Original Article

Prevalence of MRSA in Rawal Institute of Health Sciences Islamabad & its Antibiotic Susceptibility Pattern

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Author`s Contribution
[1] Conception of study
[1] Experimentation/Study conduction
[1,2] Analysis/Interpretation/Discussion
[1,2,3] Manuscript Writing
[3] Critical Review
[4,5] Facilitation and Material analysis

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Article info.
Received: 28/9/2019
Accepted: 16/12/2019

Cite this Article: *Qazi, H. N., Alam, M., Alam, B.B., Ara, J. & Sultana, N. (2019). Prevalence of MRSA in Rawal Institute of Health Sciences Islamabad & its Antibiotic Susceptibility Pattern. Journal of Rawalpindi Medical College, 23(4), 251-254.*

Conflict of Interest: *Nil*
Funding Source: *Nil*

Access Online:

https://journalrmc.com/index.php/JRMC/article/view/1320

Abstract

Objective: To determine the prevalence of MRSA infection and its antibiotic susceptibility pattern in patients undergoing abdominal and vaginal surgeries.

Material and Method: A retrospective observational study was conducted at Rawal General & Dental Hospital, Islamabad from September 2017 to September 2018 and data of approximately 300 patients were retrieved which included culture and sensitivity reports of wound and vaginal swabs of patients undergoing abdominal and vaginal surgeries to see prevalence of MRSA and antibiotics to which it is susceptible. Obesity was a risk factor and patients with immune-compromised status were not included.

Result: Female patients were most affected by 87%. Of the total cases, patients between ages 21 to 30 years were more frequent. The rate of MRSA was 37.0% in this study. There were 63% of patients who showed methicillin resistance. Linezolid was more effective in MRSA and was sensitive in 81%.

Keywords: MRSA (methicillin resistant staphylococcus aureus), wound infection, culture and sensitivity, antibiotic susceptibility.

Introduction

Methicillin-resistant staphylococcus aureus is a worldwide public health problem, that causes significant morbidity and mortality and elevated health care costs.[1] There were an estimated 94360 invasive MRSA in the United States in 2005, causing 18000 deaths per year. Infections caused by MRSA are associated with longer hospital stay and financial burden on family and society.[2]

The most common cause of hospital-acquired infections is MRSA. Staph aureus is the causative agent of skin and soft tissue infection which causes morbidly and mortality contributing to increased health care cost.[3]

A study was conducted in Uttar Pradesh in which 549 strains of staphylococcus aureus were isolated, 301 were found to be methicillin-resistant.[4] Another study witnessed that more than 80% of MRSA were found to be resistant to penicillin, cotrimoxazole, ciprofloxacin, gentamicin, erythromycin, tetracycline, 60.5% to amikacin and 47.5% to netilmicin. No strains were resistant to vancomycin. 32.0% of MRSA strains were found multidrug-resistant.[5]

Europe has a strong presence of MRSA accounting for 44% of nosocomial infections in the year 2008. Hospital-acquired MRSA has a high prevalence in Australia, North Africa, and the Middle East. This study was aimed at determining the intensity of the spread of MRSA infection in the local settings and to see its sensitivity pattern.

Objective

To determine the prevalence of MRSA infection and its antibiotic susceptibility pattern in patients undergoing abdominal and vaginal surgeries.

Methodology

This retrospective study was conducted at the Obstetrics and Gynaecology Department and the Surgical Department of RIHS, Islamabad

The duration of the study was 1 year from September 2017 to September 2018.

The sample size was calculated by the WHO calculator by following assumptions; a confidence level of 95.5%, and an alpha error of 5% and an anticipated population proportion of 26.6%. The study sample size was 300 cases.

Post-operative wound infection in patients who underwent abdominal and vaginal surgeries e.g. cesarean section, abdominal and vaginal hysterectomies, and laparotomies were included in this study. The cases having hospital stay < 2 days, immuno-compromised and those cases on steroids were excluded.

We collected data of approximately 300 patients in whom wound swabs and vaginal swabs were sent to the laboratory for culture and sensitivity. MRSA strains were identified by standard technique. The antibiotic susceptibility pattern of all the MRSA strains was to determine against the antibiotics; Penicillin, erythromycin, cotrimoxazole, amikacin, chloramphenicol, tigecycline, doxycycline, clindamycin, ciprofloxacin, vancomycin, and linezolid. The postoperative hospital stay was evaluated from a historical record.

