VIRGINIA
EPIDEMIOLOGY BULLETIN

C.M.G. Buttery, M.D., M.P.H., Commissioner
Grayson B. Miller, Jr., M.D., Epidemiologist

Editor: Carl W. Armstrong, M.D., F.A.C.P.

October, 1990 Volume 90, Number 10

GUIDELINES FOR THE CONTROL OF M.R.S.A. IN NURSING HOMES*

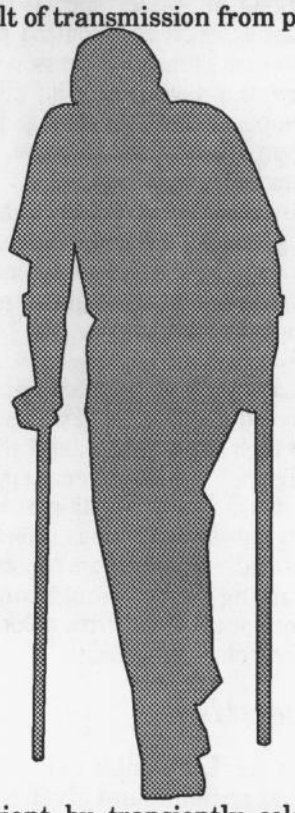
Methicillin-resistant *Staphylococus aureus* (MRSA), like all *S. aureus*, is a gram positive coccus that tends to grow in clusters. In contrast to methicillin-sensitive *S. aureus* (MSSA), MRSA is resistant to all beta-lactam antibiotics, including semisynthetic penicillinase-resistant penicillins such as methicillin, oxacillin and nafcillin, and cephalosporins such as cephazolin. MRSA is also usually resistant to other classes of antibiotics such as aminoglycosides.

Some strains of MRSA may also carry resistance to some antiseptics. This resistance is probably of little practical significance, since it does not appear to alter the efficacy at antiseptic concentrations used for handwashing.

Epidemiology

S. aureus, including the methicillin-resistant strains, is commonly found colonizing healthy individuals. It may be carried on the skin, in the anterior nasal cavity or in the intertriginous folds without any adverse effect on the individual. From 70-90% of adults may be transiently colonized with *S. aureus*, and up to 20% of individuals may be colonized for longer periods. From 50-70% of health care workers, including nurses, nurses aides and technicians may be colonized with this organism. Although colonization is common, infections are infrequent.

Transmission of *S. aureus* has been linked only on rare occasions to long-term carriers and is more likely a result of transmission from patient



to patient by transiently colonized staff, at least in hospital outbreaks. Fomites (objects such as linen or gowns) have not been implicated as vectors in transmission of MRSA, and only rarely in the transmission of MSSA.

Pathogenicity

S. aureus is capable of producing a variety of infections including abscesses, pneumonias, cellulitis, wound infections and sepsis. Risk factors for infection include admission to a tertiary care center, admission to a burn unit or intensive care unit, open wounds and indwelling intravenous catheters. Additional groups of patients who are at highest risk for staphylococcal infection are patients with prolonged hospitalization, who are immunosuppressed, who have received multiple antibiotics or those over the age of 65.

Although MRSA may not differ in pathogenicity from other sensitive *S. aureus* strains, infection with MRSA requires more complicated and expensive treatment. The treatment of choice for MRSA infection is vancomycin, which must be administered by intravenous infusion. Treatment with vancomycin has been very effective, but is expensive and may cause nephrotoxicity or ototoxicity, especially in elderly and debilitated patients.

Colonization

Asymptomatic colonized individuals do not usually require topical or systemic antimicrobial "treatment," which is often ineffective, in an attempt to eliminate or suppress carriage. Possible exceptions include immunosuppressed patients, personnel epidemiologically identified as sources of infection or individuals who are at high risk of transmitting

In This Issue...

the organism because of behavior characteristics such as a mental retardation or confusion.

If resources permit, newly admitted patients may be screened to identify colonized patients in a hospital where the organism has not become established. The colonized patient in this setting represents a potential reservoir and may expose individuals at highest risk for severe infection. Isolation of a colonized patient under these circumstances is reasonable. Discharge of this individual as soon as possible is an additional measure which may reduce risk of exposure and eliminate a potential reservoir.

Admission of a patient colonized with MRSA to a nursing home represents a somewhat different circumstance than a colonized patient in the hospital. Nursing home patients are generally healthier and although they are usually over age 65, have fewer risk factors for infection with MRSA. It would be impractical to isolate all colonized nursing home patients.

