Should I Send This Kid to ER?

A Potpourri of Paediatric Cases

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No conflicts of interest

Objectives

At the end of this presentation participants should be able to

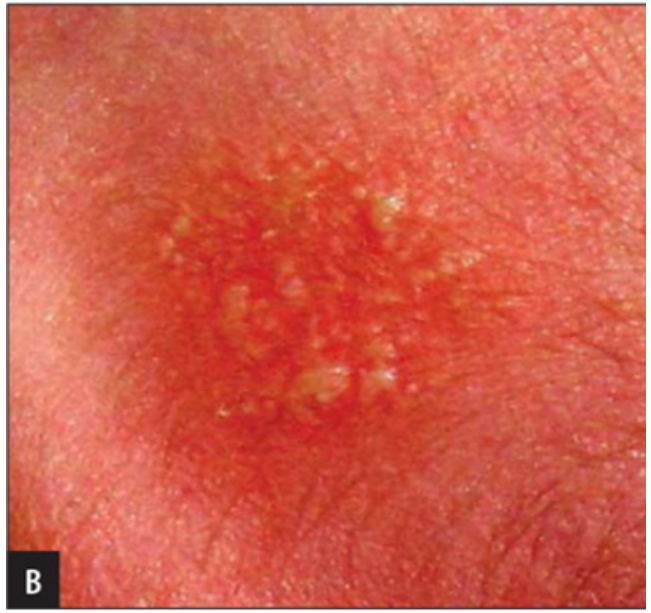
1. Describe worrisome features of rashes in babies

2. Discuss unresponsive episodes in children with temper tantrums

3. Discuss the importance of identifying abnormal vital signs in children

Well Baby Worried Mom And A Rash

- Mother brings 1-week-old girl as she is worried about a rash
- Everything is fine with the baby, no fever, feeding well
- Little bumps near the belly button

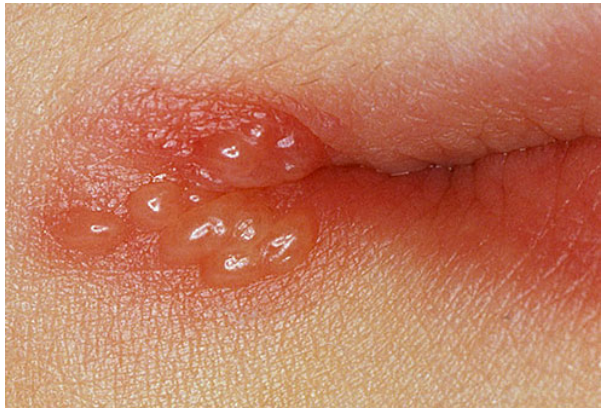


What would you do?

1. Prescribe Fucidin cream

2. Ask parents to keep the area clean and return if rash spreads or any other concerns

3. Send baby to ER



The dad had cold sores recently

Toddler With Temper Tantrums And An Unresponsive Episode

- 2-year-old girl passed out eating cereal; awoke after 2 min. She was stiff with eyes rolled back ~ approx. 2 min. Minimal period of sleepiness, now awake and alert; no retractions; skin color is normal

- Two similar episodes associated with “temper tantrums”

What would you do

1. Reassure the family and counsel them about temper tantrums
2. Refer to a Paediatric Cardiologist and Neurologist
3. Send to ER

14-year-old Athlete with Abdominal Pain

He had injured his knee while playing soccer and was on ibuprofen for 2 weeks. Come with epigastric pain for 1 week .Severe abdominal pain & pain on deep breathing few hours

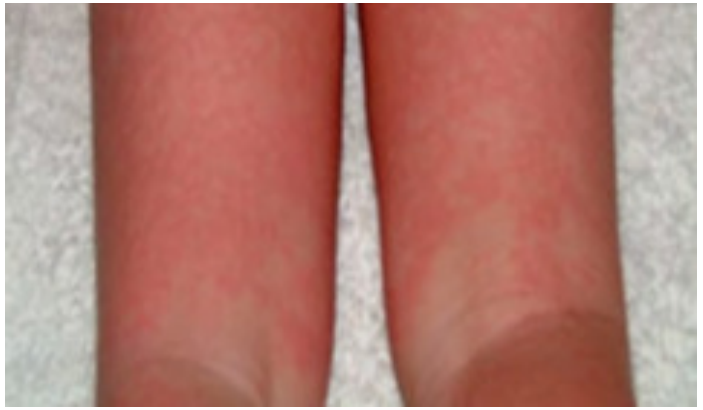
- Afebrile, Temp 37 C HR 140
  - CVS: S1 S2
  - Chest: Clear, slightly reduced air entry both lung bases better with deep breaths
  - Abdomen: He is very ticklish and tightens as soon as you put your hand on his abdomen. No RLQ tenderness

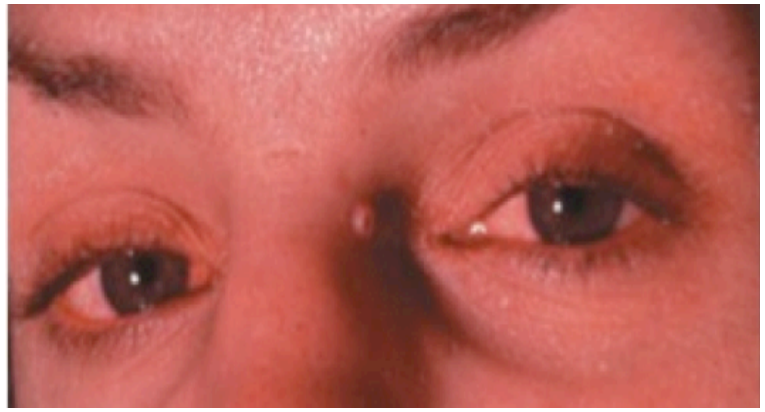
What would you do?

