Community Acquired MRSA in the Athletic Population

Brian Kyle Macy, M.D.
Primary Care Sports Medicine Fellow
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Objectives

► Describe the bacteria
► Review epidemiology
► Discuss clinical presentations and risk factors
► Review treatment strategies and return to play recommendations
What is staph?

- Facultative anaerobic bacteria
- 30+ varieties
- Causes multitude of illnesses, e.g. food poisoning, toxic shock syndrome, mastitis, skin infections, etc.
- In otherwise healthy adults, usually present in nostrils and under fingernails in at least 25% of population.
Staphylococcus Aureus
What is different about MRSA?

- One of the first bacteria to become resistant to common antibiotics.
- Methicillin-Resistant \textit{Staphylococcus Aureus} (MRSA)
- In 1960’s, hospital variety recognized (ha-MRSA)
- In late 1990’s, community variety became more prevalent (ca-MRSA)
Colonization

- 2/3 to 3/4 of humans are colonized by *S. aureus* at some point
  - 20% to 50% at any given time
  - 10% - 20% persistently colonized
- Anterior nares is most common site of colonization
- Colonization and infection dependent on complex interactions between host and microbe
- 1-3% of total colonization is some form of MRSA

Persistent colonization and frequency of boils assoc with IL-4, CRP, and complement factor H (J Infect Dis, Emonts et al, 2008)
ca-MRSA

- Causes same infections as “regular” staph
- However, these infections may be more difficult to treat.
GUIDE TO HOSPITAL

MRSA WARD
MRSA CLINIC
MRSA SPECIALIST UNIT
DEPT. OF MRSA
MRSA OLOGY

Saizelda
SSTI in Athletes

**ca-MRSA**

MRSA infection with onset in the community in an individual lacking established MRSA risk factors in a healthcare setting (recent hospitalization, surgery, dialysis, presence of invasive medical devices, or residence in LTC facility)

“Furuncles (abscessed hair follicles or “boils”), carbuncles (coalesced furuncles), and abscesses are the most frequent clinical manifestations”

- [http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca.html](http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca.html)
CA-MRSA Predominantly Causes Skin Disease

<table>
<thead>
<tr>
<th>Disease Syndrome</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin/soft tissue</td>
<td>1,266 (77%)</td>
</tr>
<tr>
<td>Wound (Traumatic)</td>
<td>157 (10%)</td>
</tr>
<tr>
<td>Urinary Tract Infection</td>
<td>64 (4%)</td>
</tr>
<tr>
<td>Sinusitis</td>
<td>61 (4%)</td>
</tr>
<tr>
<td>Bacteremia</td>
<td>43 (3%)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>31 (2%)</td>
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</table>
Early infection (Boil)
Boil with cellulitis
Post Incision and Drainage
Folliculitis
Bloodstream infections primarily affect older population.

HPA, November 2007
<table>
<thead>
<tr>
<th>Age, y</th>
<th>No. of Cases</th>
<th>White</th>
<th>Black</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>60</td>
<td>14.9</td>
<td>65.9</td>
<td>14.2</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>3.7</td>
<td>5.9</td>
<td>0</td>
</tr>
<tr>
<td>2-4</td>
<td>18</td>
<td>1.9</td>
<td>6.0</td>
<td>0</td>
</tr>
<tr>
<td>5-17</td>
<td>47</td>
<td>0.7</td>
<td>4.8</td>
<td>0.4</td>
</tr>
<tr>
<td>18-34</td>
<td>434</td>
<td>7.3</td>
<td>29.1</td>
<td>3.2</td>
</tr>
<tr>
<td>35-49</td>
<td>1082</td>
<td>16.1</td>
<td>84.9</td>
<td>6.3</td>
</tr>
<tr>
<td>50-64</td>
<td>1327</td>
<td>35.1</td>
<td>127.5</td>
<td>15.8</td>
</tr>
<tr>
<td>≥65</td>
<td>2308</td>
<td>118.0</td>
<td>253.8</td>
<td>67.0</td>
</tr>
<tr>
<td>Total (interval estimates)(^a)</td>
<td>5287</td>
<td>27.7 (21.9-32.4)</td>
<td>66.5 (43.5-63.1)</td>
<td>10.4 (10.7-16.4)</td>
</tr>
</tbody>
</table>

