Screening of Vancomycin Resistant Enterococci in Pre-Operative Surgical Patients in our Tertiary Referral Hospital

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Abstract:
Background: Glycopeptide antibiotics are a type of antibiotic that inhibits bacterial cell wall formation by inhibiting peptidoglycan synthesis. They are used for treating multi-resistant Staphylococcus aureus (MRSA) infections and enterococcal infections, which are resistant to beta-lactams and other antibiotics. Screening to detect VRE carriage in preoperative patients in order to prevent further nosocomial spread and subsequent infections of VRE. At present, VRE infections occur most often in hospitalized patients with severe underlying disease who have undergone invasive procedures and received prolonged courses of broad-spectrum antimicrobial therapy. Because therapeutic options are limited, prevention of spread from patients with known cases to other vulnerable patients is essential.

Aim of this study: Was to evaluate local epidemiology of VRE colonization in preoperative patients. So that the carriers are isolated at the earliest and treated, which further adds in prevention & spread of VRE hospital.

Materials & method: Stool sample or rectal swab were screened for all pre-operative patients. Enterococcal isolates were identified processed according to standard protocols and speciation was based on facklam and collins conventional method, and was assessed by phenotypic tests, antibacterial susceptibility pattern by minimum inhibitory concentration (mic) for vancomycin was done by E- strip.

Results: Among 71 Enterococcal isolates, 1(1.4%) was VRE.

Conclusion: Present study reveals 1.4% VRE intestinal colonization and is responsible for VRE dissemination; Rapid identification of pathogen and its resistance to antimicrobial drugs, and subsequent appropriate antimicrobial treatment are essential for better patient outcomes. Infection control measures should be quickly implemented to avoid endemicy.

Keywords: Minimum inhibitory concentration (mic), Methicillin-resistant Staphylococcus aureus (MRSA), Vancomycin-resistant enterococci (VRE).

I. INTRODUCTION

Enterococci are bacteria that are normally present in the human intestines and in the female genital tract, and are often found in the environment, like in soil and water. Enterococci bacteria are constantly finding new ways to avoid the effects of the antibiotics used to treat the infections they cause. Antibiotic resistance occurs when the microorganism no longer respond to the antibiotics designed to kill them and develop resistance to vancomycin.¹ Vancomycin-resistant enterococci (VRE) are important causes of healthcare associated infections. Antibiotic resistance has increased dramatically within the last decade. Recent studies report an increase in VRE outbreaks in wards, hosting immunocompromised patients. The spread of antibiotic resistant strains of bacteria has become a threat within hospitals. Vancomycin-resistant enterococcus (VRE) has emerged as one of these strains, a robust microorganism and can survive for long periods of time on environmental surfaces. VRE spreads quickly from patient to patient through contact with health care workers. This strain can increase the mortality rate in immunocompromised patients. Transmission of vancomycin-resistant enterococci (VRE) can occur through direct contact with colonised or infected patients or through indirect contact via the hands of health-care workers (HCWs), or via contaminated patient care equipment or environmental surfaces.²³ Antibiotic exposure plays an important role in the transmission of VRE.

Until now, the control measures aimed at reducing the incidence of VRE colonization and infection in hospitals have included: education of HCWs with implementation of hand-washing practices and compliance; wide and targeted surveillance cultures; isolation of VRE-positive patients; presumptive isolation of high-risk patients; and restriction of antibiotic use. However, despite these, VRE is still endemic in many hospitals. The causes of this could be non-compliance with infection control interventions, over use of antibiotics, and insensitive microbiological methods for detecting VRE in stool. Future prospective comparative studies of infection control approaches in different epidemiological situations might be useful.¹³

