FEVER IN THE PEDIATRIC PATIENT

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OUTLINE

• What is a fever?
• When do we worry about a fever?
• Fever in the neonate
• Fever associated with:
  • Upper respiratory
  • Lower respiratory
  • GI system
  • Skin
  • Musculoskeletal
  • Other
• Fever of unknown origin
HOW DOES ONE MEASURE A TEMPERATURE?

• “He felt warm when I kissed his forehead.” – The Mommy Test
• “She looked red and sweaty.”
• “I could feel he was burning up.”
• “I took her temp with one of those ear thingies.”
• “The school nurse sent her home because she had a fever of 99°F.”
• “I took his temp under his armpit and then added a degree.”
• “My daughter always runs low so a ‘normal’ temperature is a fever for her.”
• “I would never violate my child my putting that thing in his butt!”
HOW DOES ONE MEASURE A TEMPERATURE?

Ages birth – 3 years old ............ Take a rectal temperature!

• Lay the child on a safe surface or across your lap.
• Apply Vaseline or jelly to the tip of thermometer and turn it on.
• Insert into the rectum, past the silver tip, about ½ -1 inch total. There is often n indicator line.
• Hold the thermometer in place until it notifies you of the result.
• Clean with soap and water after each use.
HOW DOES ONE MEASURE A TEMPERATURE?

If the parents refuse a rectal temperature, you make take an axillary temperature.

• Lay the child on a safe surface.
• Turn on the thermometer.
• Place the thermometer in a dry armpit.
• Close the armpit by holding the elbow against the chest.
• Hold the thermometer in place until it notifies you of a result.
• Clean with soap and water after each use.
HOW DOES ONE MEASURE A TEMPERATURE?

Ages 3 years and older – take an oral temperature.

- Have the child lay or sit on a safe surface.
- Turn on the thermometer.
- Place the thermometer under the tongue.
- Close the mouth with the thermometer remaining in place under the tongue.
- Hold the thermometer in place until it notifies you of a result.
- Clean with soap and water after each use.
HOW DOES ONE MEASURE A TEMPERATURE?

If the parents refuse an oral temperature, or the patient is unable to comply, you make take an axillary temperature.

- Lay the child on a safe surface.
- Turn on the thermometer.
- Place the thermometer in a dry armpit.
- Close the armpit by holding the elbow against the chest.
- Hold the thermometer in place until it notifies you of a result.
- Clean with soap and water after each use.
WHAT IS A FEVER?

• In an infant ages birth – 2 months, a fever constitutes any temperature over: 100.4

• In any child over age 2 months, a fever constitutes any temperature over: 100.7
SHOULD I TREAT THE FEVER??

• Leave it alone… the fever serves a purpose!
• Oh My God… her blood is going to boil!!

• Treat the fever if it is causing distress in the child.
  • Body aches, headaches, belly pain
  • Not eating or drinking well
  • Fussy and uncomfortable

• Ibuprofen 10mg/kg every 6 hours
• Acetaminophen 15mg/kg every 4 hours
FEVER IN THE NEONATE

Any child with a fever who is under 2 months old, needs a full septic workup. Please consult a pediatrician or send the patient to the emergency department.

- Labs (CBC, CRP, CMP, blood culture)
- Urinalysis
- Lumbar puncture
- CXR, EKG or other tests
FEVER WITH RESPIRATORY SYMPTOMS
UPPER RESPIRATORY INFECTION

• The most common cause of fever in a child is... the common cold.
• May be caused by rhinovirus, adenovirus, enterovirus, coronavirus, etc.
• Children experience 1-2 colds per month through the winter, each lasting up to 14 days.
• Other symptoms may include cough, congestion, runny nose, headache, body aches, eye drainage, malaise, sinus pain and sore throat.
UPPER RESPIRATORY INFECTION

Treatment Recommendations

• Ibuprofen or Tylenol as needed for fever and discomfort
• Nasal saline to help with congestion and runny nose
  • Neti pot or nasal steroids for older children
• Humidifier to help with congestion and cough
• Vicks to help with congestion and cough
• Elevate the head of the bed to relieve postnasal drip and cough
• Avoid cough medicine in children under age 4
  • Over age 4, consider guaifenesin (Mucinex) or dextromethorphan (Delsym)
Although an upper respiratory infection is contagious, a child MAY return to school/daycare as long as they have been afebrile for 24 hours and are not going to require medication management or extra care.
Normal eardrum

Fluid filled eardrum

Ear infection

OTITIS MEDIA
OTITIS MEDIA

• This is what most parents think is the most common cause of a fever.
• May be caused by H. flu, S. pnuemo, M. cat...
• Always check both ears as children may complain of pain in the contralateral side.
Treatment Recommendations

- Children under age 2 – treat with antibiotics.
- Children over age 2 – consider observation if symptoms are mild, there is no ototorrhea, and the child is not immunocompromised. Discuss the risks and benefits with the caregiver.

