**Community-Acquired MRSA in Athletes**

See also MRSA (General)

**Background**

1. Methicillin Resistant *Staphylococcus aureus* (MRSA) is bacteria resistant to beta-lactam antibiotics
   - Antibiotic (methicillin) resistance: mecA gene
   - Gram positive cocci in groups/ clusters
   - Major cause of skin/soft tissue infections
   - In competitive sports, incr risk with:
     - Skin trauma: turf burns, lacerations, abrasions
     - Cosmetic body shaving
     - Physical contact w/person w/MRSA
     - Shared equipment

2. 2 types of MRSA
   - Hospital associated/ nosocomial: HA-MRSA
   - Community acquired: CA-MRSA
     - Epidemiologically/ genetically distinct from HA-MRSA
       - Healthy athletes w/o typical MRSA risk factors
         - First reports in sports teams in 1980s
       - Less antibiotic resistance than HA-MRSA
       - Different genetic makeup
         - MRSA strain USA-300: most common in athlete associated outbreaks
       - More virulent than MSSA or HA-MRSA
         - Panton-Valentine leukocidin (PVL) = novel toxin
           - Causes rapid tissue necrosis
           - 70% of CA-MRSA isolates
     - Presents as
       - Skin/soft tissue infections
       - Necrotizing pneumonia

3. General info
   - CDC guidelines for CA-MRSA
   - National Athletic Trainers' Association Official Statement on MRSA
   - Texas Department of State Health Services-Information on MRSA for School Athletic Departments

**Pathophysiology**

1. Nasal colonization
   - Athletes
     - Colonization reported to be a risk factor for infection
       - Association unclear in athletes
       - Also colonizes axilla, groin, perineum, pharynx, rectum, skin
2. Incidence/ prevalence
   o General population
     ▪ MRSA: 59% of ED pts w/skin/ soft-tissue infections
   o Athletes
     ▪ MRSA incidence: 2005 university retrospective study
       • Community: 2.1%
       • All collegiate athletes: 1.7%
       • Football players: 6.0%
       • MRSA skin/ soft tissue infections
         ▪ 85.7% in athletes
         ▪ 58.8% in community
     ▪ Skin infections in athletes
       • Staphylococcus aureus (22%)
       • HSV (22%)
3. Epidemiology in athletes
   o Most common in: football, wrestling, rugby
     ▪ Incr risk:
       • Lineman (4x)
       • Linebacker
       • High BMI
       • Forward in rugby
   o Outbreaks reported at high school, collegiate, professional level
     ▪ Shared balms, lubricants, unwashed towels, equipment
4. Risk factors
   o Close skin to skin contact
   o Contaminated items (towels, razors, soap)
   o Crowding
   o Cleanliness (poor skin hygiene)
   o Compromised skin integrity (abrasions, turf burns, shaving)
5. Morbidity/ mortality
   o Hospitalization for IV antibiotics
     ▪ 29% in review of sports literature (AJSM 2006)
     ▪ 60% of affected CO fencing team, 2002-2003
     ▪ 70% of PA collegiate football team in 2000
   o Recurrence may be
     ▪ Higher w/empiric beta-lactam antibiotics
     ▪ Associated w/persistent colonization
   o Long term complications
     ▪ None reported in sports literature
   o Mortality
     ▪ Death: rare

Diagnostics
1. History
   o Presents as "spider bite", pimple
   o Discomfort, warmth and redness
   o Location: extremities
   o Previous MRSA infection or close contact w/MRSA skin infection
   o Athlete (football, rugby or wrestling)
2. Physical examination
   - 70-80% present as skin and soft tissue infection
     - Tender red abscess (furuncle) w/or w/o cellulitis
       - Start small, rapidly incr to painful, inflamed, indurated area
       - Abscesses of 5-7 cm diameter not uncommon
       - Typically solitary, multiple abscesses can occur
       - Usual location: extremities
         - Knee/ forearm common
         - Face, neck, and abdomen
     - Less common
       - Folliculitis
       - Impetigo
       - Paronychia
   - Approx 10% present as:
     - Necrotizing fasciitis and myositis
     - Hemorrhagic pneumonia
3. Diagnostic testing
   - Culture all abscesses in athletes
     - Sensitivity guides antibiotic tx
       - If resistant to erythromycin/susceptible to clindamycin
     - May have inducible clindamycin resistance
4. Diagnostic criteria
   - Previous hx of MRSA: incr risk for recurrence
   - Consider in
     - Athlete, especially football, wrestler, or rugby
     - Skin abscess
     - Close contact w/CA-MRSA infected athlete

