



SCHA 2009 Annual Meeting
Saturday, March 7, 2009 @ 11:00 am

CA-MRSA

in Student Health and Sports

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2009 SCHA Annual Conference Objectives

At the conclusion of this presentation, attendees should be able to:

- Briefly describe the history and epidemiology of CA-MRSA infections in the US.
- Describe the signs and symptoms of a MRSA infection.
- List groups at increased risk for CA-MRSA infections.
- Given the prevalence of CA-MRSA, describe a clinical approach to soft tissue infections, including initial choices of antibiotics.

Hey, this looks familiar somehow . . .

- This talk is an update (and not that much of an update, really) of a talk given at SCHA in 2007
- It is OK to leave now if you want to . . . I won't be offended



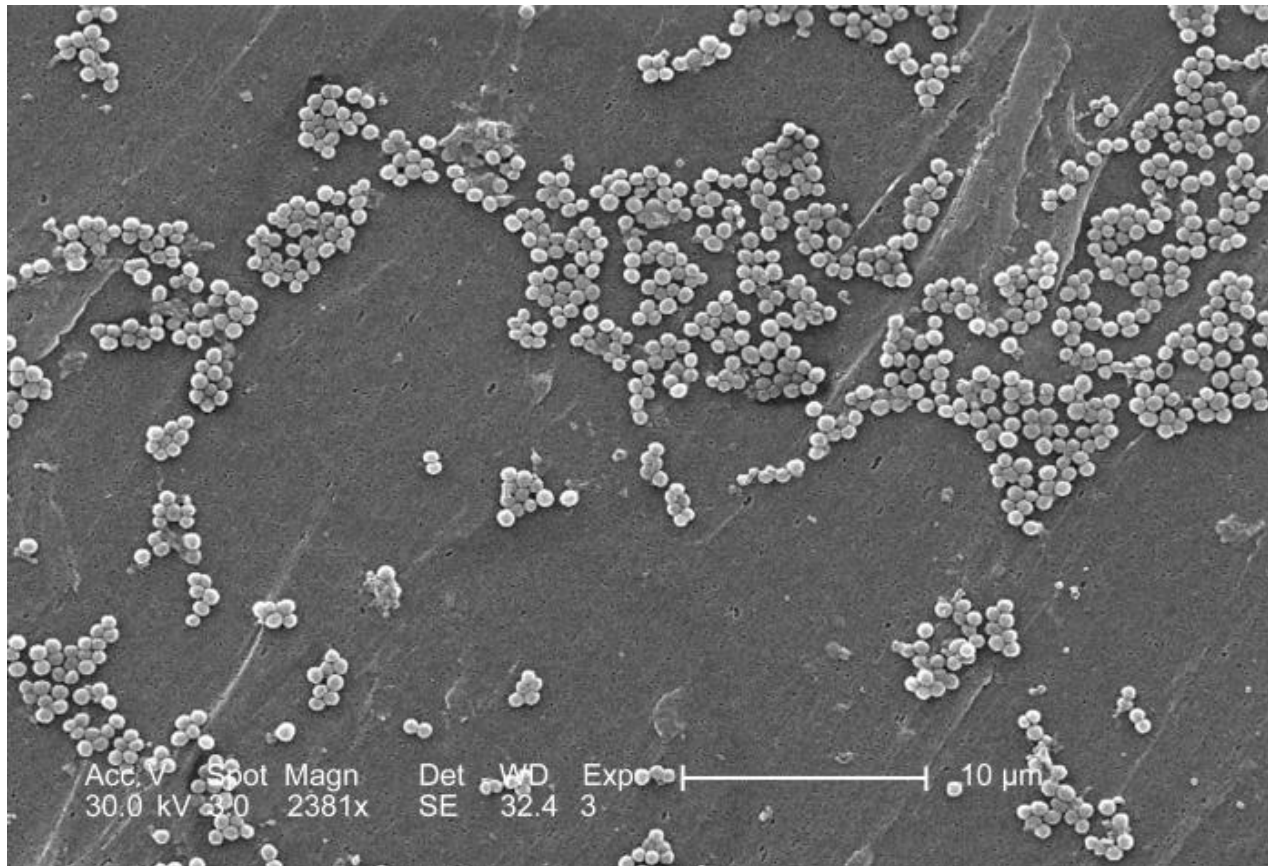


A walk through your handout

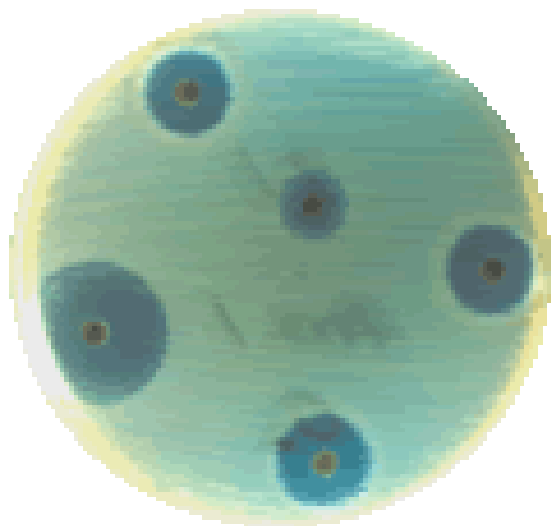
- Presentation screen shots
- Emory University Student Health Services MRSA handout / website health topic
- CDC MRSA patient handout
- 2007 CDC treatment algorithm for treatment of out-patients with suspected CA-MRSA skin and soft tissue infections (SSTIs)
- Links to 2008 MRSA Resource Kit for Healthcare Professionals

MRSA

(Methicillin Resistant Staph Aureus)



A little MRSA history/epidemiology



Determining MICs via a
Petri dish

- Methicillin was introduced in 1959.
- Outbreaks of methicillin-resistant Staph aureus (MRSA) infections were reported in the early 1960s.
