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
• Mother brings 1-week-old as she is worried about a rash

• Everything is fine with the baby, no fever, feeding well

• Little bumps near the belly button
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

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; O₂ 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++, PO₄
  – CBC with differential
12 Lead ECG

Markedly Prolonged QT Interval

T-wave alternans
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
  – Chest: Clear, slightly reduced air entry both lung bases better with deep breaths
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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)

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.

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/mm³ 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)

<table>
<thead>
<tr>
<th>Study</th>
<th>Country, time period</th>
<th>Cases</th>
<th>Type of study</th>
<th>Mortality</th>
<th>n-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaul et al</td>
<td>Canada, 1992–1995</td>
<td>53 adults with streptococcal TSS</td>
<td>Historically controlled observational study</td>
<td>7/21 (33%)</td>
<td>0.02</td>
</tr>
<tr>
<td>Darenberg et al</td>
<td>Sweden, Norway, Finland, The Netherlands, 1999–2001</td>
<td>21 adults with streptococcal TSS</td>
<td>Randomised controlled trial</td>
<td>1/10 (10%)</td>
<td>0.3</td>
</tr>
<tr>
<td>Shah et al</td>
<td>USA, 2003–2007</td>
<td>192 children with streptococcal TSS</td>
<td>Retrospective cohort study</td>
<td>5/84 (6%)</td>
<td>0.3</td>
</tr>
<tr>
<td>Carapetis et al</td>
<td>Australia, 2002–2004</td>
<td>53 adults and children with invasive streptococcal disease</td>
<td>Prospective observational study</td>
<td>1/14* (7%)</td>
<td>0.2</td>
</tr>
<tr>
<td>Linnér et al</td>
<td>Sweden, 2002–2004</td>
<td>67 adults with streptococcal TSS</td>
<td>Prospective observational study</td>
<td>3/23 (13%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Adalat et al</td>
<td>UK and RI, 2008/2009</td>
<td>20 children with staphylococcal TSS, 29 children with streptococcal TSS</td>
<td>Surveillance study</td>
<td>0/10 (0%)</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Comments:
- Disproportionate number of IVIG-treated cases also treated with clindamycin.
- Trial stopped prematurely due to slow recruitment.
- Disproportionate number of IVIG-treated cases also treated with clindamycin.
- 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.
- Subset of 53 cases treated with clindamycin from 84 total cases.
- Disproportionate number of IVIG-treated cases also treated with clindamycin. Low dose of IVIG (0.5 g/kg) used.
- 67% cases also treated with clindamycin.

Adapted from Steer et al.²

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

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 $\geq 39^0$ C, tachycardia, sats $\leq 94\%$ 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