Visual Diagnosis

Infant with Ecchymoses

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PRESENTATION

An otherwise healthy 9-month-old boy is brought to the emergency department by his foster parents with a chief complaint of unusual bruises and marks on his skin. Two days ago, the foster parents had noticed left eye redness and swelling, which has subsequently progressed to a large, swollen blue-black lesion on his left cheek and new scattered bluish lesions on his thighs. The child had been diagnosed with a viral upper respiratory tract infection 3 weeks ago and has had some lingering nasal congestion with tactile temperatures for the past week but is otherwise acting very well, eating normally, and not fussy. He has had no recent immunizations or medications. His past medical history includes a preterm birth at 31 weeks' gestation via vaginal delivery. The biological mother's pregnancy was complicated by prolonged premature rupture of membranes and polysubstance abuse. The boy did receive parenteral vitamin K at birth.

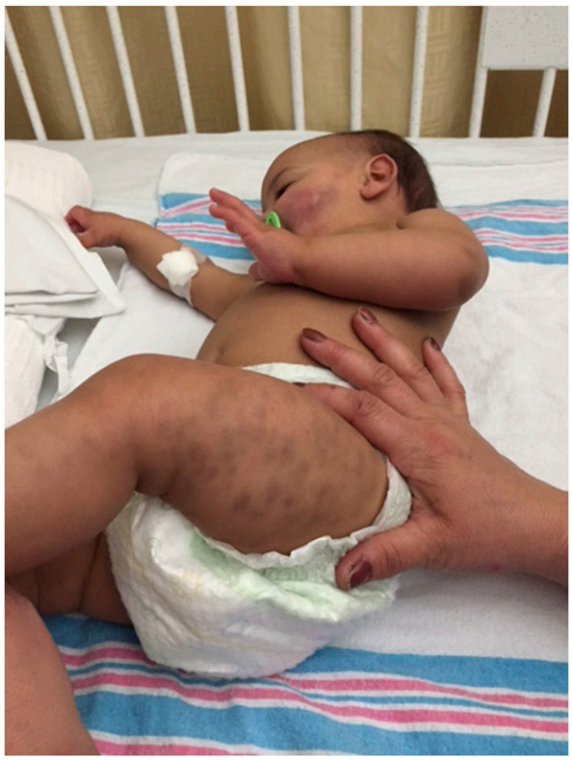

Figure 1. Scattered annular ecchymoses on the posterior thigh.

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On physical examination in the emergency department, the child's vital signs are within normal limits for age. He appears well, in no distress, and well nourished. Results of head and neck examinations are within normal limits, with a soft and open anterior fontanelle. Cardiovascular, pulmonary, and abdominal examinations also yield no abnormalities. Skin findings include a large targetoid ecchymosis with underlying edema on the left cheek, a right posterior auricular ecchymosis, and several scattered annular ecchymoses on the bilateral posterior thighs (Figs 1-4). There are no lesions on the trunk. Mucus membranes are intact and without lesions. The rest of his physical examination findings are normal. Results of a laboratory evaluation that includes a complete blood cell count, comprehensive metabolic profile, coagulation studies, and urinalysis are all within normal limits. An erythrocyte sedimentation rate is mildly elevated at 45 mm/hour.

Due to suspicions for child physical abuse, emergency department clinicians notify child protective services, and the boy is admitted to the hospital. A skeletal survey reveals nonspecific subcutaneous edema of the left leg but no healing or acute fracture. Head computed tomography scan shows no intracranial abnormalities. A dilated eye examination reveals no retinal hemorrhages. During his inpatient stay, nursing staff note on multiple occasions that the infant's skin findings change rapidly in color, shape, and size, even over the course of 8-hour shifts (Fig 5). He eventually develops bilateral nonpitting pedal edema, scrotal edema, new ecchymoses, and rapidly changing morphology of the original ecchymoses.

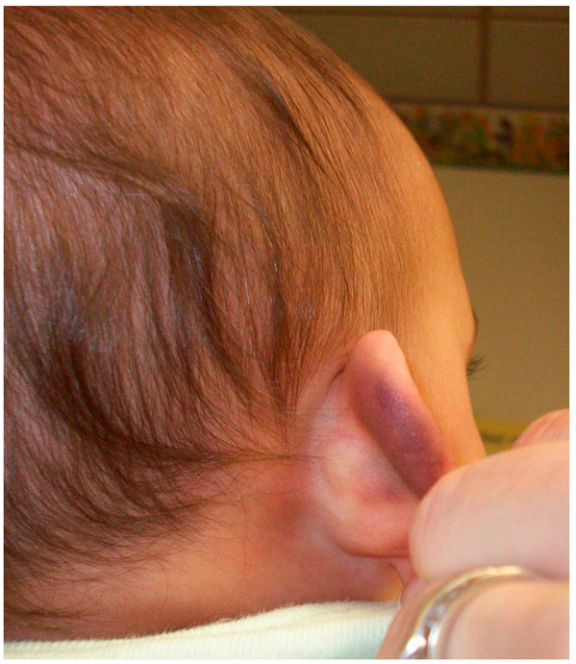

Figure 2. Right posterior auricular ecchymosis.