- Methicillin resistance in *S. aureus* is defined as an **Oxacillin** minimum inhibitory concentration (MIC) of 4 $\mu\text{g}/\text{mL}$.
- Isolates resistant to oxacillin or methicillin are also resistant to all beta-lactam antibiotics, including cephalosporins.

Enright, MC, Robinson, DA, Randle, G, et al. Proc Natl Acad Sci USA 2002.



MRSA history/epidemiology (2)

- A single clone of MRSA accounted for most of the isolates recovered during the 1960s. By 2002, five major MRSA clones had emerged worldwide.
- MRSA was at first primarily a healthcare-associated (nosocomial) infection. Since the early 1990s, it is now an increasingly prevalent community-associated pathogen.
- Community-associated (CA-MRSA) isolates usually have different molecular and antimicrobial susceptibility characteristics than healthcare-associated (HA) MRSA.
- Approximately 1% of the population is colonized with MRSA (nasal, skin).

-Enright, MC, Robinson, DA, Randle, G, et al. Proc Natl Acad Sci USA 2002.

-NEJM 352:1436 and 1445 (2005)

MRSA is all over the media



“A Menace in the Locker Room” 2005



“The Bug Drugs Can't Cure” Feb 2007

CA-MRSA prevalence

- A prospective prevalence study examined adult patients with skin and soft tissue infection that presented to one of 11 university-affiliated emergency departments in the US in August 2004.
- Staph aureus was isolated from 320 of 422 (76 percent) patients.
- The prevalence of MRSA was 59 percent of the overall staph aureus isolates.
- 97 percent were a single MRSA strain (USA300).



