Pediatric Emergencies

Winter Refresher Course for Family Medicine
January 31, 2019

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Pediatric Potpourri

Minor Complaint
or
Major Problem

Disclosures

- Sadly, I have no relevant financial relationships to disclose

Who Am I?

- University of Cincinnati, M.D., 2006
- Loyola Medicine, Pediatrics, 2009
- MCW/CHW Pediatric Emergency Medicine, 2012
- Husband, Father of 3
- Beer snob
- Triathlete

Objectives

- Use an interactive, case-based format to review common peds complaints and some potentially catastrophic illnesses in children
- Recognize clues to major illness in kids
- Highlight special physiologic and historical elements unique to children

Case 1

An 8-month-old infant with a 2-day history of increasing redness and swelling of the cheek. She has been fussy secondary to teething for the past week but is afebrile and nontoxic. Her primary care physician had been concerned about a possible facial abscess.

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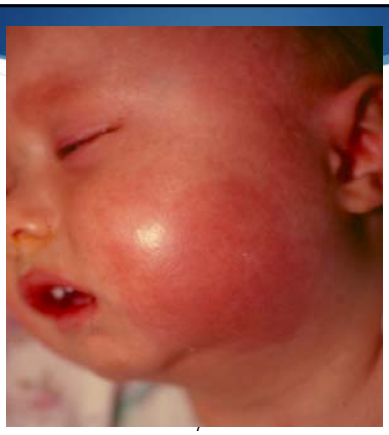


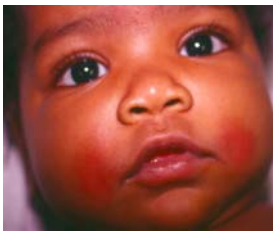
Minor Complaint

OR

Major Problem

Minor Complaint: **Popsicle Panniculitis**

- Localized fat necrosis from cold injury
- Appears 1-3 days after exposure
- Mildly tender, discrete, indurated, subcutaneous mass
- Reddish-purple discoloration
- No systemic symptoms
- Spontaneously resolve over weeks



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Case 2

A 3-week-old male with history of being a "spitty baby" who now presents with decreased feeding with some projectile emesis but normal bowel movements. He has a normal physical exam.

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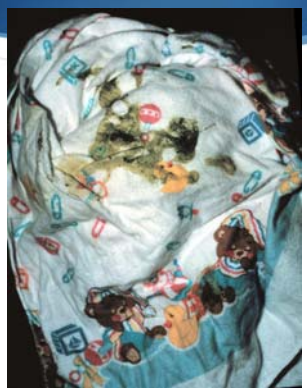


12

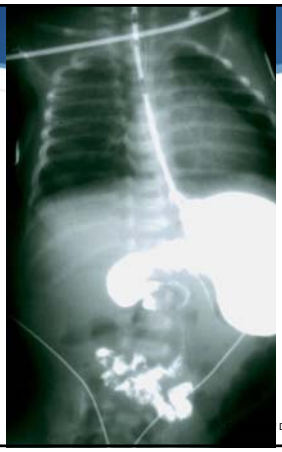
Minor Complaint

OR

Major Problem

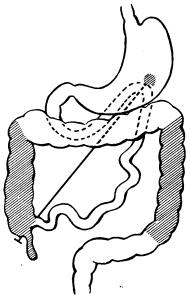
What diagnostic or lab test would you like most to order?

14



Dr. L.R. Scherer

Normal Embryologic Development



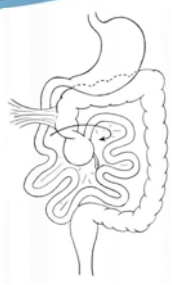
- Fixed ascending colon
- Fixed at ligament of Treitz
- Fixed descending colon
- Wide mesenteric base

Filston HC, Kirks DR. J Pediatr Surg. 1981 Aug;16(4 Suppl 1):614-620.