Journal of Pediatrics 1994 (study of 5400 children); Pediatrics 1997; BMJ 1197, 2000, 2001; JAMA 2010; and on and on and on and on...
OTITIS MEDIA

Treatment Recommendations

• First ear infection: Amoxicillin 80mg/kg divided BID
• Ear infection in the last 6 months:
  • Augmentin 80mg/kg divided BID
  • Omnicef (cefdinir) 14-20 mg/kg once daily (or divided BID)
• If refractory: Rocephin 50mg/kg (max 1G) IM every other day x3
• Allergy to amoxicillin or cephalosporins:
  • Azithromycin 10mg/kg for first dose, then 5mg/kg once daily x4 days
  • TMP-SMX if pneumococcal resistance is not a concern in your area
Otitis media is not contagious. Therefore, a child MAY return to school or daycare as long as they have been afebrile for 24 hours and are not going to require medication management or extra care while there.
Bullous myringitis

Always treat with antibiotics, starting with Augmentin.

This is a medical emergency! The patient should go to the nearest ED for surgical consultation/intervention.

Mastoiditis
CONJUNCTIVITIS

Bacterial  Viral  Allergic
CONJUNCTIVITIS

• OMG… Do you think my child has “pink eye”??
• May be caused by H. flu, M. cat, adenovirus, enterovirus… everything.
• Always check the ears as well since children often have a concomitant otitis media with bacterial conjunctivitis.
CONJUNCTIVITIS

Treatment Recommendations

• Bacterial:
  • Under age 12 months: erythromycin ointment TID
  • Over age 12 months: eye drops TID (ex Polytrim, Vigamox)

• Viral:
  • Warm compresses

• Allergic:
  • Oral antihistamines
  • Eye drops such as Patanol or Pataday
CONJUNCTIVITIS

Treatment Recommendations

BUT... reality reveals...

We usually treat with either drops or ointment for BOTH viral and bacterial conjunctivitis due to school and daycare preferences. (Children are not allowed to return until they have been treated for 24 hours.)
Conjunctivitis is very contagious.

- Bacterial: They should not return to school until they have received antibiotic treatment for at least 24 hours.
- Viral: They should not return to school until redness and drainage have resolved.
SIDE NOTE -- PHOTOPHOBIA

IF THE PATIENT HAS PHOTOPHOBIA ON EXAMINATION, THIS IS NOT SIMPLY CONJUNCTIVITIS AND THEY NEED FURTHER EVALUATION WITH AN OPHTHAMOLOGIST.
TONSILLITIS/PHARYNGITIS

- Viral pharyngitis
- Strep pharyngitis

- Centor criteria:
  - Absence of cough
  - Tonsillar exudates
  - History of fever
  - Tender anterior cervical adenopathy
TONSILLITIS/PHARYNGITIS

- My kid has a sore throat… it has to be strep!
- May be caused by strep, staph, or multiple different viruses.
- Do not miss strep throat though… sequelae include glomerulonephritis, rheumatic heart disease, scarlet fever, and the controversial PANDAS (Pediatric Autoimmune Neuropsychiatric Disorder Associated with Streptococcal Infections).
TONSILLITIS/PHARYNGITIS

Treatment Recommendations

• Bacterial (Strep throat):
  • Amoxicillin 50mg/kg divided BID (max 875mg per dose) for 10 days
  • Cephalexin (Keflex) 30mg/kg divided BID (max 500mg) for 10 days
  • Azithromycin 10mg/kg once followed by 5mg/kg once daily for 4 days
  • Clindamycin 30mg/kg divided TID (max 300mg per dose) for 10 days

• Viral:
  • No antibiotics!!
  • Ibuprofen, cold popsicles, push fluids
Pharyngitis is very contagious.

