



COMMUNITY-ASSOCIATED METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* SKIN INFECTIONS IN ATHLETES—2003

BACKGROUND

During 2003, ACDC received reports of skin or soft tissue infections (SSTI) with methicillin-resistant *Staphylococcus aureus* (MRSA) among participants of competitive sports team in Los Angeles County (LAC). Two outbreaks of MRSA SSTIs were investigated by ACDC involving players on: 1) a university football team, and 2) a soccer team from a different university. Objectives of the investigations were to describe the outbreaks, determine risk factors for disease acquisition, and implement preventive measures.

Outbreak 1: Football Team A

In August 2003, ACDC was notified that four players on football Team A were hospitalized for SSTIs with positive wound cultures for MRSA. A year prior, this team had three different players hospitalized for SSTIs—two were due to MRSA. Recognizing the potential for additional infections among these players, we initiated a public health investigation.

METHODS

A case was defined as a player on Team A with an SSTI, either culture-confirmed as MRSA or clinically diagnosed, occurring during the outbreak period August 5 to September 5, 2003. Cases were found by reviewing the trainer's treatment log, receiving reports of SSTIs from players and trainers as well as reports of hospitalized players from clinicians. Student health service was queried to determine if these infections were prevalent on campus. MRSA isolates were characterized by pulsed-field gel electrophoresis (PFGE). An unmatched case-control study was conducted to determine potential risk factors for infection. A carrier was defined as an asymptomatic teammate with a positive nasal culture for MRSA during the same period. Controls were randomly selected from asymptomatic, non-carrier teammates. A nasal carriage study was conducted to determine the nasal carriage rate of MRSA, and a carrier-control study to determine risk factors for MRSA nasal carriage. In addition, ACDC inspected the facilities with an Environmental Health specialist and recommended infection control measures.

RESULTS

A total of 11 players (seven culture-confirmed) were identified that met the case definition yielding an attack rate of 10% (11 out of 107 players on the team). All were diagnosed with SSTIs during or within two weeks of training camp (August 5–18, 2003). All were healthy males without any underlying chronic illnesses. Boils were the predominant presenting sign of infection. Two players had their initial lesions diagnosed as "insect bites." The upper extremities (forearm and elbows) were the sites most commonly infected. Nine required surgical incision and drainage, and four were hospitalized. All infections resolved after appropriate treatment were given. Infections were identified by PFGE to be due to a community-associated strain of MRSA prevalent in LAC (USA 300). Linemen appeared to be at highest risk for infections. Ultimately, 10 case-patients and 32 controls were enrolled into the case-control study. Case-patients were found to have 15 times the odds of sharing bars of soap with teammates and statistically significant higher odds (undefined) of having pre-existing cuts or abrasions than controls. Nasal cultures showed that the MRSA nasal carriage rate on this team was 8% (8 out of 99 players cultured). A total of 4 carriers were enrolled into the carrier-control study. Carriers were found to have had 45 times the odds of having a locker adjacent to or across from a case-patient than controls.

The site inspection occurred on September 3, 2003 during which time we observed many potential causes of infection: 1) wound care was delayed on the practice field, 2) towels were shared among players, 3) players were sleeping in the locker room, 4) whirlpool tubs were not properly maintained, and



5) laundry procedures might have been inadequate. Recommendations were made to address those issues. Several infection control measures were implemented by the team including increasing the frequency of cleaning of the facilities and equipment, educating players on proper hygiene, and initiating daily hexachlorophene showers (on August 25, 2003). No new SSTIs were reported for four weeks after the discontinuation of hexachlorophene showers on September 19, 2003. During October 20 to November 9, 2003, four new players were diagnosed with MRSA SSTIs. ACDC conducted another site visit—this time to observe a game held on November 22, 2003. During the game we noted that the student trainers were re-using towels between treating players and that players were sharing towels among themselves. Subsequently, the team switched to single-use towels and re-emphasized proper hygiene practices. No new infections were reported for the remainder of the season.

Outbreak 2: Soccer Team B

In September 2003, ACDC was notified of two players on a university soccer team admitted to the hospital for treatment of SSTIs. One had been culture-confirmed as MRSA. Based on ACDC's experiences with MRSA outbreaks in athletic teams, we were invited by a staff physician to conduct an investigation and make recommendations for disease control and prevention.

METHODS

Active surveillance was instituted for suspicious skin lesions throughout the season. Players with infections were reported to ACDC by a staff physician. MRSA isolates were characterized using PFGE. A cohort study was conducted by interviewing team members on September 29, 2003 using a standardized questionnaire developed from the outbreak on football team A (described above). Nasal cultures were taken from the entire team on that date to ascertain the point prevalence of nasal carriage of MRSA. A site visit was conducted to assess infection control standards and recommendations were made to improve infection control to decrease the risk of transmission of MRSA.

RESULTS

ACDC received reports from the team of seven players diagnosed with SSTIs during September–November, 2003. The overall attack rate was 25% (7 out of 28 on the team). The lesions of all the cases were erythematous and had induration about the size of a quarter with a central pustule. Six had abrasions within 1–2 cm from site of infection. However, no infections were at known skin trauma sites. The majority (86%) of infections occurred in juniors or seniors, whereas they account for 46% of the players on the team. Forwards had the highest position-specific attack rate (40%), followed by midfielders (36%). PFGE characterization of three available MRSA isolates from players with infections identified the predominant community-associated MRSA strain in LAC (USA 300).

All team members (n=28) were interviewed. All reported having shared bars of soap with teammates in the locker room, 86% having shared the whirlpool tubs with teammates, and 31% having shared the tubs with uncovered cuts or abrasions. The majority (79%) reported having cuts or abrasions and most (66%) had wounds not usually covered until >2 hours post-injury. However, the cohort study yielded no statistically significant associations. The nasal carriage rate of MRSA on the team was 4% (1 out of 28 players cultured). This nasal carrier subsequently developed an SSTI. ACDC inspected the locker room on September, 29 2003 during which we noted that players were sharing towels and only one bar of soap was available for use in the shower room. ACDC recommended to install liquid soap dispensers, provide more towels provided, and prohibit the sharing of towels and other personal items. No other SSTIs were reported to ACDC after November 2003.

DISCUSSION

Both of these outbreaks were caused by a community-associated strain of MRSA—the same strain responsible for other outbreaks in LAC, including in the County Jail, amongst men who have sex with men, and in hospital newborns. Lapses in proper hygiene practices such as delayed wound care or the



sharing of personal items might have contributed to disease transmission. In the football outbreak, use of a liquid antibacterial soap and increased health education might have prevented new infections. These investigations were limited by the small number of cases. Plus, not all case-patients were cultured and not all MRSA isolates were available for PFGE analysis. Access to players for interviews was also difficult. As such, under-reporting of infections might have occurred.

As the prevalence of community-associated MRSA increases in the public, other similar outbreaks might occur. Athletes at all levels, high-school to professional, appear to be at increased risk for MRSA SSTIs because of close conditions in the locker room, shared personal items, and shared equipment. Health care providers are encouraged to consider MRSA in the differential diagnosis of SSTIs in this population. Infections with these community-associated MRSA strains might mimic common lesions such as pimples, pustules, or "insect bites." Particular attention should be noted should clusters of these SSTIs occur signaling a potential outbreak. In LAC, these clusters should be reported to ACDC. Additional information about community-associated MRSA can be found online at www.lapublichealth.org/acd/MRSA.htm.