16

Major Problem: Midgut Volvulus

- 1: 500 births
- 80-90% present in 1st year
- Diagnosis:
  - Abd Xray: no air, dilated loops
  - Upper GI with SBF: malposition of c loop of duodenum



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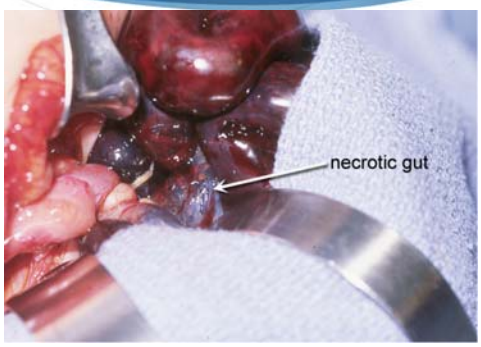


Courtesy of Dr. L.R. Scherer

18

Major Problem:
Midgut Volvulus

- Bilious vomiting in the neonate is a potential surgical emergency
- In one review,* 35 of 37 patients with malrotation "appeared well" at presentation, and 28 exhibited no abnormal physical findings on abdominal exam (including 15/25 patients with volvulus)
- Delay in diagnosis allows progression of ischemic injury and increases the risk of infarction, perforation, peritonitis, sepsis, or death

*Bonadio et al. *Pediatr Emerg Care.* 1991;7:348-349.

19

Case 3

An 18 year old male sustained a concussion in a football game on Friday night. He had an uneventful weekend and returns to school on Monday. In the afternoon, he complains of headache, dizziness, confusion, blurred vision, and nausea. He has a GCS of 15 and normal neuro exam.

21

Minor Complaint

OR

Major Problem

Minor Complaint:
Post Concussive Syndrome

- Persistence of symptoms such as:
  - Headaches, fatigue, dizziness, visual symptoms, sleep problems, personality changes, and deficits in short-term memory and problem solving
- Worse with cognitive and physical exertion
- May last for days to months
- Decision to image based on clinical exam

23

Minor Complaint:
Post Concussive Syndrome

- Treatment:
  - Physical and cognitive rest
  - Somatic complaints respond to migraine TX
  - Prevent secondary injury
  - Do not return to sports until symptom free at rest and with exertion

24

Case 4

A 10 week old female fell asleep and was placed in her crib. A minute later she was found not breathing, limp and pale lasting a few seconds. This resolved after Dad blew in her face. She has fed since then and is afebrile with a normal exam.

26

Minor Complaint

OR

Major Problem

Major Problem:
Brief Resolved Unexplained Events (BRUE) (formerly ALTE)

- Children less than a year old with any of the following symptoms lasting less than a minute
  - Central cyanosis or pallor
  - Apnea or decreased/irregular breathing
  - Change in tone
  - Alterred responsiveness
- Resolves and pt returns to baseline
- Unremarkable history, vitals, and exam
- Diagnosis of exclusion

28

Major Problem:
Brief Resolved Unexplained Events (BRUE) (formerly ALTE)

- Low Risk Criteria:
  - Older than 60 days
  - GA >32 weeks, >45 weeks of life post-conception
  - First BRUE
  - No CPR required
  - No concerning historical features
  - No abnormal physical findings

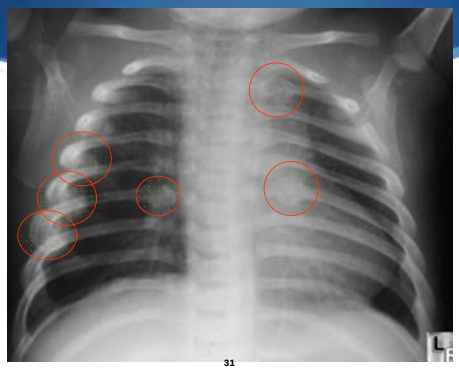
29

Major Problem:
Brief Resolved Unexplained Events (BRUE) (formerly ALTE)

- Evaluation:
  - Blood glucose
  - Consider EKG or pertussis in appropriate setting
  - Avoid indiscriminate testing or medications
  - Observe low risk for hours and reassess
    - Possible outpatient management with family comfort, CPR training, and close follow up
  - Admit high risk
  - Neonate? Full ROS
  - Suspicious story? Abuse work up

30

Back to Our Case…



31

What portions of the physical exam merit special attention?

