and a 7.2-hour average delay after presentation before any brain imaging was done.[6] The hypothesis that the focal neurological signs could be related to epileptic seizures and subsequent Todd's paresis was partially responsible for the diagnostic and treatment delay. It is estimated that 19–44% of children with AIS present with seizures. [7] There must be a low threshold for performing neuroimaging in children presenting with new-onset seizure in combination with focal neurologic deficits. But stroke should be considered if the duration of the deficit is prolonged relative to the duration of the preceding seizure. The time required to transfer the patient from the first hospital to the neurovascular centre also contributed to treatment delay.

The causes of stroke in children differ markedly from adults where atherosclerosis pre-dominates. Cardiac disorders are one of the most common etiologies, with congenital causes

predominating over acquired. Children with complex CHD who require cardiac surgery are at the highest risk of stroke, and this risk remains elevated beyond the immediate postoperative period. In this case there is no relation to CHD. Common types of paediatric strokes include:

- a) Perinatal natal stroke (common often unnoticed and undiagnosed),
- b) Haemorrhagic stroke.
- c) Ischemic stroke (this is of two types – Sino venous thrombosis stroke and Arterial ischemic stroke).
- d) Cerebral venous thrombosis stroke.
- e) Genetic causes: Sick cell disease & Clotting disorders.
- f) Environmental causes: CO poisoning, infection, Medication, Trauma, Vasculitic and Dissection.
- g) Congenital causes : AV malformations, Aneurysm, Moyamoya syndrome etc.,
- h) Nutritional deficiencies of folic acid or vitamin B12 may also cause hyperhomocysteinemia, leading to stroke.

Stroke is more common in boys than girls, even after controlling for differences in frequency of causes such as trauma. There appears to be a predominance of stroke in black children. This difference remains true even after accounting for sickle cell disease patients with stroke.

There are many other diseases that may mimic a stroke. Complicated migraines can cause focal neurologic symptoms that typically resolve within 24 hours, and should be considered if there is a family history of migraine or hemiplegic migraine.[8]

There are no clearly established laboratory testing guidelines for the assessment of paediatric stroke. Laboratory assessment may include a variety of nonspecific blood tests and more specific laboratory tests looking for specific causes of stroke such as coagulopathies, haematological disorders, or vasculitides

Long-term anticoagulation beyond the acute phase can be provided in the form of antiplatelet agents such as aspirin, clopidogrel, oral vitamin K antagonists like warfarin, or weekly subcutaneous LMWH injections.

Thrombolytic therapy in children with ischemic strokes must be carried out in a guarded and judicious manner. Published guidelines suggest that tPA may be considered in a select group of children with CVST, but could not make any further recommendations, including whether adult guidelines could be applied to adolescents who met adult eligibility criteria. Although there are case reports and case series of IV recombinant tPA for children with strokes, there is little else upon which to base thrombolytic recommendations. [9],[10],[11],[12] Despite anecdotal reports of successful endovascular thrombolysis and IV tPA use in children, there are other reports of high risks of hemorrhagic complication rates in children with systemic thrombolysis who receive IV tPA and inadequate evidence for deciding which patients are the best candidates. An international multicenter study, “TIPS” (thrombolysis in paediatric stroke), is poised to begin with the goal of assessing the safety of IV tPA within 3 hours of AIS onset, and intra-arterial tPA within 3–6 hours of onset.[13]

#### 4. Conclusion

Strokes in children are being recognized more frequently as diagnostic aids develop and clinician recognition improves. However, because the incidence is still low relative to adult strokes, and children are distinctly different from adults, it remains a challenge to create evidence based diagnostic and treatment guidelines.

Stroke should remain a strong consideration in children with concerning signs and symptoms and significant risk factors, and the best available evidence should be utilized in providing optimal medical care. This case report will give importance and consideration of other risk factors in dealing with stroke in children

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