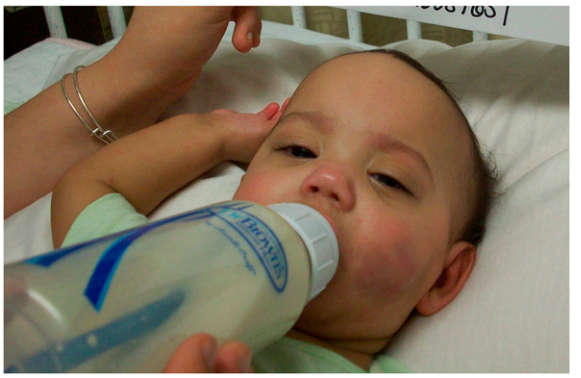

Figure 3. A large targetoid ecchymosis with underlying edema on the left cheek.

DIAGNOSIS

Based on the developing edema and changing morphology of the ecchymoses, clinicians diagnose acute hemorrhagic edema of infancy (AHEI), a self-limiting, benign leukocytoclastic vasculitis that is more common in male infants. The exact cause of AHEI is unclear, but it is believed to be due to an immune complex-mediated hypersensitivity reaction in the small blood vessels. AHEI has been associated with prodromal illnesses or medication use. Some triggers include viral and bacterial infections, vaccinations, and medications such as penicillins, sulfa drugs, and acetaminophen. AHEI generally affects children between 4 months and 2 years of age.

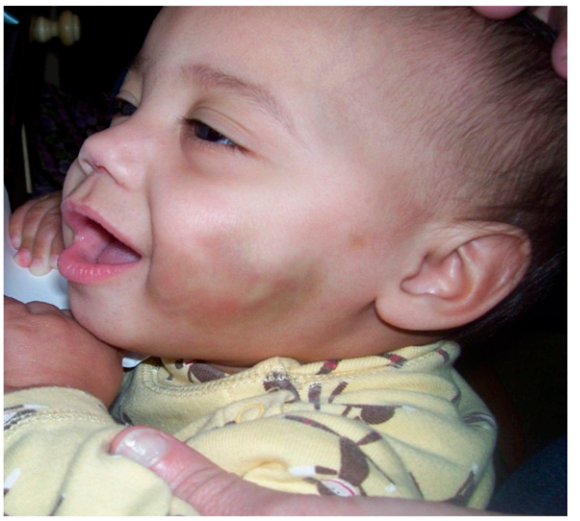

Figure 4. A large targetoid ecchymosis with underlying edema on the left cheek.

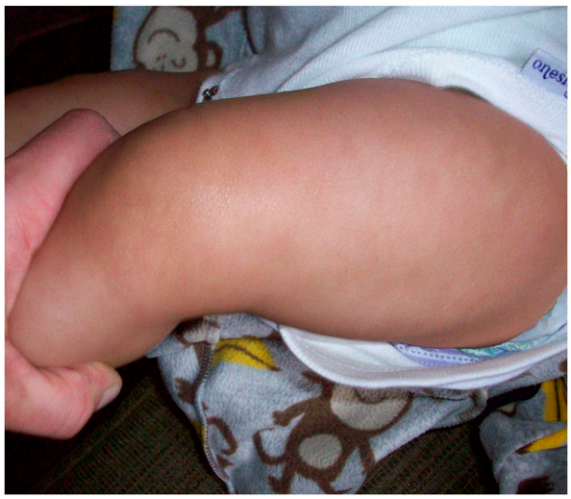

Figure 5. Near-complete resolution of scattered annular ecchymoses on the thigh on the second day of hospitalization.

Clinical Features and Treatment

AHEI is most notable for its dramatic appearance and rapidity of onset within 24 to 48 hours. It is characterized by rash, nonpitting edema, and fever in an otherwise well-appearing child. The rash can present as petechial, ecchymotic, annular, or targetoid and is primarily acral, with some involvement of the face and ears. Typically the trunk is spared. There is rare mucosal, visceral, or systemic involvement, which may include joint pain, abdominal pain, intussusception, gastrointestinal bleeding, scrotal pain, or testicular torsion. The nonpitting edema is asymmetric and often ascends from the lower to the upper extremities. Edema may also involve the skin lesions. Fever, which is not always a notable finding, is frequently low grade. Hypocomplementemia, leukocytosis, thrombocytosis, elevated erythrocyte sedimentation rate, and elevated liver transaminases have also been reported.

