Visual Diagnosis of Common and Uncommon Pediatric Infections: A Case Based Approach

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Objectives
- Recognize syndromes with visual manifestations of common and uncommon infections
- Identify specific pathogens and the targeted evaluation
- Understand epidemiologic features of infectious syndromes
- Delineate therapy for specific pathogens

Case 1 A Wave Board Debacle
- A 14 year old boy’s ankle was trapped by a wave board rope and he was dragged through a lake for 3 minutes
- Initial hospital care focused on the external injury-discharge to home
- Within 48 hours a significant area of erythema appeared with exquisitely painful ankle
- Progression despite cephalexin

Injury 4 hours after and at admit to CMH

Water-contaminated Wounds
- Spring and summer months
- Simple injury to propeller injuries to more
- Fulminant presentation and rapid progression
- Bacteremia
- Typical and atypical pathogens
  - S aureus, GAS
  - Clostridia species
  - Aeromonas hydrophila
  - Edwardsiella tarda (cat fish spine)
  - Vibrio vulnificus (salt water)

Treatment
- Identification of more serious STI ie fasciitis
  - Aggressive surgical debridement
- Tetanus vaccine update
  - Prompt assessment of vaccine status
  - TIG for those without primary series
- Antibiotics
  - Cover routine plus water pathogens
  - Clindamycin vs vancomycin plus
  - Cefepime, ceftriaxone (varied susceptibility to 1º cephalosporin)
  - Fluoroquinolones, TMP-SMX, Meropenem
Case 2 A Soil Contaminated Wound

- A 3 year old boy was riding with brother behind dad on tractor
- Fell off the aerator base and incurred 2 wounds from the spikes

Initial Appearance of Wound

Nearly 1 Year Later

- Wounds have not healed
- Continued discharge
- Ambulating well
- No systemic symptoms/signs

The Chronic Wound

- Retained foreign body
- Indolent atypical organisms
- Surgical debridement
- Targeted culture and therapy

Pathogens

- Nontuberculous mycobacteria
  - Ubiquitous in nature
  - Multi-drug rx with macrolide as anchor
  - Excision of necrotic tissue

- *Nocardi*a- aerobic, gram-positive rods
  - Aerobic actinomycetes
  - Ubiquitous in nature
  - Slow growing
  - TMP-SMX for mild disease; dual rx for severe

Case 3 A Nasty Skin Infection

- A 16 year old was ejected from a MV during a tornado in June 2011.
- Multiple trauma
- Necrotic wound 10 days later
Initial care

- Injuries:
  - large open chest wound involving 2/3 of his anterior right chest
  - multiple rib fractures causing flail chest
  - pulmonary contusion
  - open humeral fracture
  - closed head injury
  - grade one liver laceration
  - right perihepatic hematoma

- Initial Management:
  - Tracheostomy
  - Bilateral chest tube placement
  - Ribs were stabilized with hardware
  - Skin lacerations including the chest wall wounds were irrigated and closed with staples.
  - Antibiotic therapy included piperacillin-tazobactam, vancomycin and levofloxacin

Subsequent care

- The patient required twelve debridements.
- The anterior diaphragm, the anterior superior liver capsule, and the several ribs were subsequently resected.
- The right middle lobe and the lateral portion of the mediastinum were resected.
- Antimicrobial/antifungal therapy

Fungal Surgical Cultures

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Unusual Outbreak of Fungal STI

- Apophysomyces trapeziformis
- Rare mucor species
- Previous reports also in disaster setting i.e. tsunami
- Impalement by foreign material
- Rapid progression, necrotic appearance of wound
- Mortality rates up to 80%, diabetes
Cluster of cases

- 13 cases
- The median age of the patients was 48 years (range: 13–76 years); seven were female, and all were white
- Injuries sustained during the tornado included lacerations (12 patients), fractures (11), and blunt trauma (nine)
- Patients had an average of four wounds documented in the medical chart when they were examined at the emergency department.

Definitive care

- Serial debridement over multiple days and early identification of infection
- Massive blood transfusion should be anticipated
- Aggressive resuscitation intra-operatively during the debridement procedures may be necessary
- Prompt broad antibacterial coverage with either meropenem or piperacillin-tazobactam is recommended
- All debrided tissue should be cultured and antibiotics tailored according to culture results

Primary care: similarity to military wounds

- Heavy wound contamination
  - fragmented tissue, debris is soil and water contaminated agricultural material, clothing, environmental foreign bodies
- Excision of all debris and any non-viable tissue
  - identification of microvascular trauma in the wound
  - avoid the disruption of viable tissue
- No aggressive high-pressure wound irrigation
- Delay primary wound closure
- Wounds beyond those that are superficial should be debrided by surgeons with trauma training
- Approach that considers the need for reconstruction
Case 4 An Unexpected Event