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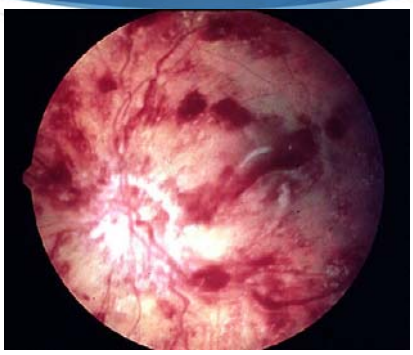
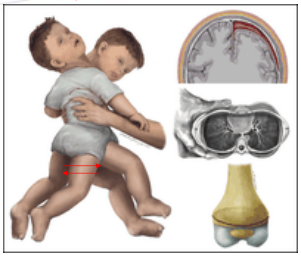


Courtesy of Drs. Dana Braner and Sandra Berr

33

Retinal Hemorrhages

- Strongly associated with deceleration injuries
- Pitetti et al Pediatrics Sept 2002
  - Child abuse was detected in 2% of patient who present with ALTE (BRUE)
  - 1% of patients had retinal hemorages



34

Major Problem: Child Maltreatment

- Evaluation
  - Skeletal survey / Bone Scan
  - Head CT if head trauma suspected
  - Lab evaluation:
    - U/A, LFTs, lipase, amylase
  - Abdominal imaging if suspect abdominal trauma

35

Major Problem: Child Maltreatment

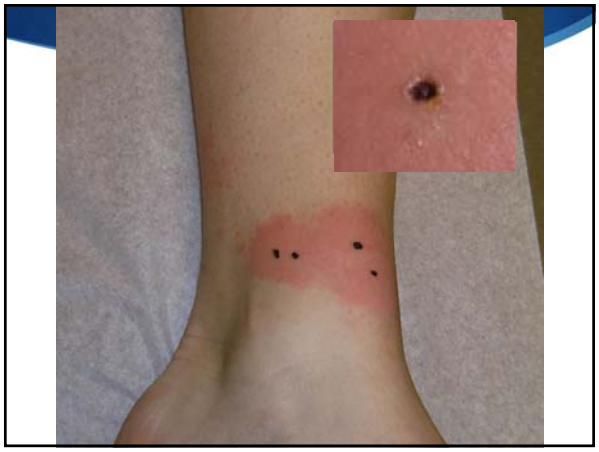
- Jenny et al. *JAMA.* 1999;281:621-626
  - 31% (54/173) abused children with head injuries were misdiagnosed on previous evaluation
  - 15 of the children were reinjured after the missed diagnosis
  - 4 deaths that might have been prevented by earlier recognition of abuse

36

Case 5

A 15 y/o female with itchy rash on face, back, and legs. She also noticed some dark black lesions at her ankles and near her knee. She is afebrile and has no other constitutional complaints or past medical problems.

38



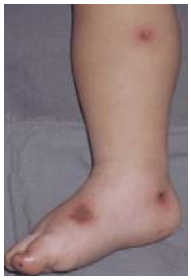
Minor Complaint

OR

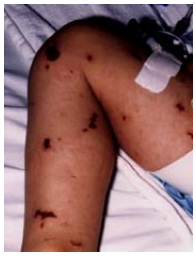
Major Problem

This is not…

- Ecthyma Gangrenosum



- Purpura fulminans



41

Minor Complaint: **Black Spot Poison Ivy**

- Uncommon manifestation of poison ivy.
- The black spot is urushiol (oleoresin) turns black when exposed to air
- Surrounding areas intensely pruritic
- Treatment: Oral antihistamines and systemic steroids taper
- Lesions eventually slough off as the epidermis desquamates.

42

Case 6

A mother calls your office. Her parents are visiting and left some of their medications on the nightstand. Her 2 year old son was found with an open bottle of grandma's "diabetes pills." No pills appear to be missing. The child is asymptomatic.

44

Minor Complaint

OR

Major Problem

Major Problem:
Oral hypoglycemic ingestion

- Hypoglycemia may be delayed up to 16-24 hours
- Sulfonylureas >>> Metformin
- Often require 24 hour hospitalization for close observation and blood glucose monitoring
- Maintenance of euglycemia
  - D10 infusion with boluses as necessary
  - octreotide can been used for refractory cases

46

One Pill Can Kill

- Sulfonylureas
- Tricyclic antidepressants
- Calcium Channel blockers
- Opiates
- Quinine
- Clonidine
- Cocaine
- Alcohol
- Methyl salicilylate (oil of wintergreen)
- Organophosphate insecticides
- Hydrocarbon aspirations

47

Case 7

An 11 year old male has a brief seizure during his swimming lesson. He is asymptomatic on presentation with a normal exam.

