



PATTERNS OF AEROBIC BACTERIAL ISOLATES AND ANTIBIOTIC SUSCEPTIBILITY FROM PUS SAMPLES IN A TEACHING HOSPITAL

Neeraj Raman*

Post Graduate Resident, Department of Microbiology, Jhalawar Medical College. *Corresponding Author

Somya Thakan

Post Graduate Resident, Department of Community Medicine/ PSM, Jhalawar Medical College.

ABSTRACT

The human skin and soft tissue infections (SSTIs) caused by microbial pathogens during or after trauma, burn injuries, and surgical procedures result in the production of pus, a white to yellow fluid comprised of dead WBCs, cellular debris, and necrotic tissues.

KEYWORDS : Pus culture, aerobic isolates, antibiotic susceptibility

INTRODUCTION

The human skin and soft tissue infections (SSTIs) caused by microbial pathogens during or after trauma, burn injuries, and surgical procedures result in the production of pus, a white to yellow fluid comprised of dead WBCs, cellular debris, and necrotic tissues [1–3]. Both aerobic and anaerobic bacteria have been implicated in wound infections which commonly occur under hospital environment and result in significant morbidity, prolonged hospitalization, and huge economic burden [4]. The emergence antibiotic resistance and its rapid spread of among pathogenic bacterial isolates are considered as grave threats to the public health worldwide. During the last few decades, multidrug-resistant Gram-negative bacterial strains such as *Acinetobacter baumannii*, *E. coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and Gram-positive methicillin-resistant *Staphylococcus aureus* (MRSA) were increasingly associated with pus infections under hospital settings due to extensive misprescription and inadequate dose regimen of antibiotics [5–7]. Rapid emergence of multidrug-resistant bacteria poses a serious threat to public health globally due to the limited treatment options and lukewarm discovery of new classes of antibiotics [7]. The objective of this study is to characterize the pyogenic bacteria from pus samples and to determine their antibiotic susceptibilities to various generations of antibiotics commonly used in chemotherapeutic interventions.

METHODOLOGY

A total of 143 pus samples were collected by sterile syringe aspiration (n = 41) and by sterile swabs (n = 102) from inpatients and outpatients of different wards of SRG Hospital, Jhalawar, Rajasthan over a period from October -November 2021 in accordance with standard protocols and ethical guidelines. Pus samples were collected from skin (furuncles, pustules, and abrasions), nasal wounds, ears, legs, internal organs (lungs, kidney, and bladder), and catheters. Pus samples were kept in Cary-Blair transport medium until processed for Gram staining and culturing. The samples were aseptically inoculated on blood agar (with 5% sheep blood) and MacConkey agar plates, incubated aerobically at 35°C–37°C for 24–48 h. Identification and characterization of isolates were performed on the basis of Gram staining, microscopic characteristics, colony characteristic, and biochemical tests using standard microbiological methods. Antibiotic discs were placed on the agar plates and incubated overnight at 37°C for 24 h. The zones of inhibition were measured and the isolates were classified as sensitive, intermediate, and resistant according to CLSI tables and guidelines.

RESULT

Based on Gram staining, morphological features, culture characteristics, and biochemical properties. Of the 143 pus samples collected from different wards of the hospital, 86

samples (60.1%) showed bacterial growth after 24–48 h of incubation whereas 57 samples (39.9%) were negative for growth. Based on Gram staining, morphological features, culture characteristics, and biochemical characterization, the bacterial isolates were assigned to eight bacterial species. *E. coli* was the most frequent pathogen as revealed by 51.2% occurrence followed by *S. aureus* (21%), *K. pneumoniae* (11.6%), *P. aeruginosa* (5.8%), and *Citrobacter* spp. (3.5%) and approximately 2.3% each was represented by *A. baumannii*, *P. mirabilis*, and *Streptococcus* spp.

3.5 5.8 2.3 2.3 2.3 51.2

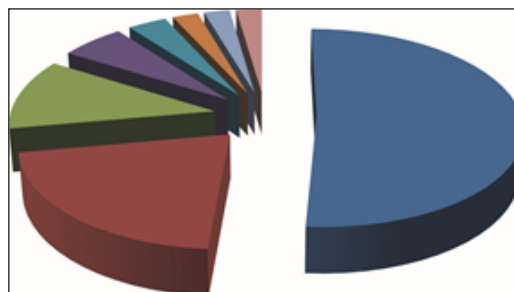


Figure 1: Distribution of bacterial pathogens (%) isolated from pus samples

Ethical consideration and Data analysis

This study was approved by the institutional ethical review board of our medical college. Data was entered using Epidata V 3.1 and further analysed using IBM SPSS 26.0 TRIAL software.

CONCLUSION

In conclusion, pyogenic wound infections were found prevalent in the tertiary care hospital and *E. coli* isolates showed highest incidence followed by *S. aureus*, *P. aeruginosa*, *K. pneumoniae*, *A. baumannii*, *Citrobacter*, *P. mirabilis*, and *Streptococcus* spp. Bacterial isolates exhibited high to moderate levels of resistance against different classes of antibiotics. The susceptibility data from this report may be worth consideration while implementing empiric treatment strategies for pyogenic infections. At the same time, strict health policies should also be implemented to regulate the purchase and prescription and restrict the unsupervised antibiotic use as well as continuous monitoring and reporting antibiotic resistance.

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