

1 **RAT BITE FEVER***STREPTOBACILLUS MONILIFORMIS*2 **Disclosures**

- Nothing to disclose

3 **Objectives**

- Identify preferred treatment for patients with Streptobacillus moniliformis bacteremia
- Recognize unique rapid diagnostic presentations and what implications these could have for escalation/de-escalation of antibiotics.
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4 **Extra, Extra...Hot off the press....**5 **HELP!!!**

- Rapid Diagnostics Pager
 - New positive blood cultures
 - Updates to pending blood cultures
 - Antimicrobial selection and dosing assistance
 - Restricted antimicrobial approvals

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6 7 **Patient ZZ**

- HPI: 29 Y/O male on day 3 of admission with 6 total days of symptoms including:
 - Muscle aches, joint pain, cough, punctate rash, nausea & vomiting
 - Fever: relapsing fevers (max: 102.1)
- Allergies: acetaminophen, bee stings
- Home medications: methadone 40 mg daily
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8 **Patient ZZ**

- PMH: Chronic Hepatitis C virus (HCV)
- SH: Alcohol use, previous IV drug abuse (IVDA) last abuse 11 months ago on methadone, rat owner
- Significant PE:
 - Skin: Painful punctate rash on hands and feet
 - ENT: a few small vesicles on lips
 - Psych: patient tearful when describing pain
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9 **Hospital Course So Far.**10 11 **BIOFIRE**

- Respiratory Panel (RP)
- Respiratory Panel EZ
- Respiratory Panel 2
- Blood Culture Identification(BCID) Panel
- Gastrointestinal Panel
- Meningitis/Encephalitis Panel (ME)
- Pneumonia Panel

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12 **BIOFIRE**

- Respiratory Panel (RP)
 - \$150
 - ✦ Cost we pay for the panel
- Blood Culture Identification(BCID) Panel
 - \$47
 - ✦ Cost we pay for the panel
- Meningitis/Encephalitis Panel (ME)
 - \$610
 - ✦ This is reported from lab and is the price we bill the patient not the cost of the panel.

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13 **How do the film arrays work?**

- Two minutes of manual manipulation
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- ~ 1 hour machine process
 - Prepares samples
 - Amplifies DNA
 - Detects organisms

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14 **Respiratory Panel (RP)**

- Quick Turn around time: ~1 hour
- Highly Specific assay (~100% for all targets)
- Various sensitivities (57%-100%)
- Sample: Nasal wash, swab, sputum culture

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- 15 **Blood Culture Identification Panel**
 - Duration: ~1 hour
 - Sample: positive blood culture
 - Sensitivity 98%
 - Specificity 99.9%
 - *E. faecalis* vs. *E. faecium*
- 16 **Meningitis/Encephalitis Panel (ME)**
 - Duration: ~1 hour
 - Sample Type: Cerebrospinal Fluid (CSF)
 - Overall 94.2% Sensitivity and 99.8% Specificity
- 17 **No target organisms detected using the FilmArray BCID panel**
 - GRAM POSITIVE RODS
 - *Prevotella melaninogenica*
 - Streptococcus species
 - ✦ *Lactobacillus rhamnosus*
 - GRAM NEGATIVE RODS
 - *Anaerobiospirillum succiniciproducens*
 - Staphylococcus species (not *S. aureus*)
 - *Enterococcus gallinarum*
 - ✦ *Lactococcus lactis*
 - VIRIDANS GROUP STREPTOCOCCI
 - *Granulicatella adiacens*
 - *Abiotrophia defectiva*
 - *Abiotrophia granulicatella*
 - YEAST
 - *Candida dubliniensis*
 - *Cryptococcus neoformans*
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- 19 **BCID: Helping narrow down the list**
 - *Excluded:*
 - *Acinetobacter baumannii*
 - Haemophilus influenzae*
 - Neisseria meningitidis*
 - Pseudomonas aeruginosa*
 - Enterobacteriaceae
 - ✦ *Enterobacter cloacae* complex
 - Escherichia coli*
 - Klebsiella oxytoca*
 - Klebsiella pneumoniae*
 - Proteus species
 - Serratia marcescens*

