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Isolation, Characterisation and Molecular Diagnosis of Staphylococcus from Burn Patients

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Abstract: ***Infection is a common cause of morbidity and mortality in burn patients. Clinical diagnosis of bacteraemia or sepsis in burn patients is difficult for a number of reasons. It could be symptomatic as a result of immune deficiency secondary to thermal injury. A retrospective study was conducted at L.L.R. Hospital Burn unit Associated with G.S.V.M. medical college, Kanpur, Uttar Pradesh. Ten burn patients were investigated for bacterial profile of burn wound infections. Specimens were collected on 3rd and 7th day of burns in form of wound swabs. The organisms were isolated and identified by standard microbiological methods. Antimicrobial susceptibility test was done by Kirby- Bauer disc diffusion method.- Gram negative organisms were found to be more prevalent. The most common isolate was Pseudomonas aeruginosa (P. aeruginosa) -38%, followed by Staphylococcus aureus (S.aureus) -35%, Klebsiella spp. -8%, Acinetobacters spp. -5%, Staphylococcus epidermidis -5%, Proteus spp. -3% and Escherichia coli. Pseudomonas was the commonest cause of infection in fire burn patients in our setting followed by Staphylococcus aureus. About 82% of the isolates showed multiple resistances. In light of our findings, regular antibiotic resistance test has to be done for each patient in order to select an appropriate antimicrobial agent.***

I. INTRODUCTION

The term “burn” means more than burning sensation associated with injury. Burns are characterized by severe skin damage that causes the affected skin cells to die.[1]

A burn is a type of injury to skin, or other tissues, caused by heat, cold, electricity, chemicals, friction or radiation. Most burns are due to heat from hot liquids, solids, or fire.

Burns can be caused by a large variety of external factors. The most common types of burns are:-

A. Thermal burn
B. Electrical burn
C. Radiation burn
D. Chemical burn
E. Friction burn

Burns provide a suitable site for bacterial multiplication and are more persistent rich source of infection than surgical wound. Burn patients are ideal hosts for opportunistic infections [2]. The burn site remains relatively sterile during the first 24 hours, thereafter colonization of the wound by bacteria is common. Pseudomonas aeruginosa has emerged as a predominant member of the burn wound flora and microorganisms routinely isolated from burn wounds include aerobic bacteria like Staphylococcus aureus, Streptococcus pyogenes, E.coli, Klebsiella species, Proteus etc. Anaerobic organisms like Bacteroides fragilis, Peptostreptococcus, Propionibacterium species and Fusobacterium species and fungi like Aspergillus niger, Candida, and Zygomycetes.[3]

After Pseudomonas aeruginosa; Staphylococcus aureus is one of the most frequently isolated pathogens in both community acquired and hospital practices.MRSA stands for Methicillin – resistance Staphylococcus aureus. It is also called by the name “superbug”.[4] It is a gram positive bacterium that is genetically different from other strains of Staphylococcus aureus. MRSA is responsible for several difficult to treat infections in humans.

MRSA is any strain of S.aureus that has developed through horizontal gene transfer and natural selection, multiple drug resistant to β-lactam antibiotics. [5] They are non-spore forming, catalase and coagulase positive, aerobic as well as facultative anaerobic bacteria.

The initial presentation of MRSA is small red bumps that resemble pimples and spider bites and may be accompanied by fever and rashes. MRSA infection can lead to serious blood stream infections, skin infections, pneumonia etc.[6] It is common in hospitals, prisons and nursing homes where people with open wounds, catheters and weakened immune systems are at a greater risk of infection.[7]

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II. MATERIALS AND METHOD

The 10 samples were collected from burn ward of LLR hospital, Kanpur and cultured Saaii College of Medical Science and Technology, Kanpur, Uttar Pradeshon the month of January 2019.

Samples were grown on Nutrient agar, Blood agar, Mannitol Salt Agar (MSA) and Muller Hinton Agar (MHA). On nutrient agar colonies golden yellow pigmented were. On blood agar β- hemolytic colonies observed after that cultures collected were streaked on the autoclaved plate having MSA media and it is left for overnight incubation at 37˚C. After 16 hours, the plate shows the yellow colonies of S. aureus.

Further biochemical identification were done on the basics of Gram staining, Catalase and Coagulase test. Antibiotic Sensitivity Test was also performed on Mueller-Hinton agar at only 4 mm deep.

III. RESULT AND INTERPRETATION

The patient lie in the age group between 30-40 years out of 10 patients 5 were males and 5 were females. The most predominant bacteria isolated was Pseudomonas followed by Staphylococcus. It is worth to note that 80% of the patients were shown coagulase negative, Methicillin and Ampicillin resistant Staphylococcus.

