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Stop the Potential Killer: Prevention of Methicillin-Resistant Staphylococcus Aureus (MRSA)

Brody Wild
Pittsburg State University

Barbara McClaskey
Pittsburg State University

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Brody Wild, Senior BSN Student

Barbara McClaskey, Faculty

Pittsburg State University

Abstract

The risk for hospital-acquired methicillin-resistant staphylococcus aureus (MRSA) infections in the ICU is great considering the length of stay and the invasive procedures most patients go through. MRSA infections may lead to death and contribute greatly to the cost of care. The purpose of this study was to examine the evidence for the best possible means of preventing MRSA. The methodology was a review of the current research. Some of the measures that were found to be beneficial included daily bathing with chlorhexidine, environmental decontamination, MRSA screenings upon admission, isolation precautions for positive patients, eradication therapy, and strict hand hygiene. Conclusions indicate that hospital acquired MRSA infections can be decreased with strict adherence to the correct regimen and continuous, hospital-wide education and awareness.

Purpose

The purpose of this study was to measure whether the implementation of extensive preventative measures in the ICU and hospital wide would lead to a decrease in the amount of hospital acquired MRSA infections in the ICU.

Background Information

- The risk for Hospital acquired MRSA infections in the ICU is great considering the length of stay and the invasive procedures most patients go through
- "(MRSA) alone results in almost half of all deaths caused by antibiotic resistant organisms"(Fukunaga).
- A 2005 study states, "The annual nationwide cost to treat hospitalized patients with methicillin-resistant *Staphylococcus aureus* (MRSA) infections is estimated to be between $3.2 billion to $4.2 billion"(Pfizer Inc. 2005.).

PICOT

Population: Intensive care patients

Intervention: Increase infection control in ICU setting

Comparison: Standard care/ no extensive measures

Outcome: Decreased hospital acquired MRSA infections

Time: Length of stay in the ICU

Methods/Materials

- Time period of research study was from 2001 through 2012, but extensive preventative measuers were not put into place until 2006
- The sample used in this research study was the 6565 admissions to the ICU at Medway Maritime hospital in Gillingham, UK
- MRSA infection obtained 48 hours or less in ICU was considered community acquired
- MRSA infection on the 5th day or later in the ICU was considered hospital acquired
- Daily bathing with chlorhexidine
- Environmental decontamination- Deep cleaning of ICU
- MRSA screenings upon admission- nasal and groin swabs
- Isolation precautions for positive patients
- Eradication therapy- topical and oral antibiotics used together
- Strict hand hygiene

Year	Acquired MRSA	Acquisition rate/ 1000 bed days (95%CI)	Acquired MRSA Bacteraemia		Acquisition rate (95%CI) in each 3-year period
2001	22	11.0 (6.4–15.6)	3	2001–2003	13.3 (10.3–16.3)
2002	29	16.0 (10.2–21.8)	3		
2003	26	13.6 (8.4–18.8)	6		
2004	28	15.8 (10.0–21.6)	11	2004–2006	13.0 (10.1–15.9)
2005	24	12.1 (7.3–16.9)	8		
2006	23	11.6 (5.8–17.4)	7		
2007	15	7.3 (3.6–11.0)	1	2007–2009	5.8 (4.0–7.6)
2008	11	5.2 (2.1–8.3)	1		
2009	12	5.1 (2.2–8.0)	1		
2010	7	4.1 (1.5–6.7)	0	2010–2012	1.6 (0.7–2.5)
2011	4	1.7 (0.1–3.3)	0		
2012	0	0	0		
Total	201	8.1 (7.0–9.2)	41		

Acquired MRSA: the number of patients with no growth of MRSA within 48 h of admission to ICU who subsequently had a positive culture on or after the fifth day in ICU; acquisition rate: the estimated rate of acquisition per thousand bed days and 95% confidence intervals (see 'Methods' section for explanation of calculation); acquired MRSA bacteraemia: the number of patients with no growth of MRSA from any site within 48 hours of admission to ICU in whom MRSA was grown from at least one blood culture taken on or after the fifth day in ICU.
Acquisition rate: 2001–2003 vs. 2004–2006, $p = 0.888$; 2004–2006 vs. 2007–2009, $p < 0.0001$; 2007–2009 vs. 2010–2012, $p < 0.0001$.

	0–5 days		>5 days		0–5 vs. >5 days
	Prevalence (%)	CI	Prevalence (%)	CI	p
2001–2003	7.1	5.4–8.8	20.2	15.6–24.8	<0.001
2004–2006	6.6	5.0–8.2	17.3	12.7–21.9	<0.001
2007–2009	3.2	2.0–4.4	7.1	4.0–10.2	0.005
2010–2012	1.2	0.4–2.0	1.6	0.1–3.1	0.59

0–5 days: 2004–2006 vs. 2007–2009, $p < 0.001$; 2010–2012 vs. 2007–2009, $p = 0.007$.
>5 days: 2004–2006 vs. 2007–2009, $p < 0.001$; 2010–2012 vs. 2007–2009, $p = 0.003$.

Results/Conclusion

- From the year 2006 and on, there was a significant decrease in the number of patients that became infected after the first five days in the ICU.
- This was due to early detection and eradication therapy to positive patients
- Results showed that after extensive measures put into place, most ICU acquired MRSA infections were caused by known positive patients admitted to the ICU
- This shows that after additional measures are taken, hand hygiene seems to be the biggest contributing factor

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