Original Article

MRSA

Prevalence of Methicillin-Resistant Staphylococcus Aureus (MRSA) in Intensive Care Unit of CPEIC, Multan

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ABSTRACT

Objective: We undertook a study to determine the prevalence of MRSA colonization on admission to our intensive care unit (ICU) and the incidence of MRSA colonization in the ICU.

Study Design: Case series study.

Place and Duration of Study: This study was conducted in ICUs in Chaudhry Pervaiz Ellahi Institute of Cardiology, Multan from January 2012, to December 2012.

Materials and Methods: we included 1230 patients in which 766 were CABG and remaining 464 were for some congenital heart disesas .All patients were screened within 24 hours after ICU admission. For the intact skin specimen, a single swab was used to sample 4 different sites (the axilla and groin on both sides). Sternotomywound were sampled also. Pre-moistened swabs were used to collect nasal and skin samples.Swabs were plated on Chapman agar alone.Data were analysed by using spss 11. Descriptive analysis were done along with p value.

Results: There were 1230 admissions to the ICU during the study. MRSA was isolated from 80 (6.8%) of 1,185 admission swabs taken, from 42 (7%) of 596 admission swabs where patients had both admission and discharge swabs taken, and from the discharge swabs of 63 (11.4%) of 554 remaining patients who had negative admission swabs.

Conclusion: This study confirmed that there is a significant rate of acquisition of MRSA in our ICU. It also raised concerns about trauma patients being at increased risk compared with other patients. We are in the process of conducting a cohort study to assess risk factors for the acquisition of MRSA among trauma patients.

Key Word: MRSA, ICU, Anaesthesia.

INTRODUCTION

GLobally Infections with methicillin-resistant staphylococci (MRSA) remain a major concern And incidence of hospital acquired methicillin resistant *Staphylococcusaureus*(MRSA) continues to rise.[1–4]

Methicillin-resistant Staphylococcus aureus (MRSA) was first identified in 1961 and currently accounts for up to 50% of all nosocomial infections in the USA. Strain typing can be useful to monitor spread of infection and response to treatment. MRSA carry a mec-A gene encoding low-affinity bacterial cell wall penicillin-binding proteins with reduced affinity for β-lactam. Some strains produce an enterotoxin leading to toxic shock syndrome.

MRSA is a common cause of nosocomial infection`in burns patients, probably due in part to a combination of the open wounds and relative immunosuppression, and also indiscriminant use of quinolone antibiotics and ciprofloxacin. There is a high incidence of environmental contamination in burns units; close proximity to infected patients and inadequate hand washing by healthcare personnel are other risk factors for spread.

Around one-quarter of Staphylococcus aureus wound swabs in burns patients grow MRSA.

Burn wound colonization may lead to loss of skin grafts and systemic sepsis. Burns patients should be screened and barrier-nursed.

There are several modes of transmission for MRSA, including transient colonisation of hospital staff and contact with heavily contaminated patients. Following Factors contribute to transmission of MRSA

1. prolonged hospital stay
2. use of several broad spectrum antimicrobial agents

National Guidelines for controlling MRSA were published in 1998 & Attempts to control this spread have relied principally on three measures: hand hygiene among healthcare workers, restriction of antibiotics, and the detection and isolation of infected or colonized patients, which is central to most national guidelines

Understanding the extent of the MRSA problem is central to designing effective control measures. We therefore undertook a study to determine the prevalence of MRSA colonization on admission to our intensive care unit (ICU) and the incidence of MRSA colonization in the ICU.

MATERIALS AND METHODS

The study was conducted from January 2012, to December 2012, in ICUs in ChaudhryPervaizEllahi Institute Of Cardiology. We have 2 surgical ICUs one

with 8 beds and other with 11 beds and an isolation. Here we admit the patient for any major cardiac procedures. After operation pt remains in icu for at least 3 days. we included 1230 patients in which 766 were CABG and remaining 464 were for some congenital heart disesas .

Infection-control practice includes hygienic hand disinfection for all persons entering and leaving ICU and after each patient contact. Basins and alcohol-based preparations (chlorhexidinegluconate in isopropyl alcohol, and ethyl alcohol gel) are widely available. The floor, work surfaces, equipment and curtain rail by each bed are cleaned daily.

All patients were screened within 24 hours after ICU admission. For the intact skin specimen, a single swab was used to sample 4 different sites (the axilla and groin on both sides). Sternotomywound were sampled also. Pre-moistened swabs were used to collect nasal and skin samples.

Swabs were plated on Chapman agar alone. 23

We recorded demographic characteristics (age and sex), previous or current hospital stays (including length of stay), history of surgery or antimicrobial therapy, date of hospital admission, date of ICU admission, severity at ICU admission ,presence at ICU admission of breaks in the skin, and history of invasive procedures.

Data were recorded prospectively on a standardized form.

