Case Report

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Severe Iron Deficiency Anemia Presenting with Fever and Gastrointestinal Complaints: A Pediatric Case Report

Urgent Message: While the evaluation of a chief complaint is a priority in urgent care, recognition of chronic disease progression is also critical.

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Abstract

Introduction: Often the chief complaint is the primary focus of urgent care visits. However, it is important to consider other aspects of the patient's health, especially in pediatric patients with comorbid medical conditions. Worsening of chronic conditions, such as iron-deficiency anemia, may not be the patient's primary complaint but may require emergent care.

Clinical Presentation: A 2-year-old boy with history of Trisomy 21 presented to urgent care with fever and congestion for 4 days, vomiting for 2 days, and mild conjunctival injection with exudate for 1 day. The guardian reported significant fatigue and increased pallor for several weeks. The patient drank cow's milk (50 oz daily) as his primary source of nutrition. Initial lab workup included a positive rapid strep test as well as a complete blood count with results as follows: Hemoglobin 2.8 g/dL; and mean corpuscular volume 53.8 fL.

Case Resolution: The patient was transferred to the emergency department and started on intravenous (IV) fluids and 3 ml/kg packed red blood cells (PRBCs). Following stabilization, the patient was admitted to the pediatric intensive care unit, where he was diagnosed with severe iron-deficiency anemia due to lack of nu-

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tritional intake. Additionally, he was found to be positive for adenovirus. A dose of intramuscular penicillin G was given for strep pharyngitis treatment. The patient received a total of four 3 ml/kg PRBCs until achieving a hemoglobin greater than 5 g/dL, and one 15 mg/kg IV iron replacement. After symptomatic improvement, the patient was discharged home on oral iron therapy and scheduled for follow up with hematology, nutrition, and his primary care pediatrician.

"For children with cognitive impairments presenting with non-specific symptoms, it is especially important to conduct a chart review, obtain an expanded history, and consider a broad differential diagnosis."

Conclusion: For patients with complex medical conditions such as Trisomy 21, it is important to review the medical chart to ensure the patient is receiving adequate preventive care, including frequent primary care provider (PCP) visits. While urgent care cannot fulfill the role of a PCP, it can act as a safety net for patients with worsening of chronic and comorbid conditions.

Introduction

Trisomy 21, also known as Down syndrome, is a genetic disorder caused by an additional copy of chromosome 21, which causes a distinct physical phenotype with a wide range of medical conditions and cognitive impairments.[1] Comorbidities of Trisomy 21, including autism, motor delays, and sensory issues, can cause feeding challenges and inadvertently lead to other conditions such as iron deficiency anemia.[2]

Iron deficiency anemia results in a low hemoglobin (Hgb) concentration due to insufficient dietary intake or absorption of iron. Laboratory findings include low mean corpuscular volume (MCV), serum ferritin and reticulocytes.[3] Increased consumption of cow's milk has a positive correlation with decreased serum ferritin due to its low iron content, calcium's inhibition of iron absorption, and association with occult intestinal blood loss.[4,5]

For children with cognitive impairments presenting with non-specific symptoms, it is especially important to conduct a chart review, obtain an expanded history, and consider a broad differential diagnosis.

Case Presentation

A 2-year-old boy with a past medical history significant for Trisomy 21 and feeding difficulties presented to the urgent care with fever and congestion for 4 days, vomiting for 2 days, and mild conjunctival injection with exudate for 1 day. The patient was directed to urgent care by his PCP on the same day with concern for dehydration.

On arrival to urgent care, the guardian provided additional history of significant fatigue and increased pallor over several weeks. The patient had also had poor oral intake and decreased urine output for several days. Weight was measured at 1st percentile and height was 6th percentile on the Down syndrome-adjusted growth chart. These measurements have been stable at these relative percentiles since birth. The patient's father and sibling had gastrointestinal symptoms the prior week. The patient drank around 50oz of cow's milk daily as his primary source of nutrition.

Prior Recent PCP Visits

The patient was also seen by ears, nose, and throat as well as developmental/behavioral pediatrics providers.

