ID THE ID: Dermatologic Manifestations of Infectious Diseases
Mary Anne Jackson, MD
Professor of Pediatrics
University of Missouri-Kansas City SOM
Section Chief, Children’s Mercy Hospital & Clinics

• I have no actual or potential conflict of interest in relation to this program.

Objectives
• Recognize syndromes with dermatologic manifestations
• Identify specific pathogens and the dermatologic association
• Understand epidemiologic features of infectious syndromes
• Delineate therapy for specific pathogens

#1-This previously healthy 15 year old boy presented in June with a 6 day history of fever and rash

Clinical History
• Previously healthy skate boarder
• Adopted w/ unknown family history
• Camping, tick exposed
• Rural
• 2 weeks ago, friends with rash s/o varicella
• No prior clinical history of varicella
• No adolescent vaccines; did not receive VZV
• No prior boils, skin abscesses
Varicella and Varicella Gangrenosa

- Prior to 1995 - benign inevitable infection
  - Neonates, immunocompromised
  - Teens, adults
  - Bacterial superinfection in healthy children
    - GABHS Necrotizing Fasciitis
  - Post vaccine - 80% reduction in disease, hospitalization, rare death
  - Additional dose and catch-up


#2 - The clinical triad of rash, arthritis and abdominal pain defines this disease which is the most common vasculitic disease of childhood. Antecedent respiratory infection usually precedes the skin findings by 2 weeks.

 Henoch's Description:

“...gently periodic sticking pains in the joints ... which are oedematous, swollen and very painful ... the characteristic spots of the disease appear in the majority of cases first on the extremities and particularly on the lower ones ... the spots are small, the size of a lentil. The fever disappears through the skin and urine crises, but the exanthema usually remains after the crisis...”
Henoch Schoenlein Purpura

- Peak age 4-6 years
- Antecedent respiratory infection or immunization
- Typical triad
  - Skin-purpura not seen initially in 25%
  - Joints-oligoarticular lower extremity
  - Abdominal pain-precede rash in up to 35%; gut edema and hemorrhage lead to ileal ileal intussusception (PEARL)
- Unusual manifestations
- Recurrence 25%

HSP-Complications

- CNS
- Respiratory tract
- Scrotal involvement-20-35% of boys
- 20-50%- renal involvement within a month of diagnosis-typically asymptomatic hematuria
  - ~10% w persistent renal dysfunction
    - Nephrotic syndrome
    - Renal insufficiency
    - Hypertension
    - Crescentic glomerulonephritis

HSP - self limited?

- “Only if you don’t mind suffering for 2-3 weeks”
- Renal involvement in 60%
  - 20% may develop RPGN

Meta-analysis: HSP and CS efficacy

For children with HSP, do CS decrease...

- Renal sequelae?
- Surgical intervention?
- Duration of abdominal pain?
- Recurrence?

Meta-analysis conclusions

Results suggest CS are helpful for:
- Prevention of persistent renal disease
- Abdominal pain
- Surgery
- Recurrence

#3-This disease typically is manifests with a confluent indurated plaque and elevated sharply demarcated borders. Name the disease and the drug of choice.
• What is erysipelas and penicillin?

Erysipelas

• GABHS
• No break in skin; often in area where lymphatic flow is impeded
• In the past, on the face; now-lower extremity

Erysipelas-Clinical Manifestations

• Rapidly spreading
• Edema, redness, and heat
• Lymphangitis and regional node
• Skin surface resembles orange peel (i.e., peau d’orange)
  – superficial cutaneous edema surrounds the hair follicles, which causes dimpling in the skin because follicles remain tethered to the underlying dermis
• Vesicles, bullae, and petechiae or ecchymoses
  – If toxic patient and widespread.

Erysipelas

• Typical clinical appearance=diagnosis
• Almost always caused by Group A streptococcus
• Occasionally other beta hemolytic streptococcus
• Rarely S aureus
• Penicillin is still the appropriate drug

• What is Neisseria gonorrhoeae?