- Strep throat: They should not return to school until they have received antibiotic treatment for at least 24 hours.
- Viral: They should not return to school until pain and fever have resolved.
PERITONSILLAR ABSCESS

This is a medical emergency! The patient should go to the nearest ED for surgical consultation and intervention.
SINUSITIS
SINUSITIS

- Significantly over-diagnosed
- Most URIs results in mucous production. As the flow rate slows, secretions stagnate and this is often misinterpreted as “green snotty nose” requiring antibiotic treatment.
- Treatment is not needed unless fever persists, there is blood in the mucous, or drainage appears purulent/pus-like.
- May be caused by H. flu, S. pneumo, or M. cat (similar to otitis)
SINUSITIS
Treatment Recommendations

• Viral:
  • Rest, drink lots of fluids
  • Use a humidifier
  • Elevate the head of the bed
  • Rinse the nose – nasal spray or neti pot; consider nasal steroids

• Bacterial:
  • Amoxicillin or Augmentin 80-100 mg/kg divided BID for 10-14 days
  • Cefdinir 14-20mg/kg daily for 10-14 days
  • Azithromycin or TMP-SMX but high rates of resistance
SINUSITIS

SCHOOL/DAYCARE

There is no need to keep the child home unless they continue to have a fever or need additional supportive care.
CROUP IN CHILDREN

Inside the Trachea

Healthy

Croup

Larynx (Voice Box)

Trachea (Windpipe)

Narrow Airway

Swollen Tissue

Healthy Airway

Smooth muscle

Trachealis muscle

Lumen

Inflammation

Viral infection

Thickened smooth muscle

Narrow lumen

Croup
CROUP

- Caused by the parainfluenza virus
- Adenovirus, influenza (A and B) may cause a similar tracheitis and mild stridor.
- Characterized by a dry “barky” cough which usually starts at night; may include inspiratory stridor.
- The stridorous cough may return for up to 3 nights but usually turns loose (catarrhal) after just a few days.
- Parents usually panic the first night and take their child straight to the ER.
CROUP

PHYSICAL EXAM:
CROUP

Treatment Recommendations

• This is a viral infection; antibiotics are NOT necessary.
• This is a disease of the trachea… albuterol and other asthma medication are NOT necessary. However, nebulized saline can be helpful.
• Dexamethasone (IM or PO) single dose can reduce rebound attacks.
• Consider prednisolone (PO) for 1-3 nights to help reduce cough.
• Racemic epinephrine is only needed in severe cases. The child should always be monitored closely for 4 hours after administration.
• Supportive treatment includes:
  • Raising the head of the bed.
  • Using a humidifier to help open the airway and decrease dry cough.
Croup is indeed contagious, similar to a cold. However, there is no need to keep the child home unless they continue to have a fever or require additional supportive care.
BRONCHIOLITIS
BRONCHIOLITIS
BRONCHIOLITIS

- Caused by respiratory syncytial virus (RSV).
- Most commonly seen in late winter (Feb and March) but the airway will continue to be irritable for several months.
- Characterized by gradual increase in RR, late expiratory wheeze and persistent cough with vomiting (due to mucous plugging).
- Infants have a much higher morbidity and should be monitored closely and frequently.
- Older children (age 12 months) are more likely to develop reactive airway disease.
BRONCHIOLITIS

PHYSICAL EXAM:
BRONCHIOLITIS

Treatment Recommendations

- This is a viral infection; antibiotics are NOT necessary.
- This is a viral infection; antibiotics are NOT necessary.
- Supportive treatment includes:
  - Discussing management of secretions:
    - Gentle percussion
    - Elevate head of bed to improve drainage
    - Using a humidifier
  - Continue to push fluids
- CONSIDER a trial of albuterol nebulizer.
  - This can be helpful for the late expiratory wheeze.
  - If there is not a definite response, do NOT continue to use. The wheezing is mostly obstructive and better treated with other methods.
BRONCHIOLITIS

Treatment Recommendations

• Hospital admission is recommended if patient has SaO2 <90%.
  • Treat with O2 supplementation and IV fluids.
  • Consider oxygen tent in addition to humidifier.
• Steroids are not necessary nor effective.
• Premature infants should be considered for Synagis administration which has been shown to decrease risk of hospital admission. (It is very difficult to qualify though and the injection is VERY expensive.)
RSV is very contagious. They should not return to daycare until symptoms have improved and they are free of fever. Unfortunately, the early presentation is similar to that of a typical cold and they are often highly infectious at that time (or even before they develop symptoms).
PNEUMONIA
PNEUMONIA
Pneumonia