49

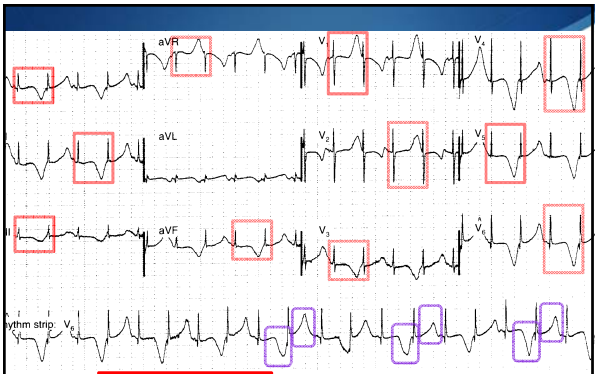
Minor Complaint

OR

Major Problem

What diagnostic laboratory value/test would you most like to order?

51



Markedly prolonged QT interval (corrected QT interval = 0.75 sec) with T-wave alternans

Franklin WH, Hickey RW. Images in clinical medicine. Long QT syndrome. *N Engl J Med.* 1995; 333(6):355. Copyright © 1995 Massachusetts Medical Society. All rights reserved.

52

Major Problem: Prolonged QT

- Case reports have linked Long QT to deaths due to drowning, near drowning, MVC, and SIDS
- Can be caused by medications, electrolyte abnormalities (especially hypocalcemia), or an inherited condition
- Presentation:
  - 30% present with syncope (secondary to VT)
  - 10% present with seizures
  - 15% "present" with death

53

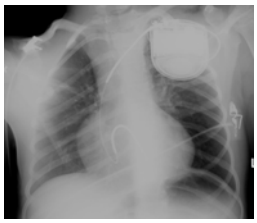
Major Problem: Prolonged QT

- Family history :
  - sudden, unexplained deaths prior to age 55
  - fainting episodes
  - unexplained accidents
- Consider cardiac arrhythmias in all patients presenting with a brief, nonspecific change in LOC
- "Spells" associated with **exercise** are particularly worrisome

54

Major Problem: Prolonged QT

- Potential therapies include β-blockers, implanted internal defibrillator, and ready access to automated external defibrillators
- IV magnesium can be administered for torsades de pointes
- Family members should be screened



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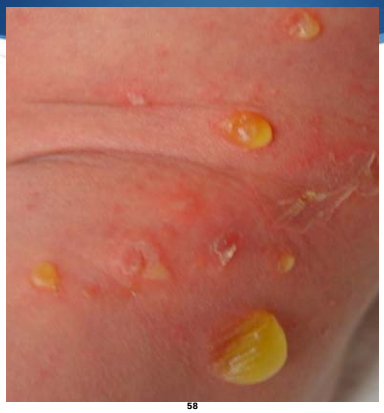
Case 8

- A 9 month old presents with skin lesions that have been developing over the past 3 days. Child has been afebrile, lesions are non-tender, nonpruritic

57



58

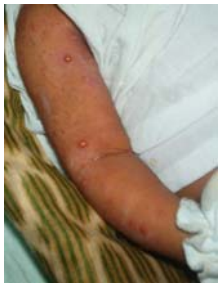
Minor Complaint

OR

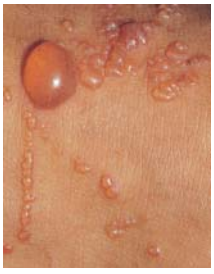
Major Problem

This is not…

- Herpes or Varicella



- Contact dermatitis



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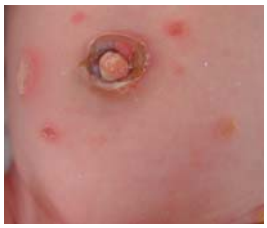
Minor Complaint: **Bullous Impetigo**

