

Iron Deficiency Anaemia: A Cause of Arterial Ischaemic Stroke in Childhood

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Abstract

Stroke in children, similar to adults can have devastating physical, neurological and emotional consequences for the child and the family. Case reports have suggested an association between iron deficiency anaemia in previously healthy children and ischaemic stroke. The exact mechanism by which iron deficiency can lead to stroke is poorly understood but it may be associated with thrombocytosis and microcytosis which decreases red cell deformability and produces a hypercoagulable state. We describe such a case, in which a three year male old child presented to our emergency with severe anaemia, further workup was normal, other than severe iron deficiency anaemia. (ASH & KMDC 19(1):49;2014).

Introduction

Stroke is defined as the acute onset of a focal neurologic deficit. According to recent studies, arterial ischaemic stroke affects 1.6 per 100,000 children per year¹. At least one risk factor can be identified in over 70% of children². The association between arterial ischaemic stroke and iron deficiency anaemia is well known and recent studies have shown that iron deficiency anaemia was 10 times more common in previously healthy children who suffered a stroke than children without a stroke³. We document the case of a 3 year old child who presented with hemiplegia. All his workup was normal except for severe iron deficiency.

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Case Report

A 3 year old male child was admitted in the paediatric ward for sudden onset of right sided hemiplegia. He was at home, apparently fit and well when he fell down while running towards his mother and then he was unable to get up. He was born in a hospital at term following an uneventful pregnancy. He is the only child of a non consanguineous marriage between parents. His development to date had been normal. There was nothing of related significance in his past or family history.

On examination he was conscious and oriented. He was 84 cms tall and weighed 13 kg. The vital measurements were within normal ranges and blood pressure was 80/56 mmHg. The tone, power and reflexes on the left side of the body were normal. Tone was increased in the right arm and leg, reflexes were brisk but power was weak. Plantar was flexor on the left but extensor on the right side. Examination of cardiovascular, respiratory and abdominal systems was unremarkable.

His initial haemoglobin value was 3.4g/dl, haematocrit 13.5% and mean corpuscular volume

48.6fL. Platelets and white cell counts were normal. Coagulation profile was also normal. He had normal haemoglobin electrophoresis pattern. Serum ferritin was markedly low; 1.60ng/ml (7-140), total iron binding capacity was elevated 672ug/dl (250-400). Plasma homocysteine was normal 10.9umol/L (5-12). ANA was negative and levels of protein C were normal.

MRI of the brain revealed asymmetric atrophy in the left cerebral hemisphere predominantly in the frontoparietal region. MRA of brain and neck vessels revealed narrowing with poor opacification in proximal cervical, petrous, and cavernous and supraclinoid portions of the left internal carotid artery. Echocardiography was normal.

The child was transfused packed cells and then started on low doses of aspirin. He received the standard management for iron deficiency anaemia. He was discharged from the hospital nearly one month later at which time there was significant improvement in power in his right arm and leg.

Discussion

Sickle cell anaemia is the most common cause of arterial ischaemic stroke in children affecting at least 10% of such children. Other causes include hypercoagulable states, vascular malformations and infections⁴. The most common clinical manifestations in children are hemiparesis and convulsions⁵.

Anaemia is the most common presentation of iron deficiency but febrile convulsions, breath holding spells, restless leg syndrome and thrombosis are increasingly being associated with iron deficiency⁶. Recent studies have demonstrated that anaemia is in fact a late manifestation of iron deficiency and brain iron depletion occurs at normal levels of haemoglobin³. Iron deficiency can have detrimental effects on both cognitive and physical development of a child.

In a study conducted by Azab SF⁷ et al. that included 21 stroke patients who had previously

been healthy, iron parameters, prothrombotic factors and prothrombin gene mutations were determined. Brain Magnetic Resonance Imaging (MRI), Magnetic Resonance Angiography (MRA) and Magnetic Resonance Venography (MRV) was also performed in all cases. The results showed that iron deficiency anaemia was present in 57.1% of stroke cases with no identified cause and that previously healthy children who developed stroke were 3.8 times more likely to have iron deficiency anaemia. In addition, there was significant association between iron deficiency and thrombocytosis observed.

Nearly 10-25% of children die during the immediate period following a stroke, 25% have a recurrent episode and upto 66% develop a persistent neurological deficit⁸. Iron deficiency anaemia is an easily recognizable and treatable condition. Early diagnosis and prompt intervention can help to minimize the physical, cognitive and financial outcomes associated with stroke in children related to iron deficiency anaemia, as it is a easily treatable condition.

References

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