- Bacterial causes such as H. influenzae
  - Strep pneumoniae in ~25% of cases
  - M. pneumoniae in children over age 5
- Viral causes such as influenza, parainfluenza, adenovirus, rhinovirus…
- Most commonly seen in the winter months
- Characterized by cough, fever, tachypnea, retractions, hypoxemia
- Much higher morbidity in patients who are infants, have chronic disease (asthma, heart disease, diabetes), or are immuno-compromised (congenital, on chemo, JIA)
- Vaccines are available!!
PNEUMONIA

PHYSICAL EXAM:

• Usually crackles in a single lobe

• But often, the exam is normal!
  • Listen carefully and closely, especially in the axillae.
  • Consider CXR if patient has had prolonged fever with productive cough.
PNEUMONIA

Treatment Recommendations

• Under age 5:
  • Augmentin 80mg/kg divided BID
  • Omnicef (cefdinir) 14-20 mg/kg once daily (or divided BID)

• Over age 5:
  • Azithromycin 10mg/kg once, followed by 5mg/kg once daily x 4 days

• If hospitalized:
  • Ampicillin is usually sufficient
Treatment Recommendations

- Hospital admission is recommended if patient has SaO2 <90%.
  - Treat with O2 supplementation and IV fluids.
  - IV antibiotics
  - Steroids and/or Montelukast (Singulair)

- Prevention:
  - Prevnar (PCV-13) and Hib are recommended in all children
  - Pneumovax (PPSV-23) is recommended all children with chronic disease
Pneumonia is usually contagious.

• They should not return to school until they have received antibiotic treatment for at least 24 hours.

• They should not return to school until fever has resolved and they do not require additional supportive treatment.
When someone says they have bronchitis

- I hope you feel better!
- Good. You talk too much
- Ain't nobody got time for dat!
BRONCHITIS

- Caused by a virus
- Characterized by persistent cough greater than 5 days. Cough is often exacerbated by a deep breath or laughing.
- Should you use antibiotics??
  - NO
  - NO
  - NO
- Supportive care such as:
  - Tea with honey, throat lozenges
  - Humidified air
  - Guaifenesin (Mucinex) or dextromethorphan (Robitussin) if over age 4-6.
- Resolves in 1-3 weeks on its own
To stop the spread of influenza, remember to boil anything that might be contaminated.

Starting with family members.
INFLUENZA

• Most commonly seen in the winter months
• Characterized by cough, fever, tachypnea, retractions, hypoxemia
• Much higher morbidity in patients who are infants, have chronic disease (asthma, heart disease, diabetes), or are immuno-compromised (congenital, on chemo, JIA)
• Vaccines are available!!
INFLUENZA

Treatment Recommendations

• Consider oseltamivir (Tamiflu) 3mg/kg twice daily for 5 days in children who:
  • Are under 2 years of age
  • Immunocompromised
  • Have chronic disease
  • Are hospitalized
• Start within 48 hours of symptoms developing
• Supportive treatment
  • Push fluids
  • Ibuprofen and acetaminophen as needed for fever and discomfort
INFLUENZA

Prevention

- Influenza vaccine
  - 2 doses, 1 month apart, when children receive the vaccine for the first time under age 8.
  - After that, 1 dose per year (similar to adults)
  - We do NOT recommend intranasal influenza vaccine anymore
Influenza is highly contagious. However, most children will have been exposed before the onset of symptoms. Therefore, exclusion is limited to those who continue to have fever or require additional care.
FEVER WITH DIARRHEA AND/OR VOMITING

YOUR ABDOMINAL PAIN IS 10/10
BUT YOU'RE EATING A BAG OF CHEETOS?
VIRAL GASTROENTERITIS
GASTROENTERITIS

- Viruses are responsible for ~75% of all intestinal infections.
- May be caused by rotavirus, adenovirus, calicivirus, enterovirus, astrovirus...
- Characterized by low grade fever, vomiting, diarrhea, loss of appetite, abdominal pain/cramping
- Monitor closely for dehydration.
VIRAL GASTROENTERITIS

Treatment Recommendations

• Push fluids
  • Pedialyte
  • Gatorade/Powerade – half electrolyte solution, half water
• Gentle diet and increase as tolerated.
  • BRAT diet – bananas, rice, applesauce and toast
  • Lactose
• Do NOT use antibiotics
• Avoid medications such as Pepto and Imodium.
  • Allow the body to eliminate the virus.
  • These medications often contain salicylates.
Viral gastroenteritis is highly contagious. Do not return to daycare or school until fever, vomiting and diarrhea have resolved.
• Responsible for a half million deaths per year in developing countries.
• Results in severe and prolonged diarrhea.
• Most common in early spring.
• Has a “unique” odor – “It smells like the clam flats”
• Monitor closely for dehydration.
• Can cause intussusception.
Treatment Recommendations

• Push fluids
  • Pedialyte
  • Gatorade/Powerade – half electrolyte solution, half water

• Gentle diet and increase as tolerated.
  • BRAT diet – bananas, rice, applesauce and toast
  • Lactose elimination IS helpful in this instance

• Do NOT use antibiotics

• Avoid medications such as Pepto and Imodium.
  • Allow the body to eliminate the virus.
  • These medications often contain salicylates.