Differential Diagnosis
1. MSSA or HA-MRSA abscess
   - Clinically indistinguishable from CA-MRSA abscess
   - Culture & sensitivity will differentiate
2. Cellulitis
3. Erysipelas
4. Impetigo
5. Folliculitis

Therapeutics
1. Incision and drainage
   - Most important
   - May be the only tx necessary if:
     - Not systemically ill
     - Otherwise healthy
     - Lesion <5 cm
2. Add systemic antimicrobial therapy if:
   - Rapid progression and presence of cellulitis
   - Lesion size >5 cm
   - S/S of systemic illness
Co-morbidities or immune suppression
- DM
- Cancer
- HIV

- Extremes of age
- Location difficult to drain or area associated w/septic phlebitis (central face)
- Lack of response to I&D alone

3. Systemic antimicrobial therapy
- Trimethoprim-Sulfamethoxazole DS
- Tetracyclines
  - Minocycline or doxycycline
- Clindamycin
  - Inducible clindamycin resistance
    - Ranges widely from 2-8% to 43 and 93%
- Fluoroquinolones
  - Resistance emerging in both MRSA & MSSA
  - Not recommended by CDC
- IV antibiotics for severe or unresponsive cases
  - Vancomycin
  - Linezolid
  - Daptomycin

4. Duration of systemic therapy
- 10-14 days-mild to moderate infection
- 2-3 wks: severe infection, slow response, immunocompromise

5. Decolonization
- Not routinely recommended
- Consider in outbreak or w/recurrence +/- consultation w/ID specialist
  - Mupirocin 2% TID x 7-10 days
    - Intranasal and
    - Topical to skin lesion after cleaning
  - Antibacterial liquid soap
    - 7.5-10% povidone-iodine liquid soap
    - 4% chlorhexadine gluconate liquid detergent

Follow-Up
1. Return to office in 24-48 hrs
   - Necessary if I&D alone
   - Important to assess response to empiric antibiotic tx
2. Admit to hospital
   - S/S of systemic illness
   - Rapidly progressive cellulitis/abscess not responding to initial tx
   - Consider infectious dz consultation

Prognosis
1. Return to Play
   - No official guidelines for most sports
     - No wound drainage
     - Lesion must be adequately covered during participation
NCAA wrestling guidelines: Bacterial Infections
- Furuncles
- Carbuncles
- Folliculitis
- Impetigo
- Cellulitis
- Erysipelas
- Staphylococcal dz
  - Preparticipation skin check
  - No new skin lesion for 48 hrs before competition
  - Completed 72 hours of oral antibiotic therapy and
  - No moist, exudative or draining lesions at competition time
  - Gram stain of exudate from questionable lesions (if available)
  - Active bacterial infections shall not be covered to allow participation

Prevention/ Screening

1. Hand washing
2. Shower after each practice and game
3. Not sharing personal hygiene items
   - Towels, clothing, bedding
   - Bar soap, razors & athletic equipment
4. Early detection by routine screening of athletes skin
5. Educate coaches, athletic trainers, players, parents
6. Clean/ treat abrasions and cuts
7. Apply clean dry dressings
8. Draining wounds must be covered
9. No participation if unable to keep lesion covered/ dry
10. Routine cleaning and disinfection of equipment

References


**Author:** Sunday Henry, MD, *Idaho State University FPR*

**Editor:** Carol Scott, MD, *University of Nevada Reno FPRP*