- More common in newborns and older infants
- Lesions on trunk and extremities
- Vesicles grow larger over three days, then rupture, draining a yellowish fluid



61

Minor Complaint: **Bullous Impetigo**

- Culture of the fluid would reveal Staph aureus (20% MRSA)
- Produces an exfoliatin toxin that causes subcorneal epidermal cleavage
- If extensive, may produce systemic symptoms
- Usual treatment with mupirocin; may use systemic antibiotic if extensive

62

Case 9

An 18-month-old male infant presents to the emergency department with a 12-hour history of intermittent abdominal pain and vomiting. He is playful between episodes. It has been over 24 hours since the last bowel movement.

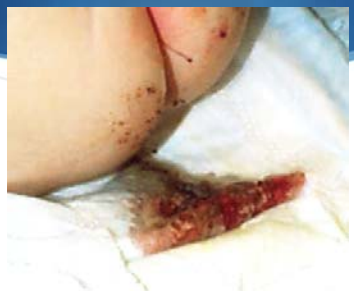
64

Minor Complaint

OR

Major Problem

He just Pooped ☺

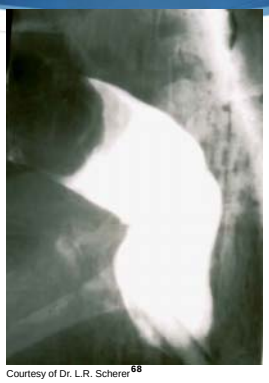


But It looks like this ☹

66

What diagnostic laboratory value/test would you most like to order?

67

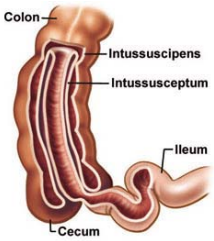


Courtesy of Dr. L.R. Scherer

68

Major Problem: Intussusception

- Most common intestinal obstruction in children under 2 y/o
- Loop of bowel invaginates caudally
- **Presentation**
  - Paroxysmal colicky abdominal pain with pain free periods.
  - Bloody stools (12 hr -2 dys later)
  - Palpable mass in RLQ/epigastrum



69

Major Problem: Intussusception

- **Diagnosis:**
  - Guiac + stools
  - X-rays: paucity of gas in RLQ, and distal to obstruction.
  - Ultrasound: views intussuceptum
- **Treatment:**
  - Air Contrast Enema: diagnostic and therapeutic
  - Surgical reduction
  - 5 % recurrence rate

70

Case 10

3-month-old female with wheezing, 2 day history of cold symptoms, feeding difficulty over the past 2 weeks (takes longer to feed, less volume consumes, sweats with feedings). On exam, she has bilateral wheezes and mild retractions.

72

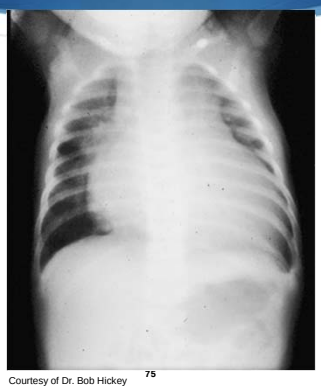
Minor Complaint

OR

Major Problem

What tests would you like to order at this time?

74



Courtesy of Dr. Bob Hickey

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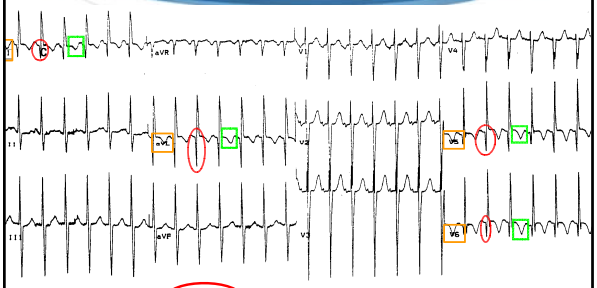

ECG: *Q waves* in leads I, aVL, V_5 and V_6 and flipped T waves

Franklin WH, Dietrich AM, Hickey RW, Brookens MA. Anomalous left coronary artery masquerading as infantile bronchiolitis. *Pediatr Emerg Care*. 1992; 8(6):338-341.

