MRSA Screening: Overrated?

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PGY-2
MRSA Infections Are Costly

- MRSA Infections:
  - 0.8% of all U.S. hospital admissions

- Nosocomial MRSA Infections
  - 2.7 million additional hospital days
  - $9.5 billion
  - 12,000 in-patient deaths

Noskin, *Clin Infect Dis*, 2005
MRSA Generates Attention
MRSA Generates Government Intervention

- Illinois SB2771 - Passed May 25, 2007
- Maryland HB966 - Failed To Pass
Anterior nares are reservoirs for *S. aureus*.

**Why?**
- Mucin provides the ideal surface for *S. aureus*.
- High affinity b/t mucin carbohydrate & staphylococcal protein

*Shuter, Infect Immun, 1996*
How To Screen

- Chromogenic Agar
  - Sensitivity increases with incubation period
  - 95.6% sensitive

- qPCR
  - 96% sensitive

- PCR preferred b/c it's timely
S. aureus Carriers

**Who?**

- ~20% almost always harbour a strain.
- ~60% intermittently harbour a strain, and that strain will change.
- ~20% almost never carry a strain.

Persistent carriage much more common in children.

Eiff, NEJM, 2001
S. aureus Carriers

- Colonization vs Infection
  - Opportunistic organisms that need a breakdown of physical or immunological defenses
- 10-30% incidence of infection after + screen
- Risk factor for infection in certain sub-groups:
  - Dialysis, Cirrhosis, Certain Surgery, ICU, Catheters

Rationale To Screen

- MRSA is **costly** to our system
- Screening is relatively **easy & reliable**
- Infection control protocols are **successful** in preventing transmission of pathogens:
  - Hand hygiene, contact, isolation
- Treating **carriers** is relatively easy
Rationale To **NOT** Screen

- Poor data
- Costs
- Negative consequences
- Resistance
Problems With The Data

- Association for Professionals in Infection Control and Epidemiology (APIC) and Society for Healthcare Epidemiology of America (SHEA)

- American Journal of Infection Control, 2007

- Joint position statement on mandates for use of active surveillance cultures for MRSA and VRE

Weber, AJIC, 2007
Problems With The Data

- Data is from experience with hospital outbreaks.
  - *Little data supporting active surveillance without an outbreak*
- Data is from surveillance in high-risk populations
  - *Can this be extrapolated to all patients?*

Problems With The Data

- Mathematical models to predict success or cost savings:
  - Models require un-validated epidemiological assumptions

- There are no well-designed, high-powered comparator trials which are the "gold standard" of active surveillance culture performance.

Weber, AJC, 2007
“The Experts” Conclude...

- “...do not support a mandate of active surveillance cultures to screen for MRSA, VRE, or other antimicrobial-resistant pathogens.”

Weber, AJIC, 2007
Rationale To **NOT** Screen

- No robust data
- Costs
- Negative consequences
- Resistance
Costs

- Logistical Issues
  - Private rooms

- Costs
  - Isolation gowns, gloves, +/- masks: $30/day*
  - U of Colorado Hospital MRSA PCR: $90
  - Mupirocin: $46

*Karchmer, J Hosp Infect, 2002
Rationale To NOT Screen

- No robust data
- Costs
- Negative consequences
- Resistance
Adverse Consequences

- Systematic review (1989–2008) of all adverse outcomes related to contact precautions (CP).
- 9 articles included in analysis

Morgan, AJIC, 2008
Adverse Consequences

- Adverse outcomes of CP:
  - Less patient-healthcare worker contact
  - More noninfectious adverse events
  - Increased symptoms of depression & anxiety
  - Decreased satisfaction of care
  - Adherence is always an issue
Rationale To **NOT** Screen

- No robust data
- Costs
- Negative consequences
- Resistance
Resistance

- Retrospective case-control study, 1990-1995
- VA in Mountain Home, TN
  - Persistant nosocomial MRSA infections
  - Aim: reduce the population of carriers
- 632 patients with positive screen
- All treated with Mupirocin 1/2 gm BID x 5 days
- Follow-up screen performed at 4 wks

Resistance

80% of all patients

20% of all patients

Resistance


\[ Y = 4.26 + 0.25X \]

\[ r = 0.39 \]

\[ P < 0.001 \]
Is It Time To Stop Searching For MRSA?

- API C and SHEA do not advocate mandatory screening.
- Despite the ease and benign nature of screening, there are consequences, costs, & unclear benefits associated with screening.
- Resistance is a reality in the treatment of asymptomatic carriers.