Studies suggest that many nursing home patients are already colonized. A study by Macoluso and others in 1988 reported that 9% of residents were colonized in one skilled nursing facility. In a Chicago community hospital study, 53% of S. aureus isolates from infected or colonized patients admitted from a nursing home were MRSA, compared with 13% of isolates from patients admitted from the community. Sixty percent of nursing home patients admitted to a northern Virginia hospital in 1989 had *S. aureus* isolated and 53% of those isolates were MRSA, compared with *S. aureus* isolation in 15% of community patients, 14% of which were MRSA. Although not every nursing home has patients colonized with MRSA, these studies suggest that nursing homes may provide an additional reservoir for the organism.

Patient Transfer

There is no reason why a MRSA-colonized patient should not be admitted to a nursing home, and colonization of a nursing home resident is not an indication for hospitalization. The determination of whether a nursing home resident has a MRSA *infection* should be made by a physician, who can also determine the need for hospitalization.

Some important considerations in transferring colonized patients from hospital to nursing home include the following:

- The nursing home should be contacted in a timely manner to permit arrangement for acceptance of a colonized patient. Finding a roommate who is either colonized or not at risk for infection with MRSA may require in-house transfer, which may not be possible on an immediate basis. It should also be clearly stated that the patient is colonized but not infected or has had an infection appropriately treated, since a positive culture report from a hospital, without further explanation, may be confusing and alarming to the nursing home.
- Routine cultures for MRSA or *S. aureus* are not recommended for nursing home patients and staff except in an outbreak situation. Colonization may be transient and a positive culture is generally not meaningful unless epidemiologically linked to infection. As mentioned above, routine "treatment" of colonized individuals is not recommended because it is difficult to eradicate the organism. Under special circumstances, such as colonized patients who are immunosuppressed or otherwise at high risk of infection, attempts to eradicate carriage may be appropriate at the direction of the attending physician.
- Given sufficient resources, the nursing home may consider cohorting known MRSA-colonized individuals. A colonized patient may be roomed with another MRSA-colonized patient, or with an otherwise healthy patient. A colonized patient should not be roomed with a patient at high risk of infection. Patients at high risk include immunosuppressed patients, patients with gastric feeding tubes, intravenous catheters, or wounds. If patients are cohorted, the nursing home should minimize crossover of staff from colonized to non-colonized patients.

Prevention

Since it is impossible to identify all colonized patients and given the evidence to suggest an endemic level of colonization in many nursing homes, it should be assumed that all persons are potential carriers. This is similar to the concept of universal precautions for prevention of HIV transmission.

Thorough handwashing should always be performed after skin to skin contact with a patient (e.g. turning a patient and assistance in dressing), regardless of MRSA status. Handwashing is the single most important procedure for preventing nosocomial infections and transmission of the organism from patient to patient. Handwashing should also be performed between care of different anatomical sites on a patient.

Gloves should be worn for contact with all wounds, invasive sites and mucous membranes, and discarded before contact with another patient, regardless of MRSA status.

Colonization with a resistant staphylococcal organism is not an indication for hospitalization or refusal of admission to a nursing home.

Bibliography

1. Brumfitt W, Hamilton-Miller J. Methicillin-resistant Staphylococcus aureus. N Engl J Med 1989;320:1189-96.

2. Kobayashi H, Tsuzuki M, Hosobuchi K. Brief Report: Bactericidal effects of antiseptics and disinfectants against methicillin-resistant Staphylococcus aureus. Infect Control Hosp Epidemiol 1989;10:562-64.

3. Oklahoma State MRSA Working Group. Recommendations for the transfer of patients colonized with antibiotic resistant bacteria between facilities and the control of methicillin-resistant Staphylococcus aureus in acute and extended care facilities. Oklahoma State Department of Health; May 1990.

4. Kentucky State MRSA Working Group. Guidelines for the control of methicillin-resistant staphylococcus aureus infections. Department for Health Services, Commonwealth of Kentucky, January 1989.

5. Considerations for the control of methicillin-resistant Staphylococcus aureus infections in health care facilities. State of New York Department of Health Memorandum Series 89-97, dated 12/04/89; Public Health Series H-66, NH-56, HRF-56, PH-37.

6. Jordan JZ, Duckworth GS, Williams RJ. Production of "virulence factors" by "epidemic" MRSA in vitro. J Med Microbiol 1989;30:245-52.

7. Horan TC, White JW, et al. Nosocomial infection surveillance 1984. MMWR 1985;35:17ss-29ss.

8. Jarvis WR. Methicillin-resistant staphylococcal infection: control of staff-transmitted infections [Questions and Answers]. JAMA 1988;259.

9. Cookson B, Peters B. Staff carriage of epidemic MRSA. J Clin Microbiol 1989;27:1471-76.

10. Wenzel RP. The emergence of methicillin-resistant Staphylococcus aureus [editorial]. Ann Intern Med 1982;97:440-42.

11. Thomas JC, Bridge J, et al. Transmission and control of methicillin-resistant Staphylococcus aureus in a skilled nursing facility. Infect Control Hosp Epidemiol 1989;10:106-10.