#4-This infection is characterized by fever, joint pain and skin lesions
**Arthritis-Dermatitis Syndrome**

- 200,000,000 annual global cases of *N. gonorrhoeae* infection
- Infection risk from a single contact=60-90% for ♀; 20-50% for ♂
- Hematogenous spread-0.5-3% of cases
- Host factors-HIV, pregnancy, MSM, SLE, IV drug, terminal complement deficiency

**Manifestations, Dx and Tx**

1. Arthritis-dermatitis
   - Triad of dermatitis, tenosynovitis, and migratory polyarthritis
2. Localized septic arthritis
   - Diagnosis and Treatment
     - Blood culture, skin lesion, or other site source
     - Exclude meningitis, endocarditis
     - Co-infection
     - 3rd generation cephalosporin—oral; avoid quinolones

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#5-An 8 year old boy with purulent meningitis had this tick related ulcer noted on examination. Name the disease and the pathogen.

*Image Courtesy of Dr. Robert Wittler*

**Tularemia**

- Also known as rabbit fever (related to skinning rabbits) but actually transmitted most often by ticks
- Children age 5-15 years
- Regional lymphadenitis, subacute
- Diagnosis by serology
- Beware if you attempt to grow the organism from wound

**Epidemiology**

*CDC tularemia report map*

[Website: www.cdc.gov](http://www.cdc.gov)
Kansas City series
Tularemia in children, PAS, 2009
- 1990-2008
- 45 cases; mean age 7
  - 9 months-14 years
- Tick vector 76%
- Median time, onset of illness to diagnosis
  - 28 days; 4-103 day
- 3=visits before dx
- 2.5=ineffective antibiotics before dx
- Ulceroglandular-60%
- Glandular-27%
- Less common
  - Oropharyngeal-
  - Typhoidal
  - Meningitis

Ulceroglandular Infection

Glandular Infection

Erythema Nodosum

Etiology of Erythema Nodosum
- Streptococcal infections-most common
- Tuberculosis in past
- Mycoplasma pneumoniae infection
- GI pathogens: Yersinia, Salmonella, Campylobacter
- Tularemia
- Fungi
- Sulfa based drugs
- Inflammatory bowel disease
- Hodgkin’s Disease

#6-Streptobacillus moniliformis is the agent causing this infection in a healthy teen. Hint=it was transmitted by close contact with who/what?
Clinical History
• 15 year old girl previously well
• 48 hours myalgia, sore throat
• Skin rash on extremities
• Arthralgia involving joints, ankles

Relevant History
• Sexually active, no birth control
  – HPV infection last year
• Smokes pot, no other drugs/alcohol
• No ticks but has had mosquito bites
• Cat scratches and new pet kitten
• Pet rats
• Piercings of lip (self performed), ear

Rat Bite Fever
• Classic syndrome
• Intimate exposure does not need bite
• Incubation 3d-3w
• Infection may have relapsing course
• Penicillin is the drug of choice
• Case fatality up to 10%

Key Points
NP carriage of *S. moniliformis* by healthy rats is high; 10-100%.
Fever, myalgias, arthralgias, vomiting, and headache followed by rash
Polyarthritis in up to 1/2 of patients is often migratory.
Fever, myalgias, arthralgias, vomiting, and headache followed by rash
Rash may involve palms and soles, petechial, purpuric or pustular.
Treatment: penicillin

What is a rat?
#7-This 10 year old developed fever, myalgia and this eye finding after lake swimming 10 days ago. Name the disease and drug of choice.

- What is leptospirosis and penicillin?

Leptospirosis
- Acute febrile syndrome may mimic Kawasaki Disease caused by spirochete, Leptospira
- 90% have self limited illness
- Distinct clinical findings: conjunctival suffusion, myalgia of calf or lumbar region
- Biphasic illness: Distinct findings usually in immune mediated phase
- Blood or urine culture< serology
- Penicillin

Epidemiology Leptospirosis
- Animal vectors, generally asymptomatic
- Contaminated water, risk after flooding
- Occupational exposure-abattoir, sewer workers, veterinarians, farmers, military
- Recreational exposures

Another reason to avoid becoming a triathlete
- Leptospirosis outbreak post triathlon; Springfield, Illinois.
- Telephone survey w/ clinical data: 834/876 triathletes
- 98 (12%) reported being ill
- 52/474 (11%) serum samples tested positive
- Heavy rains that preceded the triathlon likely to have increased contamination of Lake Springfield.
- Ingestion of 1 or more swallows of lake water was a predominant risk factor for illness.

