MRSA: The Silent Epidemic

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LEARNING OBJECTIVES

• The learner will be able to discuss the epidemiology of community-acquired vs health-care acquired MRSA
• The learner will be able to explain the precautions necessary to prevent the transmission of MRSA.

MRSA

• Methicillin Resistant Staphylococcus aureus
• Found on the skin of 1-10% of the population
  • Staphylococcus aureus is found on the skin of about 35% of the population
• Common sites of colonization: nares, axilla, inguinal folds
• S. aureus that is resistant to the synthetic penicillins (methicillin, oxacillin, nafcillin, cloxacinil, dicloxacinil and amoxicillin [+] clavulanate and the cephalosporins) is known as MRSA
• First detected in 1961

COLONIZATION VS. INFECTION

• Colonization – a micro-organism is present but has not invaded the tissue, therefore infection is not present.
  – No systemic signs or symptoms
  – Does not require treatment with antibiotics
    • Eg. MRSA – Patients can remain colonized for months to years1,2, yet never have an infection
• Infection
  – Tissue invasion has occurred
  – Needs to be treated
COLONIZATION WITH MRSA – WHO CARES?

• Operative patients who are colonized with S. aureus/MRSA are 2-9 times as likely to develop an SSI
• Infecting organism is usually the same as organism colonizing the patient in the preoperative period.
• In 2005, there were an estimated 478,000 hospitalizations with a diagnosis of S. aureus infection in U.S. hospitals. Of these approximately 278,000 hospitalizations were related to MRSA. This includes people admitted to the hospital for treatment of an infection that was acquired or occurred outside the hospital.

SITES OF MRSA INFECTIONS

• Skin and Soft Tissues
  – Furunculosis
  – Surgical Site Infections
  – Periorbital cellulitis
  – Impetigo
• Lungs
  – Necrotizing Pneumonia
  – Empyema
• Urinary Tract
• Septic Arthritis

COMMUNITY ACQUIRED MRSA

• Acquired by persons who have NOT been recently (within the past year) hospitalized or had a medical procedure (such as dialysis, surgery, catheters) are known as community-acquired MRSA (CA-MRSA) infections
COMMUNITY ACQUIRED MRSA

- Factors that have been associated with the spread of MRSA skin infections include:
  - close skin-to-skin contact,
  - openings in the skin such as cuts or abrasions,
  - contaminated items and surfaces,
  - crowded living conditions,
  - poor hygiene.

COMMUNITY ACQUIRED MRSA

- In 2005, there were an estimated 14 million outpatient (i.e., physician offices, emergency and outpatient departments) healthcare visits for suspected S. aureus skin and soft tissue infections in the United States.
- In 2004, approximately 76% of purulent (i.e., containing pus) skin and soft tissue infections (SSTIs) in adults seen in 11 emergency departments were caused by S. aureus. Of these infections 78% were caused by MRSA and overall MRSA caused 59% of all SSTIs.

Moran GJ et al. NEJM 2006;355:666-74

SIGNS AND SYMPTOMS

- MRSA symptoms in a skin infection may include a red, swollen, and painful area on your skin. There may also be:
  - Drainage of pus or other fluids from the infection site
  - Feverish feeling
  - Skin abscess
  - Warmth around the infection area
- Often mistaken for a spider bite
SOFT TISSUE

MRSA FOLLICULITIS AND FURUNCULOSIS
HOSPITAL ACQUIRED MRSA

- persons who have had frequent or recent contact with hospitals or healthcare facilities (such as nursing homes or dialysis centers) within the previous year, have recently undergone an invasive medical procedure, or are immunocompromised.

HOSPITAL ACQUIRED MRSA

- The proportion of healthcare-associated staphylococcal infections that are due to MRSA has been increasing: 2% of *S. aureus* infections in U.S. intensive-care units were MRSA in 1974, 22% in 1995, and 64% in 2004.
- More recent evaluations have documented a stabilization of this trend, with only 56% of device-associated infections with *S. aureus* reported as MRSA in 2006-2007.

*Klevens RM et al. CID 2006;42:389-91*
*Hidron AI et al. CID 2008;46:1096-1113*

HOSPITAL ACQUIRED MRSA

- The most recent estimates of the incidence of healthcare-associated infections with MRSA show decreases in these infections in the U.S.
  - Incidence of MRSA central line-associated bloodstream infections reported from hundreds of different intensive care units have decreased 50-70% between 2001 and 2007
  - A separate system tracking MRSA bloodstream infections from all types of hospitalized patients demonstrated a 34% decrease in incidence of these infections among hospitalized patients between 2005 and 2008.