- **12-month well child check:** Hgb 9.8 g/dL, T4/TSH normal. No other concerns.
- **18-month well child check:** Diet of vegetables, fruits and cow's milk. No portions discussed. No known history of anemia or blood transfusions. No other concerns.
- **24-month well child check:** Overdue

Physical Exam Findings

The patient presented febrile with temperature of 38.7°C, tachycardic with heart rate of 140 beats per minute, and had a respiratory rate of 40 breaths per minute with an oxygen saturation of 98%. His features were consistent with Down syndrome. Significant general pallor was noted. He was alert but fatigued and fussy. Eye exam was notable for pallor of bilateral inner eyelids and mild bilateral conjunctival injection. Mouth was dry. Throat was erythematous with soft palate petechiae. Tympanostomy tubes were in place in the bilateral tympanic membranes and were without drainage. Cardiac exam had notable tachycardia without murmur. Abdomen was soft, non-tender, non-distended with normal bowel sounds. Neuro exam revealed no focal deficits. His exam was otherwise benign.

Urgent Care Management

In addition to the chief complaint, the patient's history of chronic medical issues, worsening feeding difficulties and significant pallor on exam warranted diagnostic laboratory tests and imaging. While awaiting results, an oral challenge was attempted and was unsuccessful. Imaging and lab results included the following.

- **Rapid strep:** Positive
- **Chest x-ray:** Negative for focal pneumonia
- **Complete blood count (CBC):** Hgb 2.8 g/dL; MCV 53.8 fL; reticulocytes 1.3%; white blood cell 11.5 x 10^3/uL; platelets 334 x 10^3/uL

Given the critical hemoglobin value, need for resources not available in urgent care, and importance of ongoing monitoring, the patient was transferred to the emergency department (ED).

Therapeutic Intervention

In the ED, the patient immediately received 2 boluses of IV normal saline for rehydration and was started on empiric antibiotics (ceftriaxone and vancomycin) for possible sepsis. The hemoglobin was re-checked and was consistent with the prior result from urgent care. Given the low repeat hemoglobin value (2.7 g/dL) the patient was transfused with 3 ml/kg packed red blood cells (PRBCs) for suspected severe iron deficiency anemia. The early working diagnosis was that the history of high cow's milk intake (50 oz daily) was the likely cause of the iron deficiency anemia. However, more labs were planned to confirm.

Following stabilization, the patient was admitted to the pediatric intensive care unit (PICU) and hematology was consulted for further management. During admission, the patient received maintenance fluids, additional blood transfusions (4 transfusions total), and IV iron replacement. Further workup was obtained while in the PICU.

PICU workup labs included the following.

- **Respiratory infection array:** Adenovirus positive, other viral testing negative
- **Iron deficiency labs:** Low serum iron 21 ug/dL (normal 50-150 ug/dL); low iron saturation 5% (normal 15 - 50%); normal ferritin 14 ng/mL (normal 6 - 70 ng/mL); normal total iron binding capacity 406 ug/dL (normal 250 - 450 ug/dL)
- **Other labs:** Hemolysis, hemoglobin electrophoresis, direct/indirect Coombs, and lead level were all negative
- **Cultures**: Negative blood and urine cultures

Diagnosis

The patient's history of significant cow's milk intake and lab findings were consistent with the final diagnosis of severe iron deficiency anemia. Other potential causes for anemia including hemolysis (parvovirus, cytomegalovirus, autoimmune) or bleeding were ruled out. Strep pharyngitis was treated with intramuscular penicillin G. Adenoviral conjunctivitis self-resolved. Nutrition was consulted for dietary support, and the patient was discharged after 3 days.

"The severity of low-intake iron deficiency anemia can often be alleviated or prevented with adequate patient supervision and dietary counseling."

