



Hemepath Case 9: 4-Year-Old Boy

HISTORY

A 4-year-old boy is brought in by his father. The child has eaten clay from the playground on several occasions and demands “only ice” during dinners. As well, the boy is still unable to speak in sentences and expresses no interest when his parents read simple story books to him. There has been no blood observed in the stools or urine, and the boy has not had any episodes of vomiting. A dietary history reveals that the entire family are lacto-vegetarians and the child has never consumed any meat; additionally, the boy loves cow’s milk and drinks up to 6 large glasses per day.

On physical examination, the child appears pale and is noted to use his accessory muscles for respiration, even at rest. His tongue is red, shiny, and smooth, and the corners of his mouth are red and macerated. His fingernails are curved upwards, resembling a spoon. On cardiac exam, the boy’s HR is 140 bpm and auscultation reveals a systolic ejection murmur at the upper left sternal border.

CBC

Hgb (g/L)	Low
MCV	Low
RDW	High
Reticulocyte Count	Low
WBC	N
Plt	High

DESCRIPTION OF SLIDE

Peripheral Blood Smear

The peripheral smear shows severe anemia with microcytosis, anisocytosis, hypochromasia and anisochromasia. Elliptocytes (see rectangles) and target cells (see circles) can also be seen. There is also an increased number of platelets (see arrows).

*** To see the slide annotations in Imagescope, click on VIEW, then ANNOTATIONS, and then on the “eye” icon adjacent to the word “Layers”. In the “Layer Attributes” box, a brief description of the annotations is provided. You may also click on individual layer region (e.g. region 1) in the “Layer Regions” box to locate each annotation – this is especially helpful in identifying annotations when the slide is not zoomed in. ***

MORPHOLOGICAL DIAGNOSIS

Iron deficiency

DISCUSSION

Iron deficiency is the most common nutritional deficiency in infants and children, and is the most frequent cause of anemia in both children and adults. Low iron in children is usually due to an inadequate diet (in contrast to adults, where blood loss may be more common depending on the patient's social situation). Pediatric iron deficiency is often seen along with excess consumption of cow's milk (a poor source of iron that replaces other foods with higher iron content). Additionally, this boy is a lacto-vegetarian: the type of iron in plant foods (non-heme iron) is less easily absorbed by the GI tract compared to that in animal foods (heme iron). Other causes for iron deficiency, such as poor absorption from celiac disease or post gastric surgery, or blood loss, must also be considered.

Patients will have a wide variety in presentation depending on the severity of iron deficiency. A pediatric patient is often asymptomatic, with no significant findings on physical exam. In this patient (who is severely affected), glossitis, angular stomatitis, and koilonychia are observed – epithelial tissues are abnormal in severe iron deficiency owing to their rapid rate of turnover and consequent high iron demands. Tachycardia, a systolic ejection murmur, and dyspnea at rest are also evident on physical exam. Pica, especially for ice (pagophagia), is seen in this boy. Craving for other materials (e.g. clay, dirt, paper, certain foods) may also be observed in severe deficiency.

Chronic lack of iron in the diet can have significant impact on brain development in the young, affecting cognitive and motor development. These effects may be irreversible, even with correction of anemia.