1. Order a chest X ray
2. Start him on Omeprazole and Antacids
3. Send to ER

12-year-old with fever, sore throat and a sunburn

- 12-year-old girl had mild fever and sore throat for 2 days after returning from trip to Aruba. She forgot sun screen and want something for her sunburn which got worse since coming to Toronto. She is tired and said she could not sleep the previous night





What would you do?

1. Do a Rapid Strep Test and treat if positive.

2. Tell her to Use a moisturizer to help soothe sunburned skin and acetaminophen or ibuprofen while waiting for throat swab cultures.

3. Send her to ER

Well Baby Worried Mom And A Rash

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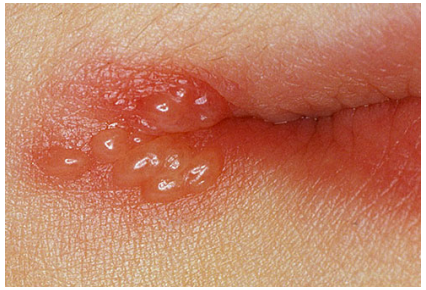
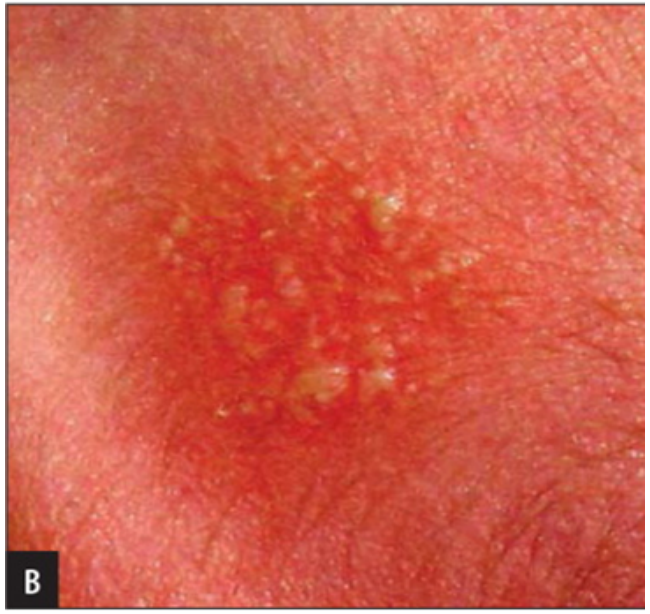




Herpes Simplex in Neonates

- May involve skin, mouth or eye
- Lesions typically develop on day 5-10
- Grouped vesicles may be seen, in linear distribution if affecting limbs
- If vesicle eroded, shallow ulcer with erythematous base may be seen
- May have associated lesions on lips -- similar to those of "cold sore" in an adult

Herpes Simplex: SEM

- HSV infection develops three patterns with roughly equal frequency
  - Localized to the skin, eyes and mouth (SEM)
  - Localized CNS disease
  - Disseminated disease involving multiple organs
- Can develop anytime between birth and four weeks

- Disseminated disease present within the first week after delivery, CNS symptoms usually occur during the second or third week

HSV Infection in Young Infants during Two Decades of Empiric Acyclovir Therapy

RESULTS: 32 with perinatally acquired HSV infection
50% had only nonspecific complaints, fever in 75%

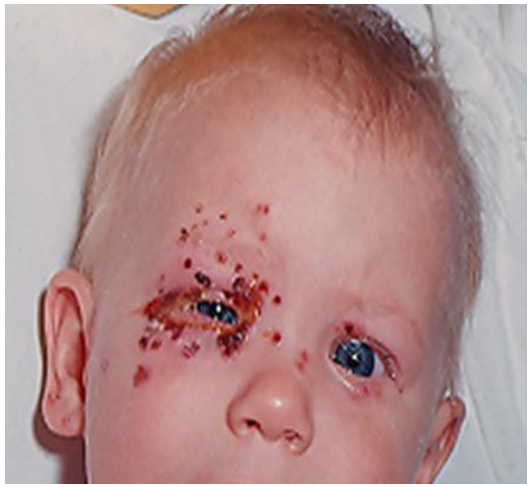
After testing, 75% (CNS) infections were found

