Infectious Diseases Among College Students
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Outbreaks of Infectious Diseases Among College Students
• Meningococcal Disease (1990s)
• Pertussis (2002)
• Measles (2004)
• Mumps (2006)
• H1N1 (2009)
• Seasonal influenza (annually)

Infectious Diseases Among College Students
• Mono and Mono-like illnesses
• Infections from Abroad
  – Travel/study abroad
  – Foreign Students

Infectious Diseases Among College Students
• Risk factors
  – Social density
  – Facilitates transmission of respiratory pathogens
  – Agents transmitted fecal-oral less of a threat due to public health interventions (clean water, sewage treatment, HVAC)
  – Behavior
    • Now more important factor in transmission than density
    • Immunization practices

Mumps
• 2006 Outbreak
  – Several Midwest college campus outbreaks
  – ~6,000 cases (38% among 18-24 yrs)
  – Contributing factors
    • Social density
    • Lack of immunization
    • Importation from abroad (primarily GG strain from UK where outbreak had been occurring)

Mumps
• What slowed the outbreak?
  – Isolation of cases (5 days)
  – Enhanced surveillance
  – Publicity
  – Education about handwashing, cough hygiene
  – Immunization
    • Midwest college attack rate low on campuses with high vaccination rates
    • Only 25 states & DC require 2 doses of MMR
Meningococcal Disease

- Outbreaks in 1990s
- Studies demonstrated increased risk in:
  - Residents of dormitories
  - College freshmen
  - Alcohol drinkers
  - Persons with URIs

- Key intervention points
  - 1997: ACHA recommends vaccination
  - 1999: ACIP permissive recommendation
  - 2005: ACIP recommends MCV4 (new vaccine product)

Meningococcal Disease

- Manifestations
  - Rash
    - Most common = asymptomatic carriage
  - URI sx common prior to invasive disease presentation
  - Incubation 1-10 days (usually <4 days)
  - LRTI/CABP
  - Meningitis
    - Meningococcemia (purpura fulminans)
  - Other
    - Septic arthritis, pericarditis, endophthalmitis, urethritis

Meningococcal Disease

- Manifestations
  - Rash
    - Develops in >80%; often absent early in illness
    - Initially blanching (macules); later, nonblanching (petechiae or purpura)
    - Fever w/petechial rash not pathognomonic (<10% have Nm)
  - Meningitis
    - Classic signs (fever, HA, photophobia, neck stiffness)
    - 30-50% meningitis only; 40% also have meningococcemia

Meningococcal Disease

- Manifestations
  - Meningococcemia
    - 20% have this alone
  - Progression from nonspecific symptoms to death in hours
    - Nonspecific symptoms
      - Fever, HA, myalgia, vomiting, abdominal pain
    - Suggestive symptoms
      - Limb pain, cyanosis, mottling, cold hands & feet!
    - Mortality high (25-40%)
    - Morbidity higher (skin grafting, amputation, cerebral ischemia)
**Infectious Mononucleosis**

- EBV causes heterophile (Monospot-positive) infectious mononucleosis
  - Incubation period: 4-6 wks
  - Prodrome (1-2 wks): fatigue, malaise, myalgia
  - First 2 wks of illness:
    - Fever (93%); may last >1 month
    - Sore throat (75%)
    - Lymphadenopathy (95%)
    - Atypical lymphocytosis (100%)
    - Splenomegaly (51%); hepatomegaly (11%)
    - Rash (10%)
    - Jaundice (5%)

**Mimickers of Mono**
- CMV (5-10%) of all IM cases
- HIV
- Toxoplasmosis
- HHV-6
- Rubella (maculopapular rash, no splenomegaly)
- Lymphoma
- Streptococcal pharyngitis (no splenomegaly)

**Bedbugs**
(aka “Eww Dat”)

- Why now?
  - Common before WWII, then DDT
  - Ant/cockroach bait traps rather than insecticide sprays
  - NOT indicative of poor hygiene or bad housekeeping
- Who?
  - Humans preferred but not required

**Bedbugs**

- Developmental time (egg to adult):
  - 86 °F = 21 days
  - 65 °F = 120 days
- Each molt requires a blood meal
- Nymphs and adults can live several months without eating (adults can live up to 18 months without food)