II. MATERIALS AND METHODS

It is a prospective study. All pre-operative cases hospitalized patients in our tertiary care centre Rajarajeswari medical college & hospital where included in the study and screened for VRE in stool or rectal swab. Duration of study is 3months from January to March 2020. Study was conducted after taking approval from ethical committee. VRE screening was performed from stool sample or from rectal swabs collected 48 hours prior to gastroenterology surgeries. Enterococcal isolates were identified processed according to standard protocols and speciation was based on facklam and collins conventional method, and was assessed by phenotypic tests, antibacterial susceptibility pattern by MIC for vancomycin was done by E- strip.⁶
III. RESULTS

Among 71 Enterococcal isolates, 1(1.4%) was VRE which was Enterococcus faecalis. The results of the present study indicate that even in situations of VRE colonization screening supports reduction of further VRE colonisation and infections. The combination of VRE bundle strategies plus screening turned out to be most simple and cost effective method.

IV. DISCUSSION

In the presented study, 1.4% VRE colonization was detected among preoperative to gastroenterology surgery cases. The spread was ended after screening in addition to common infection control bundle strategies. This study evaluated by screening within non-outbreak settings. Here, active screening on high-risk wards was shown to reduce the incidence of VRE bacteraemia and colonization’s. Screening approaches alone can help uncover undetected VRE colonization’s and identify potential patient reservoirs early in order to prevent transmission of VRE within a bundle of infection control strategies, while the application of infection control measures as hand hygiene and contact precautions has more significant effect on terminating VRE transmission. A possible explanation why screening has a direct influence in terminating spread of VRE might be that personnel’s awareness is increased, if patients are monitored and detected. In addition, since VRE cannot only be transmitted via direct or indirect contact but can also be selected due to the use of antibiotic agents, weekly screening serves the possibility of colonization follow up. Standard and extended hygienic measures can be concentrated and expanded for the wellbeing of patients and HCW’s when appropriate VRE colonization dynamics among patients on ward is more apparent. The chain of infection can be broken by improved and consistently applied standard hygienic measures (hand and surface disinfection). Some patients are nonetheless at elevated risk of VRE infection. In specific clinical situations, the optimal protection of these patients against VRE infection demands the obligatory enforcement of stricter hygienic measures (contact isolation). As VRE may cause severe nosocomial infections, transmission must be restricted. Routine measures as advocated by the Centers for Disease Control and Prevention were effective in controlling VRE in our isolated patient. VRE can spread from one person to another through contact with contaminated surfaces or equipment or through person to person spread, often via contaminated hands.

Those most likely to be infected include:

- People who have been previously treated with antibiotics, including vancomycin, for long periods of time
- People who are hospitalized, have undergone surgical procedures, or have medical devices inserted in their bodies (such as catheters)
- People with weakened immune systems, such as patients in intensive care units, or in cancer or transplant wards.

Also now a day there is emergence of Vancomycin resistance, therefore regular screening of enterococcal isolates for Vancomycin resistance detection should be implemented to limit the spread of MDR Enterococci. Since, enterococci can survive in hospital environment due to their intrinsic resistance to several commonly used antibiotics and their ability to acquire resistance to all currently available antibiotics by mutation or through plasmid, it is very important to implement infection control measures, screening of health care workers, surveillance cultures in intensive care units which can control spread of multidrug resistant enterococci.

V. CONCLUSION:

Hospital health care workers have an important role to play in the prevention and control of VRE. Proper, and frequent, hand-washing significantly contribute to preventing and controlling the spread of VRE. Providing health care workers with education and resources is also a key factor. The health belief model helps to explain how to approach and implement changes to practice. Limiting the spread of VRE requires infection control bundle strategies such as antibiotic stewardship, patient isolation, enhanced hand hygiene, surface disinfection, and increased active surveillance VRE screening and isolation can be cost-effective in majority of model simulations at commonly used cost-effectiveness thresholds, and is likely economically attractive in general settings. Our findings strengthen the understanding of VRE prevention strategies and are of importance to hospital program planners and infection prevention and control. Successful control of VRE is based on a combination of core strategies in infection control. These strategies include continued adherence to hand hygiene, appropriate use of personal protective equipment (PPE) and implementation of specific contact-based precautions, for example, increased environmental cleaning.

VI. REFERENCES