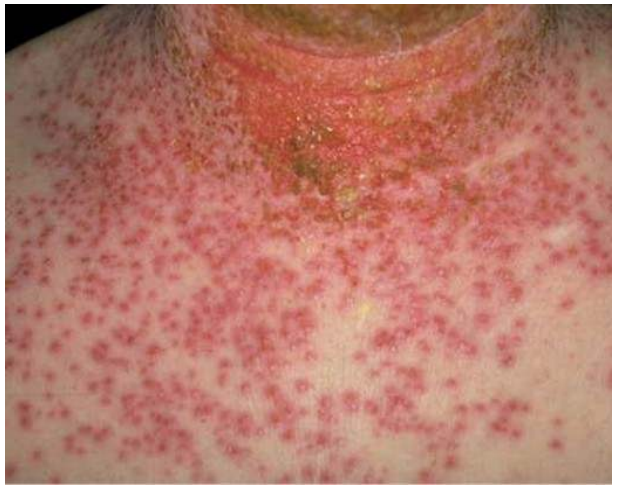
An estimated 1.3% of empirically treated patients had HSV infection

CONCLUSION: Early manifestations of perinatally acquired HSV are frequently nonspecific, yet CNS infection is common

Pediatr Infect Dis J. 2011 ;30(7):556-61.

Children with Eczema & Herpes Virus: Should we treat them with antiviral?





Almost always needs treatment with IV or oral Acyclovir

Toddler with temper tantrums and an Unresponsive Episode

- 2-year-old girl passed out eating cereal; awoke after 2 min. She was stiff with eyes rolled back ~ approx. 2 min. Minimal period of sleepiness, now awake and alert; no retractions; skin color is normal

- Two similar episodes associated with “temper tantrums”

ER Assessment

ABCDEs: Normal, Exam: unremarkable

- Vitals: HR 120; RR 24; BP 80/60; T 37.7° C Wt 12 kg; O_2 sat 99%
- PMH and FH: Negative

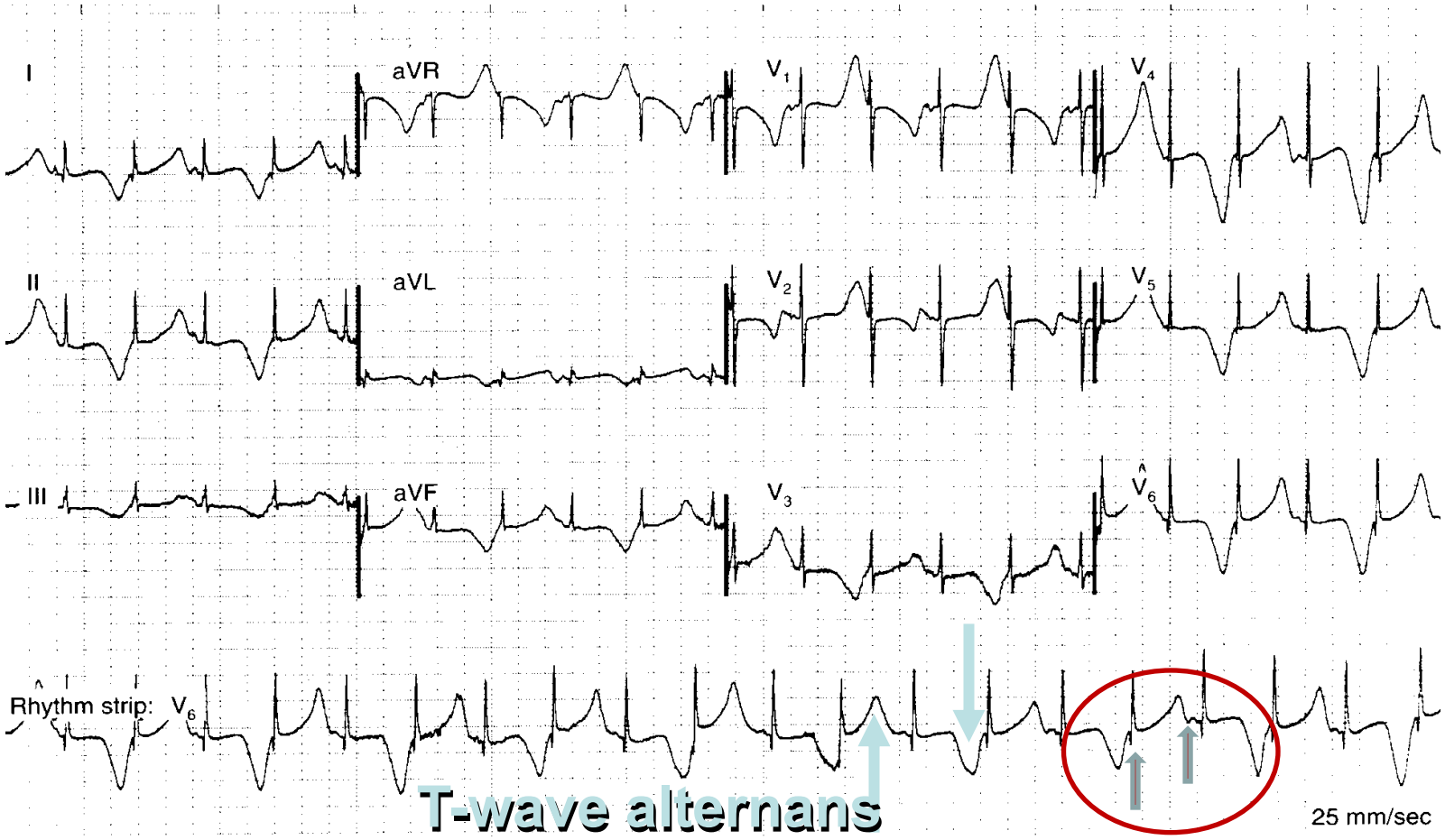
Cause: Heart, Brain or Breath Holding?