• Vaccine is available for newborns.
Rotavirus gastroenteritis is highly contagious. Do not return to daycare or school under fever, vomiting and diarrhea have resolved.

Always practice good handwashing.
C. DIFFICILE

Good and Bad Bacterial Flora

**GOOD**

**BIFIDOBACTERIA**
The various strains help to regulate levels of other bacteria in the gut, modulate immune responses to invading pathogens, prevent tumour formation and produce vitamins.

**GOOD**

**ESCHERICHIA COLI**
Several types inhabit the human gut. They are involved in the production of vitamin K2 (essential for blood clotting) and help to keep bad bacteria in check. But some strains can lead to illness.

**GOOD**

**LACTOBACILLI**
Beneficial varieties produce vitamins and nutrients, boost immunity and protect against carcinogens.

**BAD**

**CAMPYLOBACTER**
C. jejuni and C. coli are the strains most commonly associated with human disease. Infection usually occurs through the ingestion of contaminated food.

**BAD**

**ENTEROCOCCUS FACIES**
A common cause of post-surgical infections.

**BAD**

**CLOSTRIDIUM DIFFICILE**
Most harmfull following a course of antibiotics when it is able to proliferate.
C. DIFFICILE

- Due to alteration of the colonic microflora...often following treatment with antibiotics.
  - Usually within 30 days.
  - Penicillin, cephalosporin, clindamycin, fluoroquinolones (which should never be used in children)
- Higher risk of developing c. diff if:
  - Immunocompromised
  - Inflammatory bowel disease
  - Hirschsprung disease
  - Cystic fibrosis
C. DIFFICILE

- Characterized by diarrhea with abdominal pain/cramping, nausea/vomiting, and low grade fever.

- Characterized by a “unique smell” – like that of a decaying animal.

- Be aware that asymptomatic colonization is common in neonates and infants up to age 12 months. This may be an incidental finding in a child with diarrhea.
Treatment Recommendations

- Discontinue activating antibiotic
- Push fluids
- Metronidazole (Flagyl) 30mg/kg (max 500mg per dose) divided QID for 10-14 days.
- Avoid medications such as Pepto and Imodium.
- Up to 25% of patients will have a recurrence... but oddly, they usually respond well to a second course of metronidazole.
C. Difficile is extremely contagious. Do NOT return to school or daycare until diarrhea has completely resolved. Follow up stool tests are NOT necessary.
APPENDICITIS

HEY GIRL, ARE YOU MY APPENDIX?

BECAUSE I HAVE A FUNNY FEELING IN MY STOMACH THAT MAKES ME FEEL LIKE I SHOULD TAKE YOU OUT.
APPENDICITIS

- Most common need for emergent abdominal surgery in children
- Most common ages 10-20.
- Due to inflammation of the appendix, usually caused by obstruction.
- Characterized by abdominal pain (periumbilical migrating to RLQ), loss of appetite, nausea/vomiting.

The Pediatric Appendicitis Score

<table>
<thead>
<tr>
<th>Item</th>
<th>Score (point)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anorexia</td>
<td>1</td>
</tr>
<tr>
<td>Nausea or vomiting</td>
<td>1</td>
</tr>
<tr>
<td>Migration of pain</td>
<td>1</td>
</tr>
<tr>
<td>Fever &gt;38°C (100.5°F)</td>
<td>1</td>
</tr>
<tr>
<td>Pain with cough, percussion or hopping</td>
<td>2</td>
</tr>
<tr>
<td>Right lower quadrant tenderness</td>
<td>2</td>
</tr>
<tr>
<td>White blood cell count &gt;10,000 cells/microL</td>
<td>1</td>
</tr>
<tr>
<td>Neutrophils plus band forms &gt;7500 cells/microL</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10 points</strong></td>
</tr>
</tbody>
</table>

C: Centigrade; F: Fahrenheit.
APPENDICITIS

McBurney’s Point

Rovsing’s sign
APPENDICITIS

Psoas sign

Obturator sign
WARNING – WARNING – WARNING

Young children and those with developmental delays often present with atypical symptoms.
- “It just hurts a little.”
- “Maybe he pulled a muscle.”