Groups at risk for CA-MRSA infections

- The 5 C's: Crowding, frequent skin Contact, Compromised skin, sharing Contaminated personal care items, lack of Cleanliness
- Competitive athletes
- Prison inmates
- Military personnel
- Men having sex with men
- Co-morbidities/reduced immunity
- Prior skin infection
- Previous antibiotic use
- Illicit drug use (incl. methamphetamine)
- Tattoo recipients



Grundmann, H et al, Lancet 2006
2008 State of California CA-MRSA MSM Information Sheet

Specific Athlete Risk Factors

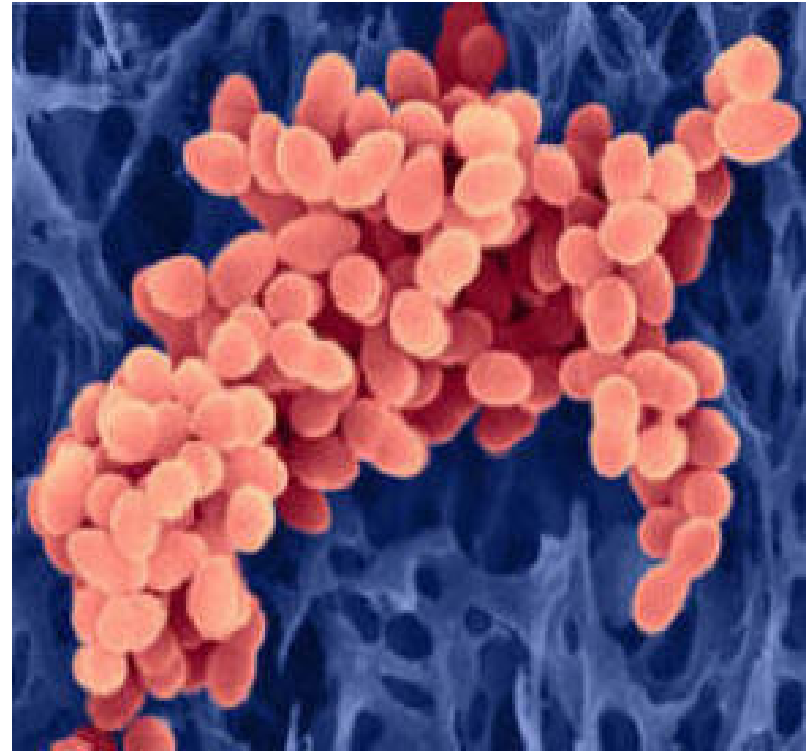


- Skin trauma (e.g., artificial "turf burns", lacerations or abrasions)
- Lineman or linebacker position in football
- A higher body mass index
- Cosmetic body shaving
- Physical contact with a person who has a draining lesion or is a carrier of MRSA
- Sharing equipment that is not cleaned or laundered between users

MMWR 2003: 52

MRSA Examples in Sports

- **University of Rochester Football 2004:** 19 MRSA cases in lineman, DBs and RBs. Artificial turf for practice and games
- **NFL:** St. Louis Rams spread 4 cases of DNA-fingerprint proven MRSA to San Francisco 49ers during a game in 2004



MRSA under electron microscopy

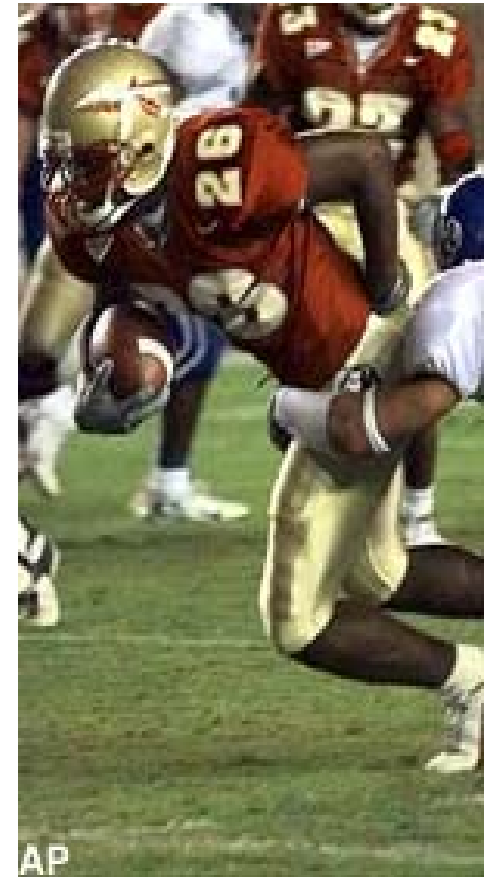
MRSA at Emory Varsity Athletics: 2005-06 and after