There is no effective therapy for AHEI other than supportive care. Corticosteroids and antihistamines have been used but have not been shown to alter the course of the disease. Spontaneous self-resolution occurs within 1 to 3 weeks of onset, although AHEI may recur.

Differential Diagnosis

Several differential diagnoses for AHEI have subtle but important differences. Of note, child physical abuse is a high consideration. AHEI is a known mimic of child abuse, especially in a child who is immobile, as in this 9-month-old patient. Bruising in children who are not yet able to cruise, particularly of the face, ears, back, or buttocks, should always raise grave suspicion of child physical abuse. The importance of a complete history cannot be overemphasized as well as adequate laboratory and radiologic studies to evaluate for any coexisting traumatic injuries. In this case, a pictorial history that documented the changes to this boy's bruises over time and the absence of any injuries aided in the diagnostic process. The targetoid and annular morphology of the lesions along with the nonpitting edema further supported a diagnosis of AHEI.

Henoch-Schönlein purpura (HSP), also a leukocytoclastic immune-mediated vasculitis, is another potential diagnosis. In fact, AHEI was once believed to be a variant of HSP. HSP is characterized by purpura, arthritis, abdominal pain, and renal involvement. A key difference between the 2 conditions is the age of onset; typically HSP presents at approximately 4 to 7 years of age and the incidence of AHEI peaks between ages 4 and 24 months. Laboratory abnormalities seen in HSP include elevated immunoglobulin A and decreased complement 3 values. Among the sequelae of HSP are intussusception, gastrointestinal bleeding, nephritis, and nephrotic syndrome. In contrast, AHEI rarely causes significant systemic effects.

Erythema multiforme is also high on the differential diagnosis list, especially related to the abrupt onset within days of illness or medication use. Erythema multiforme also is related to a hypersensitivity reaction involving the skin and mucus membranes. The rash is often targetoid, raised, and papular and spreads centripetally, but it is symmetric in distribution and is not associated with edema. In contrast to AHEI, the rash of erythema multiforme blanches to pressure. The condition self-resolves, and treatment is avoidance or withdrawal of the inciting factor.

A life-threatening consideration in the differential diagnosis is vitamin K deficiency bleeding (VKDB). Vitamin K, a lipophilic cofactor required for activation of multiple clotting factors, is neither stored in the neonatal liver nor readily synthesized in neonates due to underdeveloped gut flora. In the last several decades, the routine administration of prophylactic parenteral vitamin K to newborns has reduced the incidence of VKDB. VKDB is classified by 3 periods of onset: early (initial 24 hours after birth), classic (up to 2 weeks postnatally), and late (beyond 2 postnatal weeks). Infants who have not received vitamin K prophylaxis at birth are at high risk. Of note, the incidence of parental refusal of prophylactic vitamin K is growing. The presentation of VKDB varies, ranging from bleeding at the umbilicus, circumcision, or surgical sites to bleeding at mucosal surfaces and intracranial hemorrhage. Evaluation for children who have these presentations includes an accurate and thorough neonatal history and coagulation studies. Increased prothrombin time with normal partial thromboplastin time, platelet count, and fibrinogen value

is highly suspicious for VKDB. Treatment should not be delayed; parenteral vitamin K should be administered immediately. This was a very remote diagnostic possibility in this patient, who at 9 months of age would be very old to develop VKDB.

Meningococcemia, hematologic malignancies, and drug eruptions are also part of the differential diagnosis. These conditions can be readily eliminated through history, physical examination, and laboratory testing.

Case Progression

The boy in the case was discharged from the hospital in the care of his foster parents. His inpatient course was notable for the changing nature of his skin findings and stable clinical status. He presented for outpatient follow-up 1 week later, at which time his physical examination showed much improved ecchymoses and mild pedal and periorbital edema. Further laboratory studies, including von Willebrand testing and factors VIII and IX testing, returned results within normal limits. The patient continues to improve.

Summary

- Acute hemorrhagic edema of infancy (AHEI) should be part of the differential diagnosis for any young child presenting with unexplained bruising.
- Evolution of symptoms over time is a key discerning feature in AHEI.
- Self-resolution with no adverse sequelae is typical in AHEI.

Suggested Reading

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