Superbug increasing among HIV positive people

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Bacteria are a common source of problems, causing a variety of infections, particularly in the skin when cuts, punctures and wounds occur. Although many antibiotics are available to treat skin infections, reports of one type of bacteria—*S. aureus*—resistant to the antibiotic methicillin have been increasing over the past two decades. When *S. aureus* becomes resistant to this antibiotic it is called MRSA—methicillin-resistant *Staphylococcus aureus*.

MRSA infections are troublesome because the bacteria are usually resistant to several antibiotics. Outbreaks of MRSA infections have occurred in the community among several populations, including the following:

- homeless people
- prisoners (or those who were recently in prison)
- injection drug users
- players of contact sports
- military trainees
- men who have sex with men

The five C’s

What all of these populations have in common, and what puts them at risk for MRSA, are the following, commonly called the “five C’s”:

- **crowding**
- frequent skin contact
- compromised skin because of openings such as cuts, scrapes or wounds
- sharing contaminated personal items (such as towels, razors)
- lack of cleanliness

An additional risk factor for MRSA infection is likely HIV/AIDS, partly because HIV infection weakens the immune system. Still, not every person with HIV/AIDS (PHA) gets MRSA infections. So, researchers with the United States Naval Medical Center in San Diego conducted a large study of PHAs to try to find additional risk factors for MRSA infections.

Their findings suggest that the following may play a role in the rise of MRSA infections among some PHAs:

- exposure to a certain group of antibiotics
- past diagnosis of syphilis
- engaging in unprotected sex

**Study details**

The study team reviewed medical records of PHAs between 1993 and 2005, focusing on PHAs who were still alive at the time the review was done. They found 435 PHAs. Here is their average profile:

- 8% female, 92% male
- age - 41 years
length of HIV infection – 9 years
68% were taking HAART at the time of MRSA diagnosis
CD4+ cell count – 552 cells

Key findings
A total of 31 PHAs (7%) were diagnosed with MRSA infections. Here is some information about the location of those infections:

- 90% of infections occurred in skin or in soft tissue; other infections occurred in the eye and ear.
- Parts of the body such as the urinary tract, lungs or tissues deep inside the body were not affected by MRSA.
- Commonly infected parts of the body were the buttocks and scrotum.
- Other infected body parts included the arms, fingers, trunk, legs and feet.

Most PHAs could be treated on an outpatient basis, but 17% needed to be hospitalized for an average of five days.

Some patients were initially given the antibiotic mupirocin in the form of a nasal ointment to help clear these bacteria from a common reservoir—inside the nose. Some patients were given a body soap containing the disinfectant hexachlorophene. Both of these measures helped to greatly reduce the presence of MRSA before therapy with oral antibiotics began.

Choosing antibiotics
Initially, samples of MRSA grown or cultured from these patients were, for the most part, inhibited by the following antibiotics or combination of antibiotics:

- clindamycin
- erythromycin
- minocycline
- minocycline + Bactrim/Septra
- minocycline + Cipro (ciprofloxacin)
- minocycline + rifampin
- linezolid (Zyvoxam, Zyvox)
- vancomycin (Vanocin)

Treatment
While most PHAs received the antibiotics listed above, about 34% were initially treated with penicillin or an analogue of penicillin such as ceftriaxone (Rocephin). Such antibiotics are called beta-lactams.

Relapse
In about 21% of cases, MRSA recurred several times within nine months of the initial diagnosis and treatment. One PHA required up to four weeks of hospitalization for repeated surgery to drain his abscesses. Although his initial treatment with minocycline seemed to work, recurrences became resistant to this drug. A more expensive antibiotic, linezolid (Zyvoxam, Zyvox), had to be used.

The risk of MRSA recurrence was greatest among PHAs who were not initially offered decontamination with mupirocin nasal ointment or hexachlorophene body soap. Moreover, HIV positive people had double the risk of MRSA recurrence than did HIV negative people at the same San Diego clinic.

Risk factors
In comparing the HIV positive patients with and without MRSA, researchers found a number of factors associated with an increased risk for this infection, as follows:

- having had what the research team considered a high viral load—between 16,000 and 1 million copies—before
starting anti-HIV therapy
- previous use of beta-lactam antibiotics (such as penicillin or ceftriaxone or their analogues)
- previous diagnosis of syphilis

**Link to syphilis**

On arriving at these risk factors, an issue faced by the study team was this: Why might syphilis be a risk factor for MRSA in this population? One possibility is that penicillin and ceftriaxone are common treatments for syphilis. Studies have found that, in general, repeated exposure to beta-lactam antibiotics increases the risk of developing MRSA.

However, most cases of syphilis occurred more than a year before MRSA developed. So the researchers did not suspect that exposure to beta-lactams that long ago was a contributing factor to MRSA. Also, the presence of other sexually transmitted infections, such chlamydia or gonorrhea, was not linked to the development of MRSA.

Rather, the diagnosis of syphilis could have been a marker for unprotected sex. This behaviour may have also led to some PHAs acquiring MRSA. In the setting of a bathhouse or sex club, people may have shared towels, used hot tubs or sat in a sauna. All of these activities could have facilitated contact with someone who had MRSA, as has been found in another study. Moreover, other studies have found that regular use of a condom during sex helps reduce the risk of acquiring MRSA. However, because the U.S. military prohibits same-sex behaviour, the study team felt that it could not inquire about details on the sex life of participants.

**Substance use**

The issue of substance use was also not explored in this study, as the PHAs were military personnel and researchers assumed that no substance use took place because such behaviour is prohibited. Sharing syringes and injecting skin that has not been disinfected can increase the risk of developing skin infections. Also, many street drugs can weaken the immune system. Previous studies have found that substance use increases the risk for MRSA. So, exploring this aspect of the lives of PHAs with MRSA might have been useful.

**Now in Canada**

Although this report has focused on research done in the U.S., reports of MRSA in HIV negative people and people at high risk for HIV infection appear to be increasing in Canada. A recent Canadian study of MRSA in 32 hospitals over a period of 10 years suggests that these bacteria are increasingly common. Also, Canadian strains of MRSA appear to have developed resistance to an antibiotic commonly used against MRSA—mupirocin. These mupirocin-resistant bacteria could be treated with antibiotics such as tetracycline or Bactrim/Septra.

The Public Health Agency of Canada (PHAC) is developing a plan to reduce outbreaks of super bugs in Canadian hospitals. This plan should be ready by January 2008. Exactly which superbug PHAC will target is not clear, but MRSA is certainly a candidate. Other virulent bacteria include *C. difficile*, which has caused many deaths, particularly in Quebec.

**Tips**

The U.S. Centers for Disease Control and Prevention (CDC) has suggested that relatively simple activities can help reduce the risk of getting MRSA, including the following:

- engaging in regular hand washing and bathing
- keeping cuts and scrapes clean and covered with bandages
- not touching other people's cuts or bandages
- not sharing personal items such as towels and razors

—Sean R. Hosein

**REFERENCES:**


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