Statistical packages for social science were used to analyze data. Frequency and percentages were computed for categorical variables like gender. Mean and the standard deviation was estimated for age, BMI and duration of hospital stay.

Result

There were a total of 300 cases in this study. Females were predominant with 263 (87.7%) proportion. (Table-1)

Most of the study patients 96 (32.0%) were between 21 to 30 years of age. Almost two thirds (58.0%) were in children, adolescents and younger ages up to 30 years. The rest of the study cases were above 30 years of age. (Table-2)

The rate of MRSA was found out to be 111 (37.0%) in this study. (Figure-I)

Of the MRSA cases, 70 (63.0%) patients showed resistance to methicillin. The most sensitive drug was Linezolid (81.0%) which was found highly effective in MRSA in our local settings.

Table 1: Gender distribution in the study (n=300)

Gender	No of Cases	% age
Male	37	12.3%
Female	263	87.7%

Table 2: Age of patients in the study (n=300)

Age Categories	No of Cases	% age
Up to 15 Years	42	14%
16 to 20 Years	36	12%
21 to 30 Years	96	32%
31 to 40 Years	42	14%
41 to 50 Years	36	12%
51 to 60 Years	42	14%
61 or above	6	2%

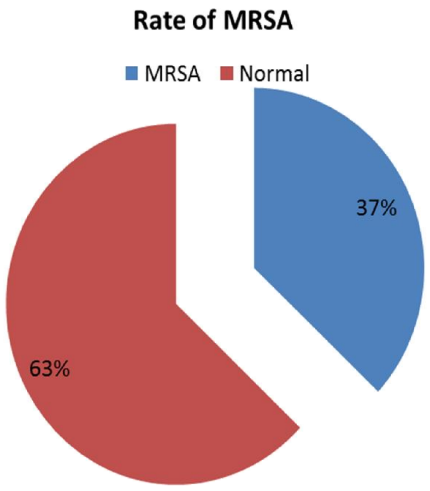

Figure I: Rate of MRSA in the study (n=300)

Discussion

Hospital and community-acquired Staphylococcus aureus infections pose a substantial burden in terms of morbidity, mortality and healthcare costs. More than two-thirds of the current study cases had MRSA who underwent various abdominal and vaginal surgeries. Similar to previous studies from the national and regional settings as well as developed and western countries have also witnessed the spread of MRSA in their hospital settings as well as community settings. An Indian study reported 61% MRSA rate.[4] Similarly, many western countries have witnessed MRSA in up to 44% hospitalized cases.[5] This high rate of MRSA is alarming and a global threat.

The introduction of new antibiotics to counter this pathogen has frequently been closely followed by the emergence of resistant strains. In the current study, there were almost two-third cases with resistant MRSA to most of the antibacterials. A comparative study from…. reported 80% cases with a resistant strain of MRSA to common antibacterials like penicillins, cotrimoxazole, ciprofloxacin, gentamicin, erythromycin, and tetracycline.[5] Most significantly, S. Aureus isolates, resistant to β-lactams have become common, and many of these are also resistant to β-lactamase-resistant penicillins. The rapid spread of methicillin-resistant S. Aureus (MRSA) clones across the world often result in hospital outbreaks, but the implementation of appropriate control measures usually reduces prevalence to sporadic levels. However, the recent emergence of MRSA infections in the community, affecting patients with no established risk factors for MRSA acquisition, is likely to impact significantly on future strategies for control of nosocomial MRSA. In contrast to other antibiotic classes, drugs sensitive to S. Aureus after many years of their clinical introduction had still remained the mainstay of treatment for MRSA infections.

With the various study populations and data gathering methodologies, comparisons between epidemiological reports are difficult to make. However, we were not able to identify firm evidence that there has been a significant decrease in total or healthcare-associated MRSA Infections in our hospital. We conclude from our study that the use of proper antibiotics that are effective against MRSA could have beneficial effects for the individuals and overall healthcare settings. Thus, proper prophylactic treatment should be used in high-risk populations. They can be highly effective in the prevention of wound infections with MRSA and further deterioration of these patients.

Conclusion

MRSA is a common cause of antibiotic resistance in patients with wound infection and longer hospital stays. Although preoperative measures like anaemia correction, proper hygiene maintenance, use of appropriate sterile instruments and meticulous surgical technique play an important part in the prevention of MRSA infection, however, Prophylactic treatment with sensitive antibiotics like linezolid and chloramphenicol in high-risk populations can prevent wound infection and shorten hospital stay.

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