Table 3. Estimated Incidence Rates of Invasive Methicillin-Resistant *Staphylococcus aureus* Infections by Race, Active Bacterial Core Surveillance, United States, 2005.
SSTI in Athletes

ca-MRSA


- Reported 11 deaths among previously-healthy young persons with ca-MRSA that occurred between October 2004 and February 2007
- Average age: 16 y/o
- Few days of fever, myalgias
- 5/11 had skin lesions
Sosin, et al—1989 KY h.s. outbreak of “boils” on football and basketball teams.

- 31 student-athletes
- 62 total lesions
- 71% treated with antibiotics
- 10% required hospitalization for IV antibiotics
- 1 player developed lung abscess
- 27% were colonized

Stacey, et al—1998 report of 5 rugby players with skin lesions that did not respond to penicillin-like antibiotics. Over time, each player developed significant abscesses. Only one player was colonized. 

Lindenmayer, et al—1998 report of 7 high school wrestlers along with others in community with MRSA skin lesions.
SSTI in Athletes

- ca-MRSA

Risk Factors
- Crowding
- Skin Injury
- Challenges in maintaining personal hygiene
- Frequent Skin Contact
- Sharing Personal Items

Groups with Increased Incidence
- Athletes
- Military Personnel
- Inmates
- IV Drug Users
- Homeless
- Children in Daycare
SSTI in Athletes

- **ca-MRSA**
  - Most patients DO NOT have recognized risk factors and ARE NOT linked to an outbreak
NFL study

CA-MRSA Abscesses among Professional Football Players
(Kazakova et al NEJM 2005;352:468-75)

- MRSA abscesses in 5/58 players at sites of turf burns

- Association with:
  - BMI >30
  - Lineman/Linebacker
  - Recent antibiotic use

- Abx use
  - 2.6 scripts/yr for Rams
  - 0.2 scripts/yr for gen pop’n

- No MRSA on colonization survey or environmental sampling
Observational:

- Athletic trainers providing wound care had no access to hand hygiene
- Towels frequently shared
- Players often did not shower before using whirlpool
- Weight-training equipment not regularly cleaned

• Transmission controlled with improved wound care, targeted therapy, enhanced hygiene
SSTI in Athletes

► ca-MRSA

Treatment
► 1) Obtain culture of ALL suspect skin lesions
► 2) Incision and drainage of all purulent material and debridement of necrotic tissue
► 3) “I&D alone may be adequate therapy for some previously healthy patients with cutaneous abscesses and no systemic signs of infection.”
► 4) Empiric antibiotic therapy should include an agent that is generally effective against MRSA
► 5) Close follow-up and adjustment of therapy
### Table 1