Follow-Up and Outcomes

At discharge, the patient was instructed to continue iron supplementation with oral ferrous sulfate daily, limit milk/dairy until hemoglobin normalized, and drink nutritional supplement drinks with iron fortification and high calories. At the 2-week follow up with hematology, the patient's acute symptoms had resolved with good tolerance of oral iron and supplement drinks. The patient continued to be a picky eater but had improved appetite and successfully reduced cow's milk intake. Follow up clinic labs showed improving anemia (Hgb 8.6 g/dL and MCV 79.5 fL). Three months later, after completing the course of oral iron, the patient's anemia resolved (Hgb 12.9 g/dL and MCV 85.3 fL) and iron improved (ferritin 26 ng/mL). The patient was permitted to reintroduce dairy (no more than 16 oz a day) and continued to take a multivitamin with iron. The primary care pediatrician continued to monitor growth and diet.

Discussion

Trisomy 21 is a genetic disorder caused by an extra copy of chromosome 21 with an occurrence of 1 in 319-1000 live births.[6] It can be diagnosed through various methods such as prenatal screenings with ultrasound and chorionic villus sampling, or genetic testing with karyotyping and fluorescence in situ hybridization.[7] There are many clinical conditions associated with Trisomy 21 including characteristic facial features, developmental disabilities, and cardiac, gastrointestinal, hematologic, neurologic, endo-

crinologic, musculoskeletal, visual, and otorhinolaryngologic disorders. Trisomy 21 is managed with parental education, therapy, and enhanced monitoring in primary and specialty care, including screening for cardiac, thyroid, and spinal disorders.

Iron deficiency anemia is defined as hemoglobin below 2 standard deviations from the mean for age and sex secondary to insufficient dietary intake or absorption of iron, an essential component of hemoglobin. One common reason, especially in pediatric patients, includes excessive cow's milk consumption, due to milk's low iron content and the presence of calcium, which further inhibits iron absorption from other sources. Approximately 2% of children between 12 to 35 months of age have iron deficiency anemia.[8] Laboratory diagnosis includes hemoglobin and MCV, which can be obtained from a CBC. Iron studies include iron, ferritin, transferrin saturation, and total iron binding capacity. Further evaluation can be obtained by hematoscopy, hemoglobin electrophoresis, and bone marrow aspiration. While iron deficiency is the most common etiology of anemia in children, other important causes to rule out include malignancy, autoimmune disease, lead poisoning, and anemia of chronic disease. The severity of low-intake iron deficiency anemia can often be alleviated or prevented with adequate patient supervision and dietary counseling.

Symptoms of anemia are typically vague and nonspecific, including fatigue or shortness of breath. Unusual behavioral changes, increased irritability, and pica can also be common anemia presentations. Patients may also be asymptomatic, but examination may reveal pallor and tachycardia. Treatment is achieved by treating the underlying cause, use of oral or IV iron supplementation, as well as blood transfusions in severe cases.

For patients with chronic medical conditions, developmental delays, or limited communications skills presenting to the urgent care, it is important to consider investigation beyond the initial chief complaint. Patients who have difficulty communicating their state may also present with non-specific symptoms that are less acutely bothersome to the patient. Medical chart review for prior preventive care visits, frequency of PCP or specialist encounters, and an expanded history for collection of general health aspects, such as dietary history, can sometimes reveal more emergent needs than the chief complaint for the visit. While urgent care cannot fulfill the role of a PCP as a healthcare institution, urgent care can act as a safety net when necessary for patients with worsening of chronic conditions.

Ethics Statement and Guardian Perspective

Informed consent for publication was obtained from the patient's mother. She said she hoped discussion of her son's case would help reduce these events from happening to other children.

Takeaway Points

- Especially for patients with chronic conditions, developmental delays, or poor communications skills, it is important to investigate beyond the chief complaint with chart review and history-taking and consider further workup.
- Labs indicating iron deficiency anemia include low levels of hemoglobin, hematocrit, mean corpuscular volume, serum iron, ferritin, transferrin saturation, and high levels of total iron binding capacity.
- At 12 months of age, pasteurized whole milk may be introduced but should be targeted to 16 oz or less daily and should not exceed 24 oz daily. Above that level, there is no additional nutritional benefit and complications such as iron deficiency anemia can ensue. ■

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