12. Reboli AC, John FJ, et al. Methicillin-resistant Staphylococcus aureus at a veteran's

affairs medical center: importance of carriage of the organism by hospital personnel. Infect Control Hosp Epidemiol 1990;11:291-96.

13. McNeil M, Solomon, SL. The epidemiology of methicillin- resistant Staphylococcus aureus. The Antimicrobic Newsletter July 1985;2:7.

14. Weathers L, Riggs D, et al. Aerosolized vancomycin for the treatment of airway colonization of methicillin-resistant Staphylococcus aureus. The Pediatr J Infect Dis 1990;9:220-21.

15. Budnick LD, Shaefler S, et al. Ciprofloxacin-resistant methicillin-resistant Staphylococcus aureus in New York health care facilities, 1988. Am J Publ Health 1990;80:810-813.

16. Reboli AC, John JC, Levkoff AH. Epidemic methicillin- gentamicin-resistant Staphylococcus aureus in a neonatal intensive care unit. Am J Dis Child 1989;143:34-39.

17. Macoluso CP, Hubble RH. High rate of methicillin resistance of Staphylococcus aureus isolated from hospitalized nursing home patients. Arch Intern Med 1988;148:569-70.

18. Storch GA, Radcliff JL, et al. Methicillin-resistant Staphylococcus aureus in a nursing home. Infect Control 1987;8:24-9.

19. Gupta A, Hancock MJ, et al. Nursing homes in northern Virginia are a reservoir for methicillin-resistant Staphylococcus aureus. Personal Communication, 1989.

20. Murray-Leisure KA, Geib S, et al. Control of epidemic MRSA. Infect Control Hosp Epidemiol 1990;11:343-50.

21. Roccaforte JS, Bittner MJ, et al. Attempts to eradicate MRSA colonization with the use of trimethoprim-sulfamethoxazole, rifampin and bacitracin. Am J Infect Control 1988;16:141-46.

22. Chandrasekar PH, Sluchak JA. Newer agents against methicillin and/or gentamicin-resistant and -susceptible staphylococci. Microbiol 1989;35:333-337.

23. Garner JS, Favero MS. Guidelines for handwashing and hospital environmental control, 1985. MMWR 1988;37(24).

24. Jarvis WR, Thornsberry C, et al. Methicillin-resistant Staphylococcus aureus at children's hospitals in the United States. Pediatr Infect Dis 1985;4:651-55.

** Submitted by Lynne Penberthy, MD, MPH, Assistant State Epidemiologist, VDH*

LYME DISEASE SURVEILLANCE CASE DEFINITION*

A case of Lyme disease is defined, *for epidemiologic purposes*, as:

- A person with erythema migrans; or
- A person with at least one late manifestation and laboratory confirmation of infection.

General definitions:

Erythema migrans (EM): For purposes of surveillance, EM is a skin lesion that typically begins as a red macule or papule and expands over a period of days or weeks to form a large round lesion, often with partial central clearing. A solitary lesion must reach at least 5 cm in size. Secondary lesions may also occur. Annular erythematous lesions occurring within several hours of a tick bite represent hypersensitivity reactions and do not qualify as EM. In most patients, the expanding EM lesion is accompanied by other acute symptoms, particularly fatigue, fever, headache, mild stiff neck, arthralgia, or myalgia. These symptoms are typically intermittent. The diagnosis of

Figure 1. *Ixodes dammini* (~10x)

EM must be made by a physician. Laboratory confirmation is recommended for persons with no known exposure.

Late manifestations: These include any of the following when an alternative explanation is not found.

- *Musculoskeletal system*: Recurrent, brief attacks (weeks or months) of objective joint swelling in one or a few joints sometimes followed by chronic arthritis in one or a few joints. Manifestations not considered as criteria for diagnosis include chronic progressive arthritis not preceded by brief attacks, and chronic symmetrical polyarthritis. Additionally, arthralgia, myalgia, or fibromyalgia syndromes alone are not accepted as criteria for musculoskeletal involvement.
- *Nervous system*: Lymphocytic meningitis, cranial neuritis, particularly facial palsy, radiculoneuropathy or, rarely, encephalomyelitis alone or in combination. Encephalomyelitis must be confirmed by showing antibody production against *B. burgdorferi* in the cerebrospinal fluid (CSF), demonstrated by a higher titer of antibody in CSF than in serum. Headache, fatigue, paresthesia, or mild stiff neck alone are not accepted as criteria for neurologic involvement.
- *Cardiovascular system*: Acute onset, high grade (2nd or 3rd degree) atrioventricular conduction defects that resolve in days to weeks and are sometimes associated with myocarditis. Palpitations, bradycardia, bundle branch block, or myocarditis alone are not accepted as criteria for cardiovascular involvement.

