WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 12, Issue 5, 1842-1849. Review Article ISSN 2277– 7105

REVIEW PAPER PSEUDOMONAS AERUGINOSA THE SEVERE NOSOCOMIAL INFECTION

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Article Received on
16 February 2023,
Revised on 10 Mar. 2023,
Accepted on 30 Mar. 2023,
DOI: 10.20959/wjpr20235-27688

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ABSTRACT

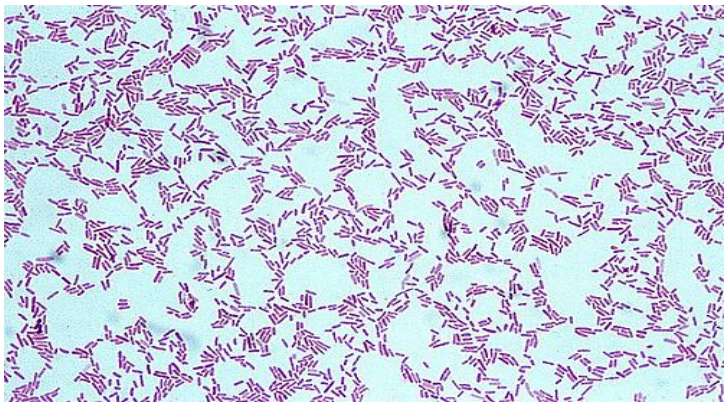
When the therapy is not performed in a hygienic manner, nosocomial infections are easily acquired. When there is a high likelihood that an injury will progress from an acute stage to a chronic stage of nosocimal infection and that the infection will require hospitalisation because they are usually caused by Pseudomonas aeruginosa or staphylococcus aureus infections, the majority of severe nosocomial infections are extremely sensitive to treatment. This is because they are often multi-drug resistant due to the use of stronger