However, exam will still be consistent with appendicitis. Always perform a good abdominal exam in infants and children with developmental delays.
APPENDICITIS

Treatment Recommendations

• Consider ultrasound first line for evaluation
• Older children and obese children will still require a CT scan
• Contact a general surgery
• Do NOT try to treat homeopathically
The child may return to daycare or school once they have been cleared by their surgeon. Return to full activities (sports, physical education) is usually limited for a specific amount of time.
Campylobacter
Norovirus
Salmonella

OTHER
FEVER WITH RASH

IF YOU DECIDE TO PUT OINTMENT ON YOUR RASH
DID YOU JUST MAKE A RASH DECISION?
CELLULITIS/ABSCESS
CELLULITIS/ABSCESS

- I think she got bit by a spider…
- Usually caused by staph – either MSSA or MRSA – but also Hib or Strep.
- Very common in the pediatric patient
  - Diaper irritation or rashes
  - Eczema
  - Bug bites
  - Untreated injuries
CELLULITIS/ABSCESS

Treatment Recommendations

• MSSA, Hib or Strep:
  • Cephalexin (Keflex) 30mg/kg divided TID for 7 days
  • Amox/clav (Augmentin) 25-50mg/kg divided BID for 7 days

• MRSA:
  • SMP-TMX 8-12mg/kg (of TMP) divided BID for 7-10 days
    • PEARL: Give 5mL twice daily for every 10kg (max 20mL per dose)
    • Clindamycin 20mg/kg divided TID for 7-10 days

• Soak for 20 minutes in warm water with Epsom salts multiple times daily to encourage drainage.
CELLULITIS/ABSCESS

SCHOOL/DAYCARE

The child may return to daycare or school as long as they no longer have a fever or require additional support. The lesion should be kept covered until it is no longer draining to avoid spread of infection.
SCARLET FEVER
SCARLET FEVER

- Caused by group A beta strep (same as strep throat)
- Characterized by a “fine, sandpaper” rash which starts at the neck and then spreads.
- Patients do not always complain of a sore throat! Kids often complain of belly pain and vomiting instead.
SCARLET FEVER

Treatment Recommendations

• Amoxicillin 50mg/kg divided BID (max 875mg per dose) for 10 days
• Cephalexin (Keflex) 30mg/kg divided BID (max 500mg) for 10 days
• If PCN allergic, consider:
  • Azithromycin 10mg/kg once followed by 5mg/kg once daily for 4 days
  • Clindamycin 30mg/kg divided TID (max 300mg per dose) for 10 days
• Continue supportive care:
  • Ibuprofen and acetaminophen for fever and pain
  • Cold popsicles to help with pain and keep hydrated
  • Push fluids
SCARLET FEVER

SCHOOL/DAYCARE

Streptococcal disease is very contagious. The child should not return to school until they have received antibiotic treatment for at least 24 hours.
HAND, FOOT, AND MOUTH DISEASE
HAND, FOOT, AND MOUTH DISEASE

- Caused by Coxsackie virus or enterovirus
- Characterized by fever, sore mouth, malaise, oral vesicles and rash. The rash is usually on the palms and soles but often on the buttocks and spreading up proximally on the extremities.
- Usually occurs summer through fall since it spreads easily through pools.
HAND, FOOT, AND MOUTH DISEASE

Treatment Recommendations

• Dehydration is a significant concern due to oral lesions.
• Continue to push fluids and cold foods.
• Ibuprofen and acetaminophen for pain and fever.
• Consider viscous lidocaine for oral discomfort.
  • Magic mouthwash: viscous lidocaine, Maalox, and Benadryl
  • Swish and spit!
Because the spread of the virus starts before symptoms develop – and continue long after symptoms resolve – there is no specific recommendation for removal from activities as it would have little impact on the spread of the infection.