- MRSA in 2 Emory varsity volleyball players and 2 coaches in Fall 2005, one hospitalization
- MRSA in 2 varsity swimmers in Fall 2005
- Scattered cases in other sports
- All female
- Many cases since, both male and female



A brief digression: Past (and Current) Examples of Other Infections in Sports

- 90 of 97 members of the Holy Cross football team developed acute Hepatitis A during a 15 day period in the Fall of 1969.
(Morse, JAMA 1972)
- Outbreak of herpes gladiatorum in 60 of 175 high school wrestlers attending a summer training camp in Minneapolis
(Belongia et al, NEJM 1991)
- Transmission of Norovirus during an Florida State v. Duke football game (11 players), RNA sequencing identical
(Becker et al, NEJM 2000)
- All high school wrestling in Minnesota halted after 25 cases of herpes gladiatorum occur in 10 schools
(Atlanta Journal Constitution, January 31, 2007)



Presentation of a MRSA infection

- Patients infected with CA-MRSA most commonly present with skin or soft tissue infections
- Often mistaken for **bug or spider bite**, because bump enlarges, becomes firm, tender and often forms a pimple/pustule very quickly.
- May also develop necrotizing pneumonia, necrotizing fasciitis, septic arthritis, rapidly fatal septicemia, endocarditis, or osteomyelitis.



MRSA abscess in the thumb/index web space

Spider bite-like MRSA progresses



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MRSA progresses quickly from a “bite” to a painful abscess



CDC says: Get a culture

- “Clinicians are encouraged to collect specimens for culture and antimicrobial susceptibility test from all patients with abscesses or purulent skin lesions, particularly those with severe local infections, systemic signs of infection or a history suggesting a cluster or outbreak of infections among epidemiologically linked individuals.”

CDC Convened Experts Panel 2006

MRSA cellulitis/abscess



Multiply pointing MRSA abscess



Photo Credit: Gregory Moran, M.D.

http://www.cdc.gov/mrsa/mrsa_initiative/skin_infection/mrsa_photo_010.html

MRSA abscess



Photo Credit: Gregory Moran, M.D.

http://www.cdc.gov/mrsa/mrsa_initiative/skin_infection/mrsa_photo_006.html

MRSA cellulitis/abscess





CDC says: Incision and Drainage is routine care

- If you can drain something, do it.
- Furuncles, other abscesses, septic joints
- If unsure, try to aspirate pus/fluid with an adequate sized needle (16 to 19G needle on a 10 cc syringe)
- If indicated, apply local heat and see patient back (soon)

CDC MRSA Treatment Algorithm 9/07

MRSA abscess post I&D



MRSA spontaneous (or patient) drainage



I'd still culture this anyway



CDC says: Empiric Antibiotics . . . maybe

- “No reliable criteria (other than a history of MRSA infection) have been identified for predicting MRSA in an individual patient presenting with a SSTI (skin or soft tissue infection).”
- If using empiric antibiotics, use local susceptibility data to guide treatment
- At Emory, we use Cephalexin (covers Group A strept and non-MRSA staph) and TMP-SMX DS together until we have a culture result.

CDC MRSA Treatment Algorithm 9/07

Oral Antibiotics effective against MRSA



- Trimethoprim-sulfamethoxazole (TMP-SMX DS) 1-2 tabs po q 8-12h – but not effective against Group A Strept
- Tetracyclines (doxycycline, minocycline 100 mg po BID)
- Clindamycin 300-450 po mg QID
- Rifampin (only in combination with other antibiotics; rapid resistance when used alone) 300mg po BID
- Linezolid (Zyvox) – not gonna tell you the dose . . .