76

Major Problem: Anomalous coronary artery

- Anomalous coronary artery arising from the pulmonary artery supplies myocardium in diastole
- Asymptomatic at birth (high PA pressures)
- When PA pressures decline, the diastolic pressure is insufficient to adequately perfuse the heart, causing myocardial ischemia and congestive failure

77

Major Problem: Anomalous coronary artery

- Episodes of paroxysmal irritability and pallor consistent with angina
- Feeding and crying are the "infant stress test"
- "All that wheezes is not asthma" *cardiac-associated* wheezing in infancy include:
  - Cardiomyopathy
  - Myocarditis
  - Left-sided obstructive lesions (eg, aortic stenosis and coarctation of the aorta)
  - Left-to-right shunt lesions

78

Summary

- Children are generally sick when sick, well when well
- There are few conditions in which children may be well appearing before a rapid decline
- A through history and mindful exam may yield clues to catastrophic illness in children

80

Summary (continued)

- Bilious emesis in the neonate is a surgical emergency
- Consider child abuse in all children with nonspecific complaints such as lethargy, crying, isolated vomiting, and ALTE
- Prolonged QT_c can present with syncope, "spells," seizures, ALTE, or death
- Beware of pills that can kill
- Wheezing in infancy can be a presentation for cardiac disease

81

Thanks!!

References

- Cases were adapted from personal cases, and AAP/AHA case presentations
- Filston et al. J Pediatr Surg. 1981 Aug;16(4 Suppl 1):614-620.
- Pitetti RD et al. PEDIATRICS 110:3 September 2002, pp. 557-562
- Bonadio et al. *Pediatr Emerg Care.* 1991;7:348-349.
- Jenny et al. *JAMA.* 1999;281:621-626
- Franklin WH, et al. *Pediatr Emerg Care.* 1992; 8(6):338-341.
- Franklin WH, et al. *N Engl J Med.* 1995; 333(6):355.
- Fox SM, PedEMMorsels.com. BRUE. 9/2/2016

84

Bonus Case

23 m/o male presents 6 days after falling off slide and cutting upper-lip. Small Lip cut keeps opening up and re-bleeding per mom secondary to child picking at lesion. No other injuries of complaints. Bleeding stops with pressure.

Minor Complaint

OR

Major Problem

Tell me more…

- PMH
  - no significant bleeding history, though may have bleed a bit after ear tube surgery
  - No excessive bruising. No nose bleeds
- Family history:
  - Mother reports personal and family h/o menorragia
  - Grandfather with severe nosebleeds.

What tests would you like to order at this time?

Lab Eval of Child with Bleeding Disorder

- Screening tests:
  - CBC: evaluate Platelet count and abnormalities in other cell lines.
  - PT/aPTT
  - Thrombin time
- Additional tests
  - Fibrinogen:
  - Bleeding time

Bonus Case: Labs

- CBC: WNL
- PT: 9.8 Sec's (normal);
- aPTT: 42.6 sec's (high).
- Collagen/ADP: 134 (elevated)

Von Willebrand's Disease (VWD)

- 1-2% of population causes Mild to moderate bleeding
- H/o mucosal bleeding
- VWF mediates platelet adhesion and carrier for Factor VIII
- Confirmatory tests:
  - VWF levels (variable)
  - Factor VIII level (variable)
  - VWF activity (ristocetin cofactor test)
  - VWF antigen (assess number of VWF binding sites)
  - VWF multimer analysis

Treatment of Bleeding in VWD

- Desmopressin (IV, IN, SQ): (15x dose for DI)
  - Release VWF from endothelial storage sites
  - Use if has documented 2-5x incr. post dose
  - May rpt at 12-24 hrs but deplete tissue stores
- Factor VIII concentrate/ Cryoprecipitate (contains VWF)
- Aminocaprioc Acid (Amicar)
  - Inhibits fibrinolysis via inhibition of plasminogen activator substances and antiplasmin activity.

Bonus Case Follow up

- Lip bleeding on arrival to Heme Onc clinic
- VWD labs show normal VWF levels and activity
- Factor VIII extremely low
- Diagnosis: Hemophilia A (mild)
- Treatment: Recombinant Factor VIII