- A 17 year old girl reports for screening laboratory studies as she is going to be the bone marrow donor for her brother with leukemia.
  - She has had sore throat and fever to 40 for 3 days.
  - An area of swelling associated with a wisdom tooth is noted and her pediatrician gives her amoxicillin with clavulanate.
  - The next day, her screening labs for EBV, CMV, HHV-6, Parvovirus and HIV are reported to be negative.
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Treatment EBV mononucleosis

- Supportive
  - CNS symptoms
  - Co-infection with GABHS
- Avoid contact sports
  - Splenic rupture
- Dexamethasone only for airway obstruction
- Antivirals suppress virus but have no clinical impact

Case 5: An Atypical Rash

Associated findings

Typical HFMS

- Common viral illness caused by enteroviruses
- Children aged <5 years
- Summer and autumn months
- Coxsackievirus A16
- Typically asymptomatic
- Mild febrile illness; rash on palms of hands and soles of the feet, and sores in the mouth
- Associated, often weeks after initial symptom onset, with nail dystrophies (e.g., Beau's lines or nail shedding)

Atypical HFM

Notes from the Field: Severe Hand, Foot, and Mouth Disease Associated with Coxsackievirus A6 — Alabama, Connecticut, California, and Nevada, November 2011 - February 2012

- 63% aged <2 years, 24% adults aged ≥18 years;
- 70% exposure to a child care facility or school
  - 53% of 15 adults had contact with children in child care, or provided medical care or were related to a child with HFMD
- 80% sought care; hospitalization > typical HFMD (19%)
- Clinical manifestations
  - Fever ¾
  - Rash on the hands or feet, or in the mouth 2/3
  - Rash on the arms or legs 1/2, face 4/10, buttocks 1/3, and trunk 1/5
  - Maculopapular; vesicles were reported in 70% and scabs in 65%
  - Shedding of nails occurred after initial infection in 2
Public Health Implications

- Educate patients and their families about atypical HFMD
- Exclude sick children from school or daycare until they have been afebrile for at least 24 hours without the use of antipyretics and they have been free of diarrhea and/or vomiting for at least 24 hours
- If an atypical rash with extensive blistering is present, the child may be excluded until blisters are healed or scabbed and no longer draining or oozing

History of Present Illness

- 18 year old: enlarging erythematous plaque on right cheek
- Right tragus piercing 2 months prior with hollow bore needle at tattoo parlor
- PCP: incised and drained the lesion and prescribed a 3 week course of cephalexin
  - Lesion re-developed, repeatedly drained by PCP
- ER evaluation at 5 months

Infections Associated with Piercing Sites

- Bacteria
  - *Staphylococcus aureus* (including MRSA)
  - Group A streptococcus
  - *Pseudomonas aeruginosa*
- Tetanus
- Hepatitis B or C
- HIV
- Tuberculosis
- Non-tuberculous mycobacteria

Case 6

- A teen with an infection following piercing
- A youngster with a fake tattoo

Presentation 5 months of treatment

Summer Beach Fun

- 5 year old vacationing in Florida
- Fake (henna) tattoo applied
- Weeks later, the following reaction

Henna Tattoos

- Henna-paint the skin for adornment and for religious reasons
  - "The Night of the Henna"
  - *Lawsonia inermis, alba*
- The leaves harvested from this bush are dried and powdered, mixed with oil, lemon
- The pigment binds to the skin and achieves the desired stain
- The longer the henna remains in contact with the skin, the darker will be the resulting color
- Rarely sensitizing

"Black henna"

- Contemporary composition of the paint, which contains paraphenylenediamine
  - Kerosene or petrol is also added to improve the uptake which Risk of sensitization
- Allergic contact dermatitis after skin after 7-14 days after first exposure
- Red eczematous or raised reaction develops in the pattern of the tattoo
  - Lichenoid, pustular or blistering

From: *Clinicopathologic Features of Skin Reactions to Temporary Tattoos and Analysis of Possible Causes*

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NTM associated with tattoos

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### NTM Tattoo Outbreak

- Initial report from NY; 14 cases
- Epi-alert went out
- 86% due to *M. chelonae*, the others by *M. abscessus*
  - Use of ink contaminated with NTM
  - Unopened bottle of Company A pre-diluted gray ink

### Tattoo Advice

- Use registered tattoo parlors
- Request tattoo specific inks
- Request sterile water be used for any dilutions
  - NTM organisms in water
- Ensure tattoo artists follow hygienic practices
- Be aware of the potential for infection
- Notify the tattoo artist and the Food and Drug Administration's MedWatch program if an adverse event occurs
- 1-800-332-1088; Red Book pg 869

### Counseling

- Teen travel counseling: sex, drugs, rock and roll

### 6 Cases: 6 Practical Lessons Learned

- All wounds aren’t created equal
- A detailed history is invaluable and knowledge of suspected agent can guide the lab and rx
- Polymicrobial infection usually follows environmentally contaminated wounds-ex is key and having the right team available
- Narrow your differential after summarizing: factor in and out confounding variables
- Timing is everything-the longer the lesion has been present, the more likely the pathogen is atypical
- Take care in getting your tattoo