Laboratory confirmation: is established when a laboratory isolates the spirochete from tissue or body fluid, detects diagnostic levels of IgM or IgG antibodies to the spirochete in serum or CSF, or detects a significant change in antibody levels in paired acute and convalescent serum samples. States may determine the criteria for laboratory confirmation and diagnostic levels of antibody. Syphilis and other known causes of biologic false positive serologic test results should be excluded as appropriate when laboratory confirmation has been based on serologic testing alone.

If you have questions, please call 804-786-6261.

** Submitted by Suzanne R. Jenkins, VMD, MPH, Zoonotic Disease Control, VDH, and based on a recommendation developed by the Council of State and Territorial Epidemiologists and the Centers for Disease Control*

STAFF CHANGES IN EPIDEMIOLOGY

Lynne Penberthy, MD, MPH, has finished her two-year assignment by the CDC to the VDH Office of Epidemiology. Dr. Penberthy's enthusiasm, analytical skills and sense of humor will be greatly missed (except when one of us tries to let a notable birthday slide by quietly...). We wish her well at her new job at the U.S. Health Care Financing Administration!

Taking her place is Amy S. Bloom, MD. Dr. Bloom received her B.A. from Smith College and her M.D. from Albany Medical College in 1984. She completed her medical residency at Rochester, NY. Prior to joining CDC as an Epidemic Intelligence Service (EIS) Officer, she practiced medicine in Rochester. Dr. Bloom will be working on investigations and surveillance projects during her two-year assignment to VDH. Please call her with any questions, concerns, or situations that might warrant her investigative attention. She can be reached at (804) 786-6261.

Cases of Selected Notifiable Diseases, Virginia, September 1 through September 30, 1990.

Disease	Total Cases Reported This Month						Total Cases Reported to Date in Virginia		
		Regions							
	State	NW	N	SW	C	E	This Yr	Last Yr	5 Yr Avg
AIDS	39	3	17	7	4	8	460	302	192
Campylobacter	71	19	11	17	14	10	441	547	495
Gonorrhea	1101	-	-	-	-	-	13072	12035	12411
Hepatitis A	46	3	5	15	12	11	231	228	183
Hepatitis B	24	4	4	1	8	7	187	239	322
Hepatitis NANB	2	1	0	0	0	1	33	60	54
Influenza	0	0	0	0	0	0	768	1887	2102
Kawasaki Syndrome	2	0	0	0	1	1	18	18	19
Legionellosis	2	1	0	0	1	0	11	8	11
Lyme Disease	12	3	0	1	0	8	100	35	17
Measles	12	0	0	0	0	12	86	22	55
Meningitis, Aseptic	76	11	20	7	8	30	233	255	194
Meningitis, Bacterial*	11	1	1	4	1	4	109	140	152
Meningococcal Infections	2	1	0	0	1	0	42	51	51
Mumps	7	0	2	0	0	5	97	100	73
Pertussis	2	2	0	0	0	0	17	30	29
Rabies in Animals	20	6	3	1	8	2	153	200	211
Reye Syndrome	0	0	0	0	0	0	1	2	1
Rocky Mountain Spotted Fever	3	0	1	0	1	1	19	13	22
Rubella	0	0	0	0	0	0	1	0	3
Salmonellosis	213	22	43	33	62	53	1020	1106	1190
Shigellosis	23	3	9	6	1	4	125	347	194
Syphilis (Primary & Secondary)	59	2	6	11	26	14	659	431	294
Tuberculosis	37	2	7	4	7	17	283	265	289

Localities Reporting Animal Rabies: Augusta 1 skunk; Brunswick 1 raccoon; Dinwiddie 1 raccoon; Fairfax 1 raccoon; Fauquier 1 cat; Hopewell 2 raccoons; King William 1 cat; Loudoun 1 raccoon; Newport News 1 skunk; Orange 1 fox; Page 1 skunk; Prince George 2 raccoons; Prince William 1 skunk; Russell 1 skunk; Spotsylvania 1 raccoon; Surry 1 raccoon; Sussex 1 raccoon; Warren 1 raccoon.

Occupational Illnesses: Asbestosis 16; Carpal Tunnel Syndrome 40; Coal Workers' Pneumoconiosis 22; Dermatitis 1; Loss of Hearing 12; Poisoning, Toluene 1.

* Other than meningococcal

Published monthly by the
VIRGINIA HEALTH DEPARTMENT
Office of Epidemiology
109 Governor St
Richmond, Virginia 23219