They may return once they are no longer febrile and do not require any additional care. Remember to practice good handwashing.
ROSEOLA

**RUBEOLA**
- Ordinary measles
- Conjunctivitis
- Cough
- CORYZA
- Fever
- KOPLIK SPOTS ON BUCCAL MUCOSA
- Rash appears at the hairline and spreads cephalocaudally over 3 days

**RUBELLA**
- German measles
- Headache
- Low grade fever
- Sore throat
- Coryza
- FORCHHEIMER SPOTS ON SOFT PALATE
- Rash begins on the face and spreads cephalocaudally

**ROSEOLA INFANTUM**
- Exanthem Subitum
- Affects young children 6-36 months old
- Caused by Human Herpes Virus 6
- Abrupt high fever after fever subsides, a rash develops, starting on the neck and trunk and spreading to the face and extremities

www.medicomic.com
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ROSEOLA

• Caused by herpes virus 6 and 7
• AKA: Roseola infantum, Sixth disease, exanthem subitum
• Characterized by high fever, often with rapid spikes (and sometimes associated with febrile seizures), which last 1-4 days. Once fever resolves, it is then followed by the morbilliform rash.
• The rash blanches and will last around 48 hours.
ROSEOLA

Treatment Recommendations

- Ibuprofen and acetaminophen as needed for the fever.
- Once the rash appears, no treatment is needed.
  - The rash rarely itches or causes any problems.
  - It will resolve on its own within a couple of days.
Once the rash appears, the patient is no longer contagious! Therefore, they may return to school or daycare even with the rash.
FIFTH DISEASE
FIFTH DISEASE

• Caused by Parvovirus B-19
• AKA: Erythema infectiosum, Slapped cheek disease
• Characterized by fever, arthralgia, rash, runny nose.
• Sometimes the rash will cause a “stocking glove purpura”.
• Can be dangerous for pregnant women as infection can spread to the fetus and cause the bone marrow to stop making blood cells thereby causing a serious anemia
FIFTH DISEASE

Treatment Recommendations

• Ibuprofen and acetaminophen as needed for the fever.

• Once the rash appears, no treatment is needed.
  • The rash rarely itches or causes any problems.
  • It will resolve on its own within a couple of days.

• Make sure that anyone in their life who is pregnant has been notified of possible exposure.
Once the rash appears, the patient is no longer contagious! Therefore, they may return to school or daycare even with the rash.
VARICELLA

- ulcer
- blister
- papule
- scabbing
VARICELLA

- Caused by varicella virus
- AKA: Chicken pox
- Characterized by fever, arthralgia, malaise, respiratory symptoms, and rash
- The rash is VERY itchy!
- Monitor closely for sequelae:
  - Skin infections
  - Glomerulonephritis
  - Reyes syndrome
Treatment Recommendations

- Consider treatment with antivirals if detected within 48hrs.
  - Acyclovir 10-20mg/kg/dose 4 times daily for 5 days
- Ibuprofen and acetaminophen as needed for the fever.
- Continue to push fluids.
- Supportive treatment for pruritus:
  - Oral antihistamines
  - Topical cold cloths, calamine lotion, cool baths, oatmeal
  - Trim fingernails short or cover with gloves to prevent scratching
- Keeping cool has been shown to decrease the number of lesions
- Remember that a vaccine exists for prevention!!
Varicella is very contagious, even before the rash develops. The virus continues to be contagious until all the vesicles are crusted, typically 3-7 days after onset of the exanthem.

The child should remain home, away from others, until all the lesions are crusted over.
FEVER WITH MSK SYMPTOMS
JUVENILE IDIOPATHIC ARTHRITIS
JUVENILE IDIOPATHIC ARTHRITIS

- Autoimmune disorder
- Characterized by low grade fever with joint pain and swelling
- Watch closely – many young children do not specifically complain of pain but will alter gait or move stiffly
JUVENILE IDIOPATHIC ARTHRITIS

Treatment Recommendations

• Referral to pediatric rheumatologist
• Consider immediate referral to orthopedics for joint aspiration
• Once diagnosed, don’t forget to check for other autoimmune disorders:
  • Thyroid disease
  • Uveitis
  • Celiac disease, IBD
There is no concern that arthritis is contagious.