No postictal state, No evidence of seizure activity: Urinary incontinence, bitten tongue, witnessed tonic-clonic activity

Diagnostic Studies

- ECG
- Laboratory
  - Glucose
  - VBG, Electrolytes, Ca^{++}, Mg^{++}, PO_4
  - CBC with differential

12 Lead ECG



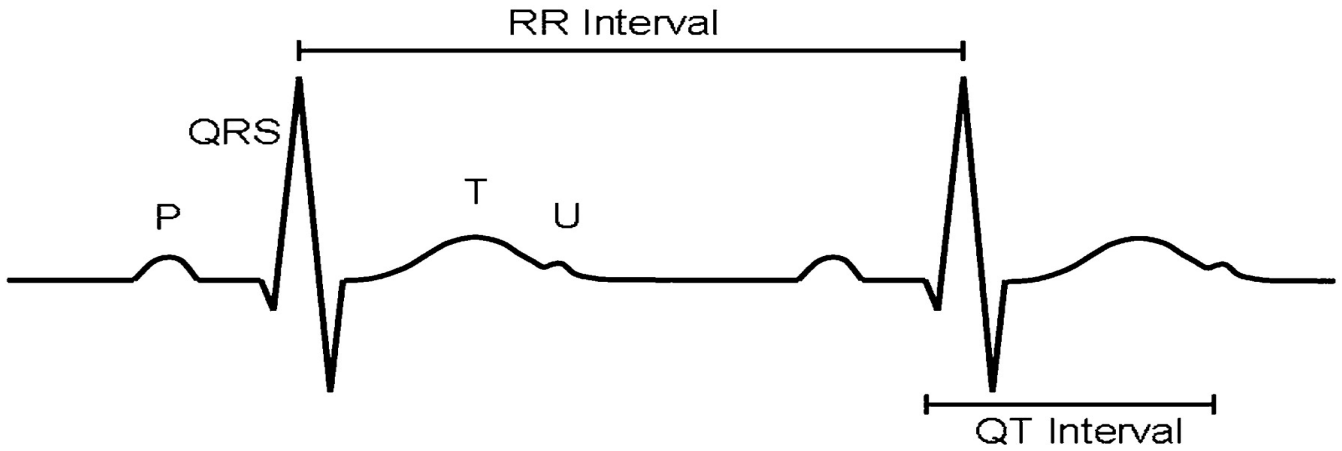
Markedly Prolonged QT Interval

Prolonged QT

- 10% present with seizures
- 15% of patients with prolonged QTc die during their first episode of arrhythmia
  - 30% of these deaths occur during the first year of life

Bazett's Formula

$$QTc = \frac{QT}{\sqrt{RR}}$$



Case Progression

- This patient has prolonged QT syndrome
- She is at risk for fatal dysrhythmia (ventricular tachycardia or ventricular fibrillation)
- She needs to be admitted/transferred to a pediatric cardiology center for cardiology evaluation

Athlete with Abdominal Pain

On ibuprofen for 2 weeks. Come with epigastric pain 1 week .Severe abdominal pain & pain on deep breathing few hours

