|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
NLM (National Library of Medicine ID: 101738825)
Index Copernicus Value 2022: 79.52
Original research article Volume 6, Issue 05; May: 2022; Page No. 78-80

Isolation and Characterization of Enterococcus Species from Clinical Samples in Tertiary Care Hospital

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Conflict of interest: No conflict of interest.

Abstract

Enterococcus species are significant nosocomial pathogens responsible for a variety of infections, including urinary tract infections (UTIs), bacteremia, and endocarditis. Their increasing resistance to multiple antibiotics poses a major challenge in clinical settings. This study aimed to isolate and characterize Enterococcus species from clinical samples in a tertiary care hospital and determine their antibiotic susceptibility patterns. A total of 150 samples, including urine, blood, pus, and body fluids, were collected and processed using standard microbiological methods. Enterococcus faecalis was the predominant species (60%), followed by Enterococcus faecium (35%) and other species (5%). Antibiotic susceptibility testing revealed a high prevalence of resistance to aminoglycosides and beta-lactams. Vancomycin-resistant Enterococci (VRE) were detected in 12% of the isolates. The findings highlight the necessity for robust infection control measures and judicious use of antibiotics to curb the spread of resistant strains.

Keywords: Enterococcus, antimicrobial resistance, vancomycin-resistant Enterococci, nosocomial infections, tertiary care hospital

Introduction

Enterococcus species are Gram-positive, facultative anaerobic bacteria that form part of the normal flora of the human gastrointestinal tract but have emerged as leading causes of hospital-acquired infections (1). The two most clinically relevant species, Enterococcus faecalis and Enterococcus faecium, are associated with UTIs, bacteremia, wound infections, and endocarditis (2). Due to their intrinsic resistance to many antibiotics and ability to acquire resistance genes, these pathogens pose a serious public health concern (3).

A key concern in enterococcal infections is their resistance to aminoglycosides, beta-lactams, and glycopeptides such as vancomycin. Vancomycin-resistant Enterococcus (VRE) infections are particularly problematic, as treatment options are limited (4). Studies have reported varying prevalence rates of Enterococcus species and their resistance patterns across different regions (5,6). Understanding the local epidemiology is essential for guiding empirical therapy and implementing infection control measures (7).

This study aimed to isolate and characterize Enterococcus species from clinical specimens obtained from a tertiary care hospital, determine their antibiotic susceptibility patterns, and identify the prevalence of multidrug-resistant strains.

Aim

To isolate and characterize Enterococcus species from clinical samples in a tertiary care hospital and assess their antimicrobial susceptibility.

Objectives

1. To determine the prevalence of different Enterococcus species in clinical specimens.
2. To assess the antimicrobial resistance patterns of isolated Enterococcus species.

Materials and Methods This cross-sectional study was conducted in the Microbiology Department of a tertiary care hospital over a period of one year. Clinical samples (urine, blood, pus, and sterile body fluids) were collected from hospitalized patients suspected of enterococcal infections. Sputum and stool samples were excluded to minimize contamination by commensal enterococci. The isolates were identified using standard microbiological techniques, including Gram staining, bile esculin agar, and biochemical tests. Antibiotic susceptibility testing was performed using the Kirby-Bauer disc diffusion method, following CLSI guidelines.

Results

Table 1: Distribution of Enterococcus species across various clinical samples.

Sample Type	Total Isolates	E. faecalis (%)	E. faecium (%)	Another Enterococcus (%)
Urine	70	50 (71.4%)	18 (25.7%)	2 (2.9%)
Blood	40	20 (50%)	18 (45%)	2 (5%)
Pus	30	15 (50%)	12 (40%)	3 (10%)
Body Fluids	10	5 (50%)	5 (50%)	0 (0%)

Table 2: Antibiotic resistance patterns of Enterococcus isolates.

Antibiotic	Resistant Isolates (%)
Ampicillin	80 (53.3%)
Gentamicin	90 (60%)
Vancomycin	18 (12%)
Linezolid	5 (3.3%)

Discussion

The present study identified E. faecalis as the most common Enterococcus species, which aligns with previous studies (8). The high prevalence of antibiotic resistance, particularly to aminoglycosides and beta-lactams, raises concerns regarding treatment options. Vancomycin resistance was observed in 12% of isolates, which is consistent with reported global trends (9).

The high rate of multidrug resistance underscores the need for routine antimicrobial surveillance and infection control strategies. Judicious use of antibiotics, along with stringent hand hygiene and environmental disinfection, can help curb the spread of resistant strains (8, 9). Future research should focus on molecular mechanisms underlying antibiotic resistance and the efficacy of alternative treatment options.

Conclusion

Enterococcus species, particularly E. faecalis and E. faecium, are major contributors to hospital-acquired infections. Their ability to develop resistance to multiple antibiotics poses significant therapeutic challenges. This study highlights the prevalence of multidrug-resistant Enterococcus strains, with notable resistance to aminoglycosides and vancomycin. To combat the rising threat of resistant enterococcal infections, healthcare institutions must implement robust antibiotic stewardship programs and infection control measures.

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