A plea: Don't jump to Linezolid (Zyvox)

- FDA-approved for treatment of complicated skin infections and hospital acquired pneumonia due to MRSA in adults
- Although rare, MRSA resistant to linezolid had been reported
- Associated with dose- and duration-dependent reversible myelosuppression, peripheral and optic neuropathy and lactic acidosis
- CDC recommends getting an ID consult before using



CDC MRSA Treatment Algorithm 9/07



Intravenous antibiotics for MRSA

- Vancomycin is usually the drug of choice
- Some ERs in Atlanta will I&D, stat dose with vancomycin and send home on oral antibiotics (often clindamycin)
- Vancomycin-intermediate (VISA) and vancomycin-resistant (VRSA) strains have been reported Japan in the 1990s, France in 2000 and in the USA since 2002



MMWR 1997, 46:813



Antibiotics not recommended for MRSA infections

- Beta-lactams and cephalosporins (of course)
- Flouroquinolones (ciprofloxacin, levofloxacin, etc.): rapid development of resistance while on therapy
- Rifampin alone
- Macrolides (erythromycin, azithromycin, clarithromycin): resistance is common among MRSA isolates

CDC Convened Experts Panel 2006



MRSA colonization

- Approximately 1% of the population is colonized with MRSA (nasal).
- 20-30% of nasal carriers will also be colonized on areas of intact skin (perineum, hands, umbilicus in infants, less frequently axilla)
- Gastrointestinal colonization by MRSA may be more common than appreciated
- In one study, subsequent MRSA infection occurred in 29% of 209 adults colonized with MRSA during hospitalization, with one-half occurring after discharge from the hospital (30-60% in other studies)
- 3-5% of healthcare workers are nasal carriers of MRSA in facilities where MRSA is a problem.
- While there is evidence to support decolonization in non-MRSA Staph aureus carriers, to date there is no data to support use of agents to eliminate MRSA nasal (or intestinal) colonization.

*Reagan, DR, Doebbeling, BN, Pfaller, MA et al, Ann Int Med 1991
Huang, SS, Platt, R, Clin Infect Dis 2003
CDC Convened Experts Panel 2006*



Should you decolonize?

- Many people do . . . Efficacy not established
- Mupirocin (Bactroban) 0.5 g in each nostril BID for 5 days
- Some combine with Rifampin 300mg po BID for 5 days
- Bathing MRSA carriers with chlorhexidine gluconate-containing soap (Hibiclens) during the course of mupirocin decolonization therapy has been recommended, but efficacy is not established

Watanakunakorn, C et al. Amer Jnl Infect Control 1995

MRSA decolonization of a cohort

- Some teams with unchecked MRSA infections have resorted to culturing the anterior nares of all players and coaches
- Never hurts to seek the advice of your Public Health department or an ID consult



MRSA on your team

- **Meet with team: “See the trainer or team physician immediately for skin lesions/ infections. Do not try to drain an infection yourself!”**
- **Shower with Hibiclens (entire team) – NO EVIDENCE OF EFFICACY TO DATE**
- **Cover wounds**
- **Clean hands (alcohol-based cleaners in the locker rooms)**
- **Do not share razors, towels, personal items**
- **I&D, treat with antibiotics (oral, IV)**
- **No return to play/practice until fully resolved (no purulence, drainage, significant erythema)**



Why can't I have a quote?

**“You gotta think MRSA
or you’ll miss MRSA”**
(Huey 2009)





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http://www.cdc.gov/mrsa/mrsa_initiative/skin_infection/PDF/provider/MRSA_HCPKitLetterF.pdf

http://www.cdph.ca.gov/HealthInfo/discond/Documents/MRSA_MSM_Consumer.pdf



Thank you!
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