- Afebrile, Temp 37 C HR 140
  - CVS: S1 S2
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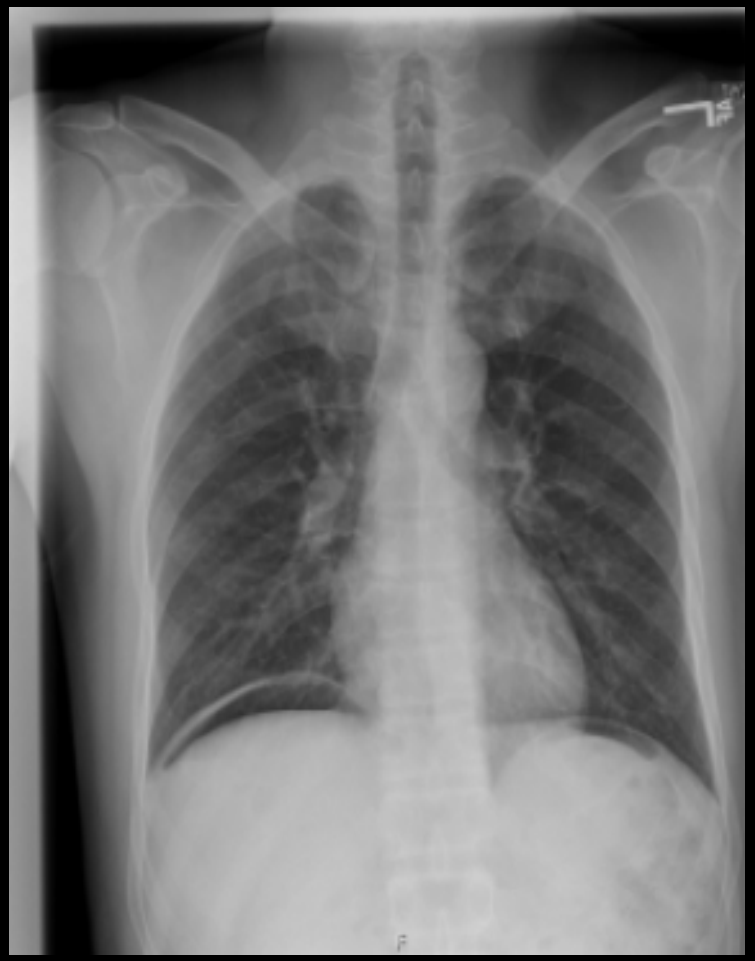
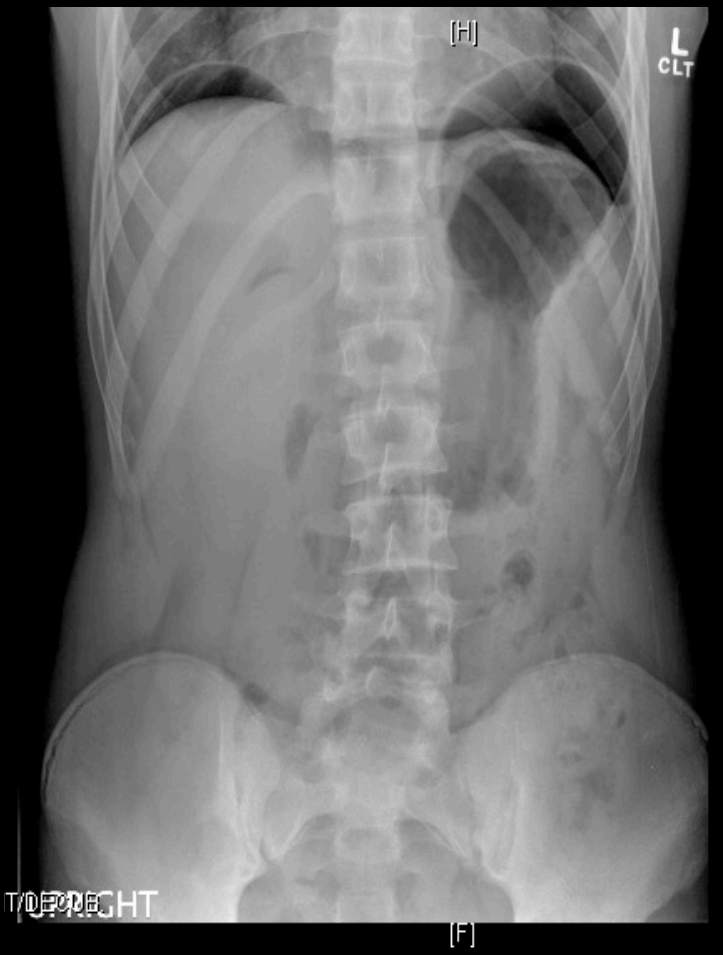
X rays





Although perforated peptic ulcers are rare in children it happens

Tachycardia may prognosticate life-or organ-threatening diseases in children with abdominal pain

1683 visits for abdominal pain

1512 of which had vital signs measured at rest

83 had tachycardia

58 and 58 controls were matched

Diseases more in tachycardia group (p=0.043)

19% tachycardia group (appendicitis, UTI, intuss, renal failure)

5% in controls (UTI, intussusception)

Hayakawa et al.Am J Emerg Med. 2017 Jan 24.

12-year-old with fever, sore throat and a sunburn

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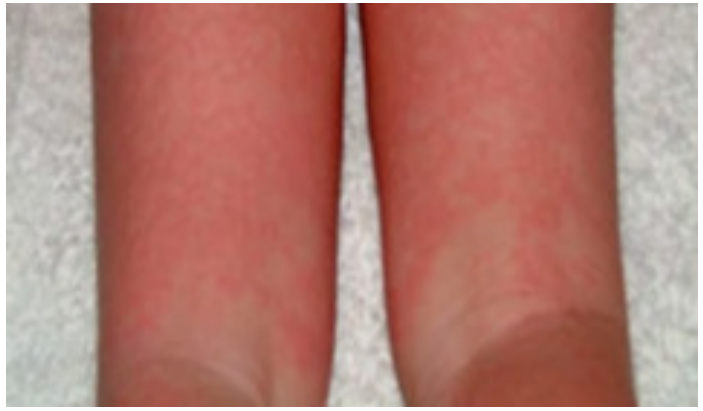
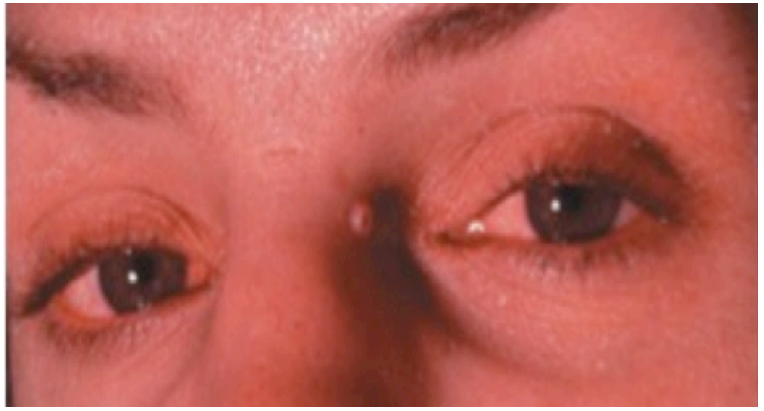




You check her BP 80/40

Diagnosis?