**Antimicrobial Dosing Recommendations for MRSA**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Adult IV Dosage</th>
<th>Adult Oral Dosage</th>
<th>Pediatric IV dosage</th>
<th>Streptococcus pyogenes activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clindamycin</td>
<td>1,200-2,700 mg/day divided every six to eight hours&lt;sup&gt;1&lt;/sup&gt;</td>
<td>300-450 mg every six hours&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Age &gt;1 month: 20-40 mg/kg/day divided every eight hours&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td>Daptomycin</td>
<td>4 mg/kg every 24 hours; if CrCl &lt;30, every 48 hours</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>Doxycycline/ Minocycline</td>
<td>100 mg every 12 hours&lt;sup&gt;1&lt;/sup&gt;</td>
<td>100 mg every 12 hours&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Age &lt;8 years: contraindicated</td>
<td>No</td>
</tr>
<tr>
<td>Linezolid</td>
<td>600 mg every 12 hours</td>
<td>500 mg every 12 hours</td>
<td>Age &lt;12 years: 10 mg/kg every eight to 12 hours&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>400 mg every 12 hours</td>
<td>400 mg every 12 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quinupristin/ Dalopristin</td>
<td>7.5 mg/kg every eight to 12 hours&lt;sup&gt;1&lt;/sup&gt;</td>
<td>N/A</td>
<td>7.5 mg/kg every eight hours&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td>Rifampin (adjunctive only)</td>
<td>600 mg every 12 hours&lt;sup&gt;*&lt;/sup&gt;</td>
<td>600 mg every 12 hours&lt;sup&gt;1&lt;/sup&gt;</td>
<td>15-20 mg/kg/day divided in one to two doses, maximum 600 mg/dose&lt;sup&gt;1&lt;/sup&gt;</td>
<td>No</td>
</tr>
<tr>
<td>Tigecycline</td>
<td>100 mg once, then 50 mg every 12 hours</td>
<td>N/A</td>
<td>Not established</td>
<td>Yes</td>
</tr>
<tr>
<td>TMP-SMX</td>
<td>15-20 mg/kg/day divided every six hours</td>
<td>One to two double strength tablets every 12 hours&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Age &gt;2 months: 15-20 mg/kg/day divided every six hours (TMP&lt;sup&gt;1&lt;/sup&gt; component)&lt;sup&gt;1&lt;/sup&gt;</td>
<td>No</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>15-20 mg/kg/day divided every 12 hours; then dosage and interval adjusted to trough levels</td>
<td>N/A</td>
<td>15 mg/kg/dose every eight hours; then dosage and interval adjusted to trough levels</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<sup>*Dosages are for patients with normal renal function. Higher dosages may be desired for patients with more severe infections.*
<sup>1Dosage is every eight hours for patients with pneumonia or complicated skin infections and every 12 hours for patients with uncomplicated skin infections.
<sup>2Dosage is every 24 hours for patients with uncomplicated skin infections.
<sup>CrCl: creatinine clearance; TMP-SMX: trimethoprim-sulfamethoxazole.

Source: References 24, 29.
Severe MRSA infections show signs of falling.

There has been a 12% decrease in reported cases of MRSA bloodstream infections over the six years of the mandatory surveillance scheme (HPA) to March 2007.
SSTI in Athletes

Prevention

1) Cover all draining wounds with clean, dry bandages
2) Clean hands regularly and always immediately after contact
3) Maintain good general hygiene
4) Don’t share potentially contaminated items
5) Launder clothing after each use and allow to dry thoroughly
SSTI in Athletes

Prevention

6) Do not participate in activities where you have skin to skin contact with other persons until wound is healed

7) Clean equipment and surfaces with an OTC detergent/disinfectant that specifies *staphylococcus aureus* on the label and is suitable for the surface being cleaned

   ▶ 1:100 solution of diluted bleach (1 tablespoon bleach in 1 quart water)
Take Care Of Your Skin: TIPS FOR ATHLETES

Keep it clean! Washing hands and showering with soap and water protect against skin infections.

Stay healthy. To avoid skin infections:

- Wash your hands frequently.
- Shower after playing sports; use a clean towel.
- Keep cuts and scratches clean and covered with a bandage.

Tell your coach or athletic trainer if you think you have a skin infection.

CDC.gov
SSTI in Athletes

- NFHS Universal Hygiene Protocol
  - Shower immediately after all competition/practice
  - Wash all clothing after each practice
  - Wash personal gear (kneepads, etc) periodically
  - Don’t share towels or personal hygiene products
  - Refrain from cosmetic shaving
Return to Play

- With mild to moderate SSTI
  - RTP 72h after initiation of therapy
  - No new lesions for 48h

Wound has to be covered

If leakage occurs, athlete should be removed

SSTI in Athletes

► Physician Release for Athlete (Wrestler) to Participate with Skin Lesion
  
  Date of exam
  Diagnosis
  Location and Number of Lesions (ALL)
  Medications Used
  Date Treatment Started
  Earliest Date Athlete May Return
SSTI in Athletes

► Release Form

Go To:
► www.khsaa.org
► Click on Wrestling
► Then click General Information
► Find and click on Skin Condition Form (4/07)
SSTI in Athletes
The athletic community is becoming more aware of ca-MRSA infections.

Outbreaks can be prevented with basic hygiene measures.

Keep open lines of communication with healthcare personnel.