**Bedbugs**

- Feed mostly at night; bite is painless
- Salivary fluid containing an anticoagulant injected; this is irritant
- Feeding lasts 3 mins (nymphs) to 15 mins (adults)
- Once fed, they crawl away and hide in dark, protected sites—prefer wood, fabric, paper surfaces near bed
Bedbugs

- Rows of ≥3 welts on exposed skin are characteristic of bedbugs
  - (Flea bites have red spot in the center)

Bedbugs

- Signs of infestation:
  - Live insects
  - Fecal material
  - Cast skins

Bedbugs

- Treatment
  - Topical steroids
  - Oral antihistamines

- Prevention
  - Inspection
  - Sanitation (put vacuum bag in plastic)
  - Trapping (plastic over mattress >1 yr)
  - Insecticides

MRSA--SSTI

- Abscess
  - Incision and drainage (AII).
    - No difference in outcomes with antibiotic
      - RCT of patients with MRSA abscesses; cure rates:
        - Cephalexin (84.1%) vs. Placebo (90.5%)²
      - Treatment reserved for systemic symptoms, severe local symptoms, immunosuppression, extremes of age, critical location (e.g., face), and failure to respond to I&D

MRSA--SSTI

- Recurrences
  - Preventive educational measures that focus on appropriate wound care/personal hygiene are recommended (AIII):
    - Keep draining wounds covered (AIII)
    - Maintain good personal & hand hygiene (AII)
      - Avoid reusing/sharing personal items & linens that contact infected skin
  - Educational measures that focus on environmental hygiene should be considered (BIII):
    - Focus cleaning efforts on surfaces that may contact bare skin or uncovered infection (AIII)
MRSA--SSTI

- Decolonization
  - Indicated if recurrent SSTI or ongoing transmission among household members or other close contacts despite optimizing wound care and hygiene measures (CIII)
  - Should be offered in conjunction with ongoing reinforcement of hygiene measures:
    - Nasal decolonization with mupirocin NOT effective (CI)
    - Cluster-randomized, double-blinded, placebo-controlled trial of CA-MRSA colonized soldiers = decrease in nasal colonization, but NO DECREASE IN INFECTION RATES¹
    - Body decolonization: chlorhexidine or dilute bleach baths (CIII)
    - Oral antibiotics are NOT recommended (AIII)
      - Ellis MW, AAC 2007

Case

- 24 yo college student presents to the ER with 2 day history of rigors, fever (102 °F), and sweats that developed on return trip from Ghana
- Exam: nonfocal; appears “washed out” but not acutely ill
- Labs:
  - WBC normal; Hgb 12.5; plt 100k
  - CMP: tbili 1.5, otherwise normal

Malaria

- *Plasmodium* species
  - *P. falciparum* (Pf)
  - *P. vivax*
  - *P. ovale*
  - *P. malariae*
  - *P. knowlesi*
- Transmitted by female *Anopheles* mosquito
- Most cases in USA imported

Malaria

- Imported malaria
  - Increased travel
    - >1,000 cases/year in USA and rising; most *P. falciparum*
  - Risk factors for mortality
    - Age, comorbidities
    - Inadequate or incorrect pre-travel advice (VFR)
    - Lack of compliance (overseas advice)
    - Increased drug resistance
    - Lack of recognition of the disease
    - Delays and inaccuracies in lab diagnosis

Malaria: Signs & Symptoms

- **FEVER!**
  - Favor malaria: Do NOT favor malaria
  - True rigors: Skin rash
  - Splenomegaly: Diffuse abdominal pain
  - Abnormal CBC: Eosinophilia
  - Hyperlipidemia: Acute joint swelling
  - Elevated transaminases: Lymphadenopathy
  - May be seen in malaria:
    - Headache, myalgias, cough, N/V, diarrhea
    - Presentation may be atypical in semi-immune & with prior chemoprophylaxis and/or abs (e.g., doxy, azithro, clinda, T/S)

Malaria: Diagnosis

- Traditional:
  - Thick film: used for diagnosis
  - Thin film: used for speciation
- Rapid detection tests (RDTs)
  - Consistently better than blood films in all studies
  - Only 0.5% false-positive (e.g., RF)
  - Rarely false-negative (proztoine, HRP2 gene deletions, very low Ag levels)
  - N.B.: after Rx, antigenemia ≠ parasitemia