A.Kawasaki Disease

B.Toxic Shock Syndrome

C.Scarlet Fever

D.Measles

CDC Clinical Criteria for Toxic Shock Syndrome

- **Fever & Hypotension** < 5th percentile by age for children < 16 years
- Multi-organ involvement (two or more of the following)

1. Renal impairment: Creatinine ≥ 2X of normal
2. Coagulopathy: Platelets ≤100,000/mm^3 or DIC (PTT, INR, Fibrinogen, FDP)
3. Liver involvement: ALT, AST or S Bilirubin ≥ 2X of normal
4. Acute respiratory distress: diffuse pulmonary infiltrates & hypoxemia
5. A generalized erythematous macular rash that may desquamate
6. Soft-tissue necrosis(necrotizing fasciitis or myositis, or gangrene)

Toxic Shock Syndrome Facts

- Causes
  - Toxin producing strains of Staph aureus
  - Strep pyogenous
- Mortality 5-15%; Recurrence 30%

Rx: Aggressive management to prevent multi-organ failure

ABX: Clindamycin active against toxin producing strains

Ceftriaxone + Clinda usually (Fluclox and Gent)

IVIG

Table 1 Studies of intravenous immunoglobulin (IVIG) in toxic shock syndrome (TSS)

Study	Country, time period	Cases	Type of study	Mortality			Comments
				IVIG group	No IVIG group	p value	
Kaul *et al*[8]	Canada, 1992–1995	53 adults with streptococcal TSS	Historically controlled observational study	7/21 (33%)	21/32 (66%)	0.02	Disproportionate number of IVIG-treated cases also treated with clindamycin.
Darenberg *et al*[3]	Sweden, Norway, Finland, The Netherlands, 1999–2001	21 adults with streptococcal TSS	Randomised controlled trial	1/10 (10%)	4/11 (36%)	0.3	Trial stopped prematurely due to slow recruitment. Disproportionate number of IVIG-treated cases also treated with clindamycin.
Shah *et al*[9]	USA, 2003–2007	192 children with streptococcal TSS	Retrospective cohort study	5/84 (6%)	3/108 (3%)	0.3	Non-conventional definition of TSS. Overall lower mortality than other studies suggests cohort with less severe disease. Only study failing to find reduced mortality with IVIG. 94.8% cases also treated with clindamycin.
Carapetis *et al*[4]	Australia, 2002–2004	53 adults and children with invasive streptococcal disease	Prospective observational study	1/14* (7%)	7/39† (18%)	0.2	Subset of 53 cases treated with clindamycin from 84 total cases.
Linnér *et al*[5]	Sweden, 2002–2004	67 adults with streptococcal TSS	Prospective observational study	3/23 (13%)	22/44 (50%)	<0.01	Disproportionate number of IVIG-treated cases also treated with clindamycin. Low dose of IVIG (0.5 g/kg) used.
Adalat *et al*[1]	UK and RI, 2008/2009	20 children with staphylococcal TSS, 29 children with streptococcal TSS	Surveillance study	0/10 (0%)	8/39 (21%)	0.2	67% cases also treated with clindamycin.