20  **Rat Bite Fever**

- 1 *Streptobacillus moniliformis*
- 2 • North America
 - Bite: often not present
 - Incubation Period: <7 days
 - Rash: maculopapular rash extremities
 - Polyarthralgias: Common
- Food contamination
 - Haverhill Fever (1926)
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- 3 *Spirillum minus (sodoku)*
- 4 • Asia
 - Bite: becomes indurated and ulcerated 2 weeks later
 - Incubation Period: 1-3 weeks
 - Rash: red-brown macular rash
 - Polyarthralgias: Rare

21  **Animal Vectors**

- Rats
 - Domesticated (10-100%)
 - Wild (50-100%)
- Mice
- Minor:
 - Guinea pigs
 - Gerbils
 - Ferrets
 - Cats*
 - Dogs*

22  **Microbiology - *Streptobacillus moniliformis*****Gram-negative rod****Difficult organism to culture, requiring microaerophilic conditions**

- Growth requires:
- Trypticase soy agar or broth enriched with 20% blood, serum, or ascetic fluid.
- 2-3 days (up to 7)
- Sodium polyanethol sulfonate used as an anticoagulant in most aerobic blood culture bottles will inhibit growth.
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23  **Epidemiology**

- High risk populations
- Underreporting: Not reported, difficult to culture
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24 **Disease Presentation**

- Nonspecific initial presentation with 13% untreated mortality
- S/Sx:
 - Relapsing fever (92%)
 - Rash (61%)
 - Polyarthralgias (66%)
 - Myalgias (29%)
 - Nausea and vomiting (40%)
 - Headache (34%)
 - Sore throat (17%)

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25 **Distinctive Rash**26 **Advanced Disease**

- When left untreated Rat bite fever can cause
 - Endocarditis (17 case reports) (53% mortality)
 - Pericarditis
 - Systemic vasculitis
 - Meningitis
 - Hepatitis
 - Nephritis
 - Amnionitis
 - Pneumonia
 - Focal abscesses

27 **Differential Diagnosis**

① Bacterial

- ② • *S. pyogenes*
 - Scarlet fever
 - Rheumatic fever
- *S. aureus*
- Disseminated gonorrhea
- Meningococemia
- Leptospirosis
- Secondary syphilis
- Typhoid fever
- Brucellosis
- Tick borne disease:
 - Lyme disease
 - Ehrlichiosis
 - Rocky Mountain Spotted Fever

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③ Viral

- 4 • Epstein-Barr Virus
- Parvovirus B19
- Coxsackievirus

28 **General Reported Susceptibilities**

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30 **Treatment**

- Adults
 - IV PCN: 200,000 units q4h (14 day treatment duration)
 - ✦ Increase to 1.8-2.4 million units /day if no improvement in 48hrs
 - ✦ Oral PCN (500 mg QID), AMP (500 mg QID), AMOX (500 mg TID)
 - IV Ceftriaxone 1-2 gram daily
- PCN Allergic:
 - IV/PO: Doxycycline 100 mg BID x 14days
 - PO Tetracycline 500 mg QID
- Alternative:
 - Streptomycin, Gentamicin
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31 **Pediatric Dosing**

- Pediatric
 - IV PCN: 100,000 to 150,000 units/kg/day divided QID, max: 8 million units/day
 - ✦ Increase to 200,000 to 300,000 units/kg/day maximum 24 million units/day
 - ✦ PO PCN: 25 to 50 mg/kg/day divided TID-QID, maximum 2 grams per day
 - Ceftriaxone 50-100 mg/kg/day maximum 2 grams daily
 - For less severe cases not requiring hospitalization all PO courses
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- PCN Allergic
 - Doxycycline 2-4 mg/kg/day divided BID, maximum 200 mg per daily

32 **Completed Hospital Course**

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