Clin Infect Dis June 2002
This teen developed necrotizing fasciitis after he injured himself on a piece of metal while swimming in a local lake. The causative pathogen of his cellulitis is gram negative bacillus resistant to penicillin, but susceptible to carbapenems, TMP/SMX and quinolones.

**What is *Aeromonas hydrophila*?**

*Aeromonas hydrophila*

Another water borne pathogen

- Gram-negative, facultatively anaerobic bacteria found in soil and fresh and brackish water worldwide
- Red Book 2006—“Swimming is a communal bathing activity by which the same water may be shared by dozens to thousands of people each day, depending on venue size.”

*Aeromonas hydrophila* infection

- Think of this organism w/ patient w/ soft tissue infection after trauma/water exposure
- Fulminant
- Fascia involved
- Requires debridement
- Appropriate antibiotics- susceptible to carbapenems, TMP/SMX and quinolones

This previously healthy girl had her tragus pierced at a local tattoo parlor 5 months ago.

**Clinical History**

- 18 year old Caucasian female with an enlarging erythematous plaque on right cheek
- Right tragus piercing 2 months prior with hollow bore needle at tattoo parlor
- PMHx: Long QT syndrome
- PCP attempted to incise and drain the lesion and prescribed a 3 week course of cephalaxin
  - Lesion re-developed, repeatedly drained by PCP
- ER evaluation at 5 months
Surgical Excision

- Histology revealed necrotizing granulomatous inflammation with neutrophilic microabscesses
- Special stains for bacteria, fungi, and acid fast bacilli were negative

Body Piercing

- Now a popular practice among teenagers
- Common sites for piercing include:
  - Ears
  - Nose
  - Tongue
  - Navel
  - Eyebrow
- Complications associated with body piercing include:
  - Infection
  - Bleeding
  - Allergic reactions
  - Scarring

Infections and Body Piercing

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

**What is *Mycobacterium fortuitum***?

Nontuberculous Mycobacteria

- Ubiquitous in water and soil
- A growing number of non-tuberculous mycobacteria species reported with body piercing
  - Eyebrow- *M. flavescens*
  - Nipple- *M. fortuitum*
  - Navel- *M. chelonae*
  - Breast- *M. abscessus*
- Associated with cosmetic procedures
  - Leg furunculosis-pedicure whirlpools (*M. fortuitum*)
  - Liposuction, mesotherapy

NTB Cutaneous Infections

- Consider when piercing related infections fail to respond to antibiotics effective against common bacterial pathogens
- Varied cutaneous presentations
  - Pustules, nodules, plaques and ulcers
- Acid-fast organisms are not always found with special stains
  - Must confirm diagnosis with tissue culture
    - Allows identification of specific organism and antimicrobial susceptibilities
What you need to know before you get your tattoo or piercing

- Performing Piercings
  - Use of sterile wrapped needles (hollow bore)
  - Sterile technique
  - Do not use piercing guns (cannot sterilize)

- Aftercare of body piercing sites
  - Sterile saline soak 2-3 times per day
  - Avoid pools and hot tubs
  - Antibacterial soap 1-2 times per day
  - Avoid trauma/friction


#10-An 18 year old boy was finned by a fish, injuring his hand. *Edwardsiella tarda* was cultured from his wound. What was he doing, and what antibiotic would treat the infection?

www.sports.espn.go.com

- What is noodling, and treatment with TMP/SMX, ciprofloxacin, second or third generation cephalosporins?

Noodling: no complaints that you didn’t learn anything here today!

- Another danger of water!
- AKA catfisting, grabbling, graveling, hoggling, dogging, gurgling, tickling and stumping
- Fishing for catfish with your bare hands
  - Legal in 11 states
  - Kentucky, Louisiana, Mississippi, Oklahoma, Alabama, Georgia, Tennessee, Kansas, Illinois, Arkansas, and Missouri.

Complications

- Superficial cuts and minor wounds
- *Edwardsiella tarda* associated with catfish
- Losing fingers is also a risk (bite vs infection)
- Most holes are deep enough that diving is needed, so there can be a danger of drowning
- Alligators, snakes, beavers, muskrats and snapping turtles may make the hole their home.....