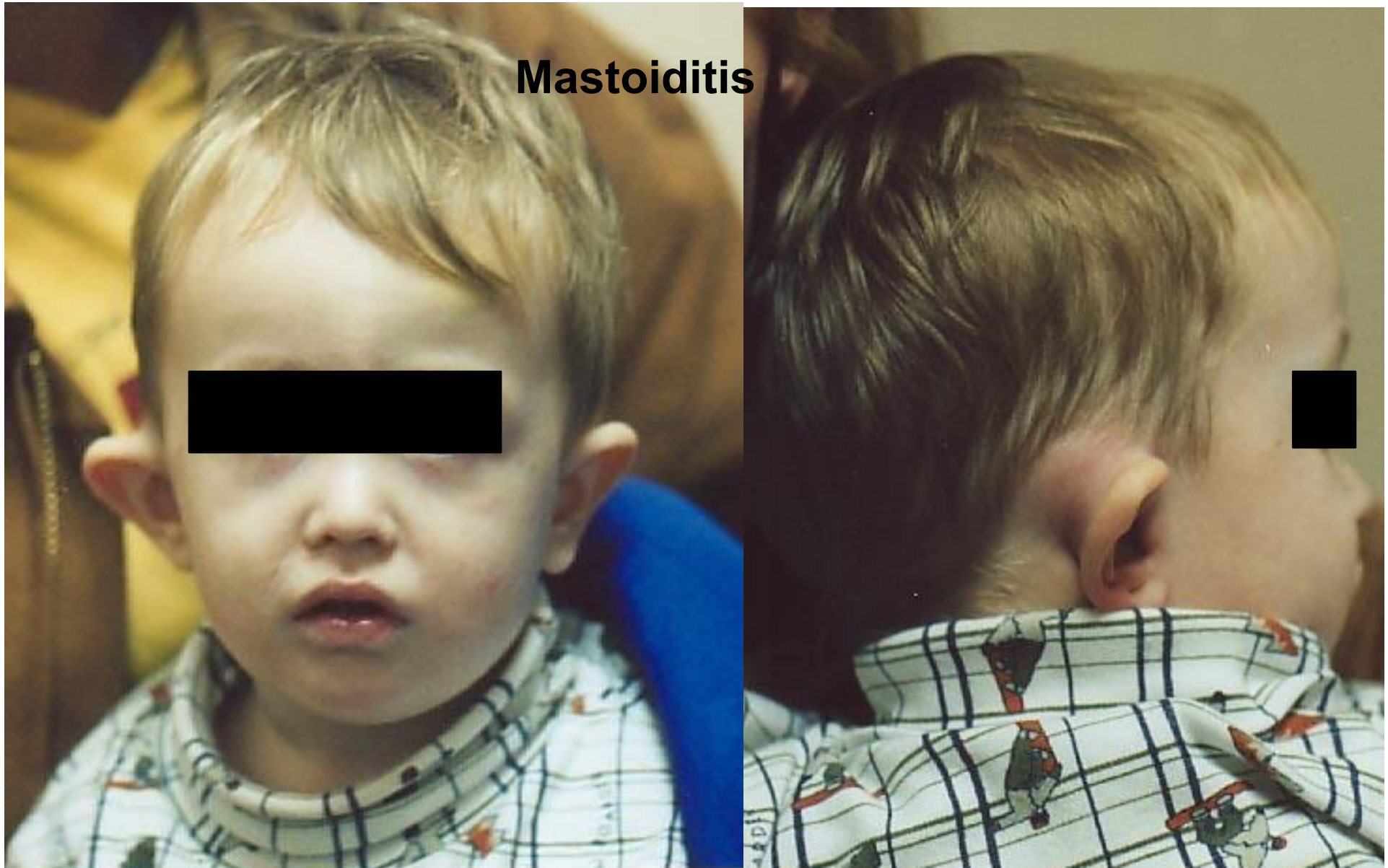
Curr Infect Dis Rep. 2014 Dec. 16(12):447.

Adapted from Steer *et al*.[2]

*13 cases of TSS (7 with necrotising fasciitis), 1 case of necrotising fasciitis.

†24 cases of TSS (13 with necrotising fasciitis), 7 cases of necrotising fasciitis, 8 cases of other invasive group A streptococcal disease.

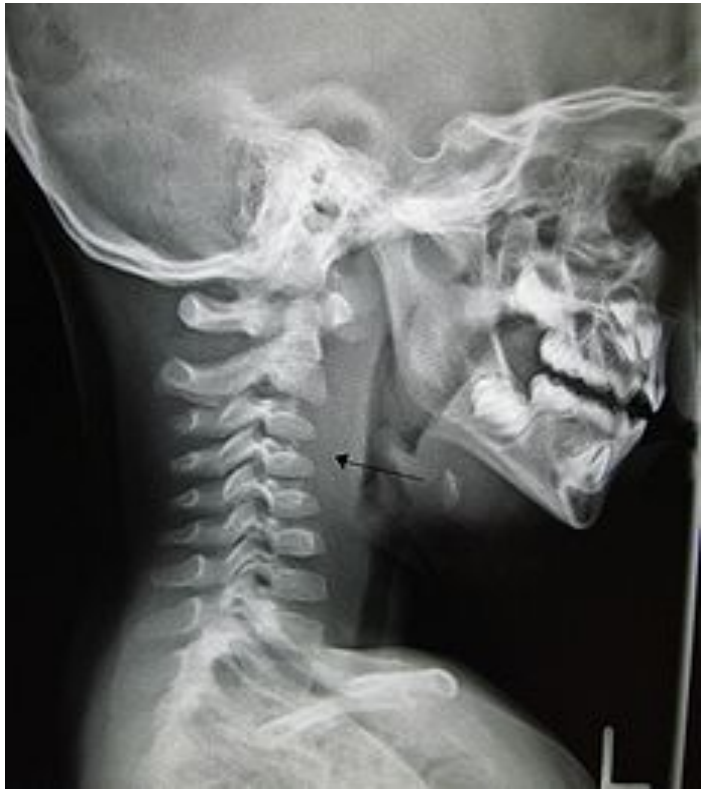
Sometimes it is easy to spot



Sometimes it is subtle

- 18 month old fever, runny nose mild cough 3 days. Refusing to eat and keeps head tilted to a side.