Sample no.	Gentamicin	Methicillin	Streptomycin	Amoxicillin	Ampicillin
Sample- 2	Sensitive	Resistant	Sensitive	Intermediate	Resistant
Sample- 4	Sensitive	Resistant	Intermediate	Resistant	Intermediate
Sample- 10	Intermediate	Resistant	Sensitive	Resistant	Resistant

This studies shown that the despite of significant improvement in the survival of burn patient, infectious complication continue to the major cause of morbidity and mortality. Though control of invasive bacterial burn wound infection, strict isolation techniques and infection control policies have significantly minimized the occurrence of burn wound infection.

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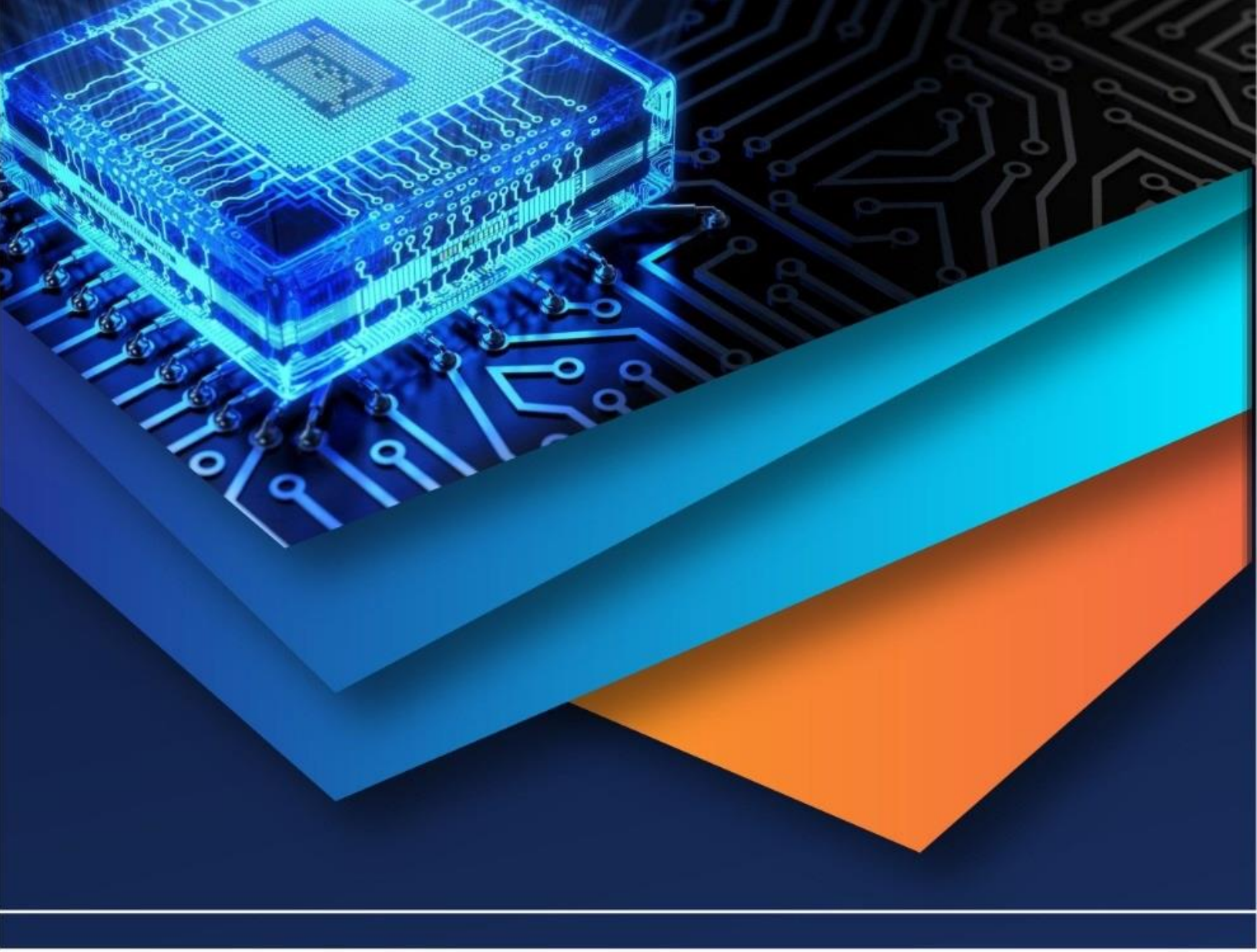

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