Data were analysed by using spss 11. Descriptive analysis were done along with p value.

RESULTS

There were 1230 admissions to the ICU during the study. The mean age of the study patients was 57 years (range, 12 to 97 years) and 887 were male. The mean length of stay (LOS) in the ICU was 5.3 days (median, 3 days; range, < 2 to 15 days) and the mean LOS in the hospital prior to admission to the ICU was 6 days (median, < 1 day; range, < 1 to 224 days). A total of 1230 of 1,662 patients had an admission swab taken and 596 of 1,662 patients had both admission and discharge swabs.

MRSA was isolated from 80 (6.8%) of 1,185 admission swabs taken, from 42 (7%) of 596 admission swabs where patients had both admission and discharge swabs taken, and from the discharge swabs of 63 (11.4%) of 554 remaining patients who had negative admission swabs.

Table No.1: Comparison regarding age groups, gender, length of ICU stay and type of surgery

Demographic characteristics		Only one swab taken – on admission	Two swabs taken at admission and at discharge	total
Age group,(y)	< 10 yrs	30 (2.43%)	22 (1.78%)	52 (4.22%)
	11-20	13 (1.05%)	30 (2.43%)	43 (3.49%)
	21-30	20 (1.62%)	15 (1.21%)	35 (2.84%)
	31-40	43 (3.49%)	20 (1.62%)	63 (5.12%)
	41-50	25 (2.03%)	30 (2.43%)	55 (4.47%)
	51-60	345 (28.05%)	255 (20.73%)	600 (48.78%)
	>61	100 (8.13%)	72 (5.85%)	172 (13.98%)
Gender	Male	540 (43.9%)	170 (13.82%)	710 (57.72%)
	Female	220 (17.89%)	300 (24.32%)	520 (42.28%)
Length of ICU Stay,(d)	< 1	15 (1.21%)	26 (2.11%)	41(3.33%)
	2-3	321 (26.09%)	419 (34.07%)	740 (60.16%)
	3-4	100 (8.13%)	199 (16.17%)	299 (24.31%)
	5-6	22 (1.78)	88 (7.15%)	110 (8.94%)
	>7	0	55 (4.47%)	55 (4.47%)
Type of surgery	CABG	266 (21.63%)	500 (40.65%)	766 (62.28%)
	Congenital Heart defects	160 (13.01%)	304 (24.72%)	464 (37.72%)

DISCUSSION

Hospital-acquired infections—a fifth of which are caused by meticillin-resistant Staphylococcus aureus (MRSA)—are estimated to cost the UK National Health Service (NHS) £1 billion per year.[7] The incidence of MRSA is especially high within intensive-care units, with one in six patients in English units being colonised, infected, or both.[11] National guidelines for preventing the spread of MRSA recommend contact precautions and isolation of infected or colonised patients in a single room or cohort—ie, grouping them geographically with designated staff, though without the benefit of a physical barrier.[14-17] Although workers on several reports have suggested a benefit from single-room isolation or cohort nursing, in a systematic review no well-designed studies were noted that allowed the role of isolation measures alone to be assessed.[19,24]

In this study, 11.4% of patients admitted to the ICU acquired MRSA. The strongest risk factor was LOS in the ICU, but certain units also had a higher risk, even after adjusting for LOS. Some of the patients (6.8%) were already colonized with MRSA at admission to the ICU, with prior LOS in the hospital being a significant risk factor.

Others have reported similar rates of MRSA colonization at admission to the ICU, but a lower incidence of new colonizations in the ICU. [25,26] Due to differences in methodology and reporting between studies, it is difficult to directly compare results.[22]

However, there were no substantial differences in age, gender, or LOS in the ICU between patients who had both admission and discharge swabs taken and those who had only one swab taken. There were some minor differences in the other studies under which they were admitted, probably because of differences in staff compliance with the swabbing protocol of the study in the different areas of the ICU. Given the similarities between the two groups, it seems reasonable to suppose that those patients swabbed on admission and discharge are representative of patients screened at least once regarding risk of infection in the context of an adjusted analysis of risk factors.[18-20]

Cardiac surgery patients at our institution received vancomycin and rifampin as preoperative prophylaxis because of a high rate of infection of sternal wounds with MRSA. It may be that the overall burden of MRSA was decreased in the cardiothoracic surgery ward by reducing MRSA infections, which may explain why these patients did not have a lower risk of acquisition of MRSA in the ICU. It may also be that this study did not have adequate power to detect a reduced risk for acquisition among cardiothoracic patients in the ICU.

Risk factors associated with MRSA carriage

- Age older than 60 years
- history of hospitalization or
- surgery

CONCLUSION

This study confirmed that there is a significant rate of acquisition of MRSA in our ICU. It also raised concerns about trauma patients being at increased risk compared with other patients. We are in the process of conducting a cohort study to assess risk factors for the acquisition of MRSA among trauma patients.

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