Sometimes it is subtle



Retropharyngeal Abscess

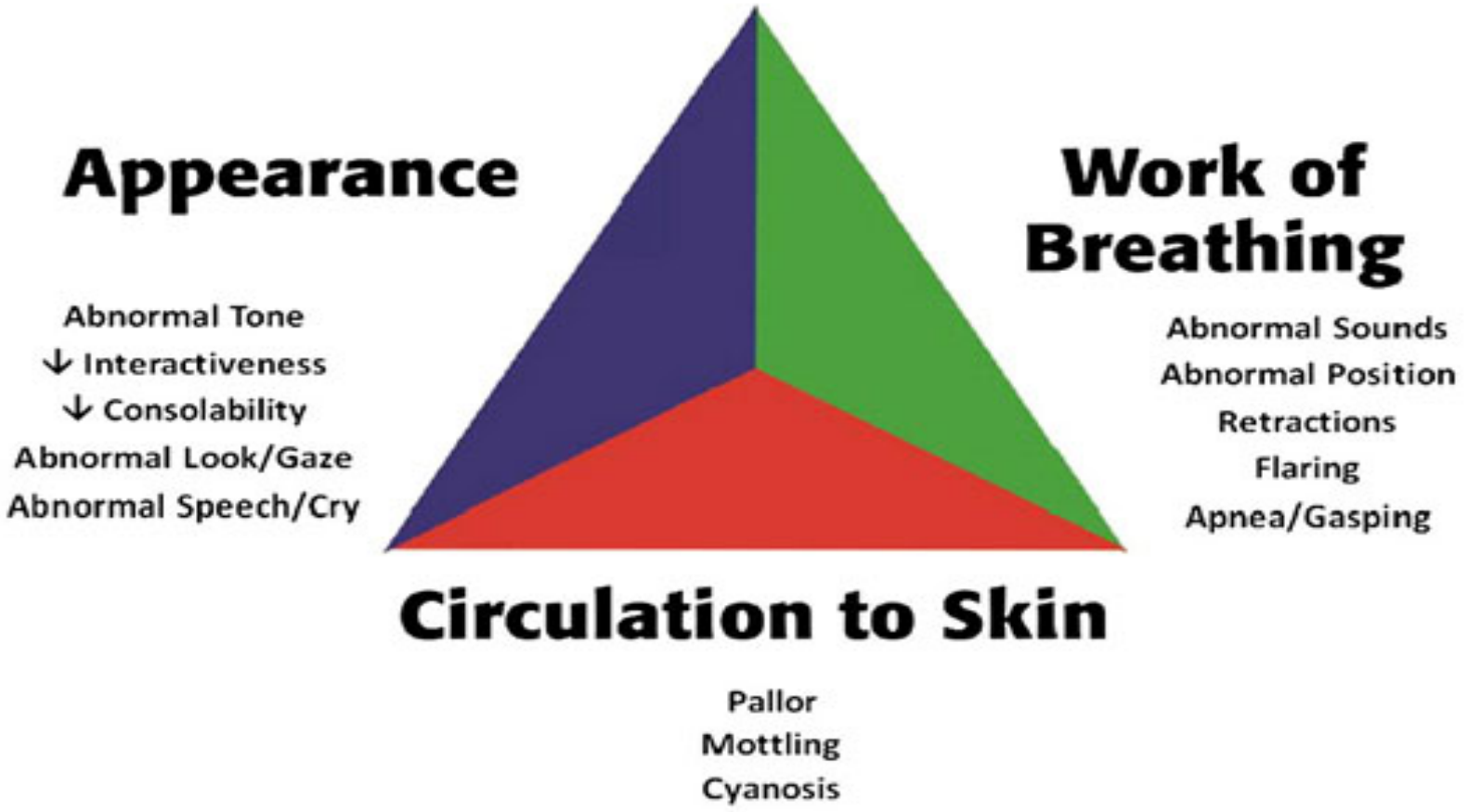
Fever and refusal to feed holds head to a side

Retropharyngeal abscess

- Presentations
  - fever (74%)
  - sore throat (47%)
  - dysphagia (38%)
  - trismus (36%)
  - decreased appetite (22%)
    - voice change (18%)odynophagia (17%)neck pain (15%) irritability (11%) difficulty breathing (8%)

Retropharyngeal and parapharyngeal infections in children: the Toronto experience. International journal of pediatric otorhinolaryngology. 2005 Jan 1;69(1):81-6.

Pediatric Assessment Triangle



Normal Ranges of Heart Rate and Respiratory Rates in Children from Birth to 18 Years of age: a systematic review of observational studies Fleming et al. Lancet 2011;

How I remember vitals

Neonate: **HR 140** **RR 40**

Adult: **HR 70** **RR 16**

Risk of serious infection: tem >or=39^0 C, tachycardia, sats<or=94% or capillary refill >2 secs. (Arch Dis Child. 2009)

Vital sign assessment in Malawi Decreased mortality from 9.3%

Reduction with hospital staff 5.7%

vital sign assistants 6.9%

Trop Med Int Health. 2013

Take home points

- HSV1 can cause neonatal herpes with devastating sequelae
- Unresponsive episodes may have a cardiac cause
- Tachycardia without fever need to be explored further
- Check BP in unwell children. Toxic shock can happen with pharyngitis too

Thank You