HOWEVER, if the patient begins treatment with immune modulators, you will need to monitor closely for additional infections due to immunocompromise.
LYME DISEASE
LYME DISEASE

• Caused by Borrelia bacteria which is spread through the bite of a deer tick
• Characterized by low grade fever with joint pain and swelling or erythema migrans rash
• Too much debate...
LYME DISEASE

Treatment Recommendations

• Doxycycline 2mg/kg/dose (max = 100mg/dose) twice daily for 10-21 days
  • Only recommended for children over age 8
• Amoxicillin 50mg/kg (max = 500mg/dose) divided BID for 10-21 days

• Is testing necessary?
• Is ongoing antibiotic use necessary?
LYME DISEASE

SCHOOL/DAYCARE

There is no concern that lyme disease is contagious from person to person. Therefore, the child may immediately return to daycare or school.
OTHER
FEVER
CONCERNS
PFAPA

• PFAPA = Periodic fever aphthous stomatitis, pharyngitis, and adenitis
• More than 3 documented episodes of fever, lasting no more than 7 days, occurring at regular intervals (usually 3-6 weeks)
• Pharyngitis but tender cervical lymphadenopathy or aphthous ulcers
• Normal laboratory studies in between episodes
• Otherwise normal growth and health
• Symptoms respond immediately to a single dose of prednisone 2mg/kg (max = 60mg)
KAWASAKI DISEASE

- Characterized by high fever lasting greater than 5 days in addition to at least 4 of the following:
  - Bilateral bulbar conjunctivitis
  - Oral mucosal changes (cracked lips, strawberry tongue)
  - Changes in the extremities (erythema, induration, periungual peeling) – often painful initially, followed by desquamation
  - Exanthem – erythematous, diffuse, nonspecific maculopapular rash
  - Cervical lymphadenopathy

Images courtesy of the Kawasaki Foundation
KAWASAKI DISEASE

- Peak incidence in children age 9-11 months; rare under age 3 months
- Caused by ? (unknown)
- Monitor closely for
  - Cardiac disease
  - Arthritis and arthralgias
  - Hepatic dysfunction
  - Transient hearing loss
  - Aseptic meningitis

- Treatment:
  - High dose IV Ig
  - High doses of aspirin… monitor for Reyes syndrome

- Management:
  - Echocardiogram (at onset, 2 weeks, 6-8 weeks)
  - Defer all live virus vaccines for 1 year
FEVER WITH NOTHING??
FEVER WITH NO OTHER SYMPTOMS

• First 24 hours:
  • Perform a good exam
  • Check a urinalysis to rule out urinary tract infection

• After 48 hours:
  • Perform another good exam
  • Check labs including CBC, ESR, and CRP

• After 5 days:
  • Perform another good exam
  • Check labs including CBC, ESR and CRP
  • Order CXR
  • Order blood cultures

• Prolonged fever without symptoms:
  • Consult with infectious disease
CASE

12 month old male, no previous medical history, NKDA

• 9/13/17: Presented to ER with a fever of 104 after developing a seizure
  • Diagnosed with febrile seizure and told to follow up with PCP
• 9/14/17: Dr Rudloe
  • EEG ordered due to abnormal seizure
  • Continue acetaminphen and ibuprofen
• 9/15/17: Lisa Allen PA-C (and student)… 48 hrs of fever
  • Fever last night of 103; in office, 101.0 rectal. Fatigue and ↓ appetite
  • Ordered labs – CBC, CRP, CMP, U/A – all were normal
9/18/17: Dr Stwertka... day 5 of fever
  • Continued fever at home (97.8 rectal in office) with poor appetite
  • Ordered labs – CBC, CRP, ESR, CMP and blood culture
    Elevated alk phos, increased lymphocytes

9/22/17: Lisa Allen PA-C (and student)
  • Temp in office 98.5 rectal
  • Consulted with Pediatric Infectious Disease at EMMC who recommended
    respiratory culture and consider testing for adenovirus, enterovirus, CMV, and
    EBV. Parents declined viral testing.

9/25/17: DR Stwertka
  • Temp 98.2 axillary (parents declined rectal)
  • Recommended discontinuing antipyretics as he seemed to be getting better
10/1/17: ER with repeat febrile seizure and temp of 105
   - Consulted with Dr Whittaker (pediatrician)
   - Ordered labs including CBC, CRP, blood cultures and lyme antibody
   - Diagnosed with AOM and gave a single dose of amoxicillin
     - Dr Whittaker examined and disagreed with diagnosis. Abx discontinued.

10/2/17: ER with ongoing fever 103.8
   - CXR negative
   - Parents requested admission and were denied

10/2/17: Dr MacGregor… 3 weeks of fever
   - Additional labs – babesiosis, anaplasmosis, ASO titer
   - Referral to Pediatric Infectious Disease
• 10/2/17: Pediatric Infectious Disease
  • Respiratory virus culture and enterovirus culture obtained
  • Mild URI symptoms noted

• 10/4/17: Lisa Allen PA-C (and student)
  • Fever has resolved and patient is now back to his usual self