

## **Clinical Communications: Pediatrics**



### **ISCHEMIC STROKE OF THE SPINAL CORD: A PEDIATRIC EMERGENCY IN AN OTHERWISE HEALTHY CHILD**

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**Abstract—Background:** Spinal cord infarctions in children are rare, with few cases reported in the literature. Recognition is challenging, as children’s clinical presentations and underlying pathological processes differ from those of adults. Most reported cases are in children with predisposing medical conditions, but spinal cord strokes can occur in otherwise healthy individuals. **Case Report:** A 10-year-old boy with no significant medical history presented with progressive left-sided weakness and neck pain. He was diagnosed with ischemic infarction of his inferior medulla and cervical spinal cord. **Why Should an Emergency Physician Be Aware of This?:** Ischemic stroke of the spinal cord should be considered in children with clinical weakness, even in the absence of risk factors. © 2016 Elsevier Inc. All rights reserved.

**Keywords—**pediatric stroke; ischemic stroke; spinal cord ischemia; weakness

#### **INTRODUCTION**

Spinal cord infarctions in children are rare, with very few cases reported in the literature. They are difficult to diagnose in children, as the clinical presentations and underlying pathogenesis differ from those in adult patients. While there are some medical conditions that can predispose a child to spinal cord ischemia, they can occur in an otherwise healthy child, as was the case with our patient.

Emergency physicians must consider spinal cord infarction so spinal cord imaging studies can be obtained and appropriate and timely treatment provided.

#### **CASE REPORT**

A 10-year-old African-American male presented to the emergency department (ED) with left-sided weakness. He was a previously healthy child with no chronic illness, prior hospitalizations, or surgical history. He was in his usual state of health until the day before presentation, when he started to experience a general feeling of “heaviness” in his left arm. Although he had been participating in conditioning drills for football practice, he denied any traumatic events. He was seen by the medic at the football field for this complaint, but was reassured that everything was fine. At home that evening, the patient’s left-arm weakness progressed. His mother described him mentioning a mild headache, but he then went to bed and slept through the night. Upon waking the following morning he was unable to move his left arm and left leg. He also had one episode of emesis. The patient was unable to walk, which greatly concerned the mother, so he was taken immediately to the ED.

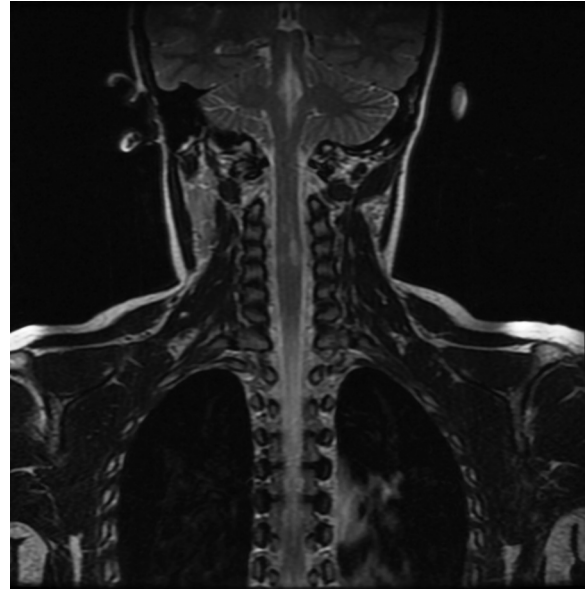
Upon arrival to the ED, vital signs were as follows: temperature 36.6°C; heart rate 108 beats/min; respiratory rate 22 breaths/min; blood pressure 107/70 mm Hg; and pulse oximetry 100% on room air. He was alert, oriented,

and answering questions appropriately. His head was normocephalic without evidence of any trauma. His pupils were equal and reactive bilaterally. His fundi appeared normal. His visual fields and extraocular movements were intact, but he was noted to have vertical upbeat nystagmus with primary gaze. Facial strength and sensation were intact, but with tongue protrusion there was deviation to the left. He did report some tenderness to palpation of the upper and mid cervical spinous processes, so cervical spine precautions were initiated. There was flaccid paralysis of the left upper extremity and paresis of the left lower extremity, with only minimal voluntary movement at the ankle and toes. Deep tendon reflexes were 1+ in the left knee, ankle, and hip and 0 in the left biceps and triceps. Right upper and lower extremity strength and reflexes were normal. Sensation was intact to light touch throughout. The remainder of his examination, including heart, lungs, and abdomen, was unremarkable. A diagnosis of acute stroke was made and the patient was entered into the institutional pediatric stroke pathway. Pediatric neurology service performed the National Institutes of Health Stroke Scale and assigned the patient a score of 6, which fell into the moderate stroke severity category.

Laboratory investigations, including complete blood count, basic metabolic panel, coagulation studies, antinuclear antibody, complement levels, fibrinogen and D-dimer, all returned within normal range. Sickle cell screen and drug screens were negative. Computed tomography scan of head, cervical spine, and thoracic spine without contrast was performed and was read as normal, without evidence of hemorrhage. Magnetic resonance imaging (MRI) of the head and neck without contrast showed no evidence of acute infarct on diffusion-weighted imaging (DWI). Magnetic resonance angiography of the head and neck without contrast was unremarkable, without evidence of stenosis, aneurysm, or dissection.

The patient was admitted to the pediatric intensive care unit for continuous cardiorespiratory monitoring and frequent neurologic checks. He was not started on any medications at the time of admission.

The day after admission, the patient underwent MRI of the cervical and thoracic spine with contrast due to concern for a demyelinating or compressive lesion as the etiology of his symptoms. This imaging study demonstrated restricted diffusion and abnormal T2 signal involving the anterior inferior medulla on the left, extending caudally to the anterior and left lateral aspect of the cervical spinal cord to C4 (Figure 1). There were additional focal areas of restricted diffusion anteriorly on the right side of the cervical cord at C3 and C4. These findings were consistent with a diagnosis of anterior medullary and cervical spinal cord infarctions, thought to be



**Figure 1. Coronal T2-weighted MRI image. Demonstrates abnormal T2 signal on the left extending caudally from the inferior medulla to C4.**

related to anterior spinal artery involvement. At this time, the patient was started on aspirin therapy.

Investigation to identify possible causes and risk factors for stroke was started during the patient's admission and completed as an outpatient. Echocardiogram showed normal cardiac anatomy with no evidence of right-to-left shunting, a known risk factor for cardioembolic stroke. Complete work-up showed no evidence of predisposing inflammatory, prothrombotic, or cardiac disease.

Once medically cleared, he completed inpatient rehabilitation before discharge home. He continues on low-dose aspirin therapy. With continued outpatient rehabilitation, his motor function continues to improve, although some left-sided weakness persists.

## DISCUSSION

Stroke is a rare occurrence in the pediatric population, with an estimated incidence of 2 to 13 per 100,000 children per year (1). Due in part to a lack of exposure, recognizing a child experiencing acute stroke remains a challenge for emergency physicians. This is particularly true for pediatric arterial ischemic strokes (AIS), which are less common than hemorrhagic strokes in children and even harder to diagnosis. The most common underlying conditions associated with AIS in children are sickle cell disease arteriopathy and congenital or acquired heart disease (2). While current studies are examining the role that recent respiratory infection plays in elevating stroke risk, there remain many questions about what causes stroke in healthy children, as some studies report that

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