*Kallen A, et al. JAMA. 2010*
HOSPITAL ACQUIRED MRSA

POPULATIONS AT RISK
- Elderly
- Immunocompromised
- Health care workers
- Low Socioeconomic groups
- Males
  - Correctional Facilities
  - Athletes
- Day care Centers

TREATMENT
- Incision and drainage constitutes the primary therapy for these purulent skin infections
- Empiric antimicrobial coverage for MRSA may be warranted in addition to incision and drainage based on clinical assessment
  - presence of systemic symptoms,
  - severe local symptoms,
  - immune suppression,
  - extremes of patient age,
  - infections in a difficult to drain area
  - lack of response to incision and drainage alone.
TREATMENT
• Antibiotic treatment, if indicated, should be guided by the susceptibility profile of the organism
• Obtaining specimens for culture and susceptibility testing is useful to guide therapy
  – those with more severe infections
  – those who fail to respond adequately to initial management.
  • May require consultation with an Infectious Disease specialist

PREVENTION
• Standard Precautions
  – Hand Hygiene
  – Gloving
  – Mouth, nose, eye protection
  – Gowning
  – Appropriate device handling of patient care equipment and instruments/devices
  – Appropriate handling of laundry

STANDARD PRECAUTIONS
• Hand Hygiene
  – Perform hand hygiene after touching blood, body fluids, secretions, excretions, and contaminated items, whether or not gloves are worn.
  – Perform hand hygiene immediately after gloves are removed, between patient contacts
  – Perform hand hygiene between tasks and procedures on the same patient to prevent cross-contamination of different body sites.
STANDARD PRECAUTIONS
• Gloving
  – Wear gloves (clean nonsterile gloves are adequate) when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes, nonintact skin, or potentially contaminated intact skin could occur.
  – Remove gloves after contact with a patient and/or the surrounding environment (including medical equipment).

STANDARD PRECAUTIONS
• Mouth, nose, eye protection
  – Use PPE to protect the mucous membranes of the eyes, nose and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions and excretions.
  – Select masks, goggles, face shields, and combinations of each according to the need anticipated by the task performed.

STANDARD PRECAUTIONS
• Gowns
  – Wear a gown, that is appropriate to the task, to protect skin and prevent soiling or contamination of clothing during procedures and patient-care activities when contact with blood, body fluids, secretions, or excretions is anticipated.
STANDARD PRECAUTIONS

• Appropriate device handling of patient care equipment and instruments/devices
  – Ensure that reusable equipment is not used for the care of another patient until it has been appropriately cleaned and reprocessed and that single-use items are properly discarded.
  – Clean and disinfect surfaces that are likely to be contaminated with pathogens, including those that are in close proximity to the patient or high touch items.

STANDARD PRECAUTIONS

• Appropriate handling of laundry
  – Handle, transport, and process used linen to avoid contamination of air, surfaces and persons.

PREVENTION

• Contact Precautions
  – Patient Placement
  – Use of Gloves and Gowns
  – Patient transportation
  – Patient care equipment and instruments or devices
  – Environmental measures
• Discontinuation of Contact Precautions
  – No recommendations can be made
CONTACT PRECAUTIONS

• Patient placement
  – In Patient placement in hospitals and LTCFs, when single-patient rooms are available, assign priority for these rooms to patients with known or suspected MRSA colonization or infection
  – Give highest priority to those patients who have conditions that may facilitate transmission, e.g., uncontained secretions or excretions.
  – Cohort patients with the same MRSA in the same room or patient-care area.

• Gloving
  – Wear gloves whenever touching the patient’s intact skin or surfaces and articles in close proximity to the patient (e.g., medical equipment, bed rails).
  – Don gloves upon entry into the room or cubicle.

• Gowning
  – Don gown upon entry into the room or cubicle.
  – Remove gown and observe hand hygiene before leaving the patient-care environment.
  – After gown removal, ensure that clothing and skin do not contact potentially contaminated environmental surfaces that could result in possible transfer of microorganism to other patients or environmental surfaces.

• Patient transport
  – In acute care hospitals and long-term care and other residential settings, limit transport and movement of patients outside of the room to medically-necessary purposes.
  – When transport or movement in any healthcare setting is necessary, ensure that infected or colonized areas of the patient’s body are contained and covered.
  – Remove and dispose of contaminated PPE and perform hand hygiene prior to transporting patients on Contact Precautions.
  – Don clean PPE to handle the patient at the transport destination.
CONTACT PRECAUTIONS

• Patient-care equipment and instruments/devices
  – Use disposable noncritical patient-care equipment (e.g., blood pressure cuffs) or implement patient-dedicated use of such equipment.
  – If common use of equipment for multiple patients is unavoidable, clean and disinfect such equipment before use on another patient.

CONTACT PRECAUTIONS

• Environmental measures
  – Ensure that rooms of patients on Contact Precautions are prioritized for frequent cleaning and disinfection (e.g., at least daily) with a focus on frequently-touched surfaces (e.g., bed rails, overbed table, bedside commode, lavatory surfaces in patient bathrooms, doorknobs) and equipment in the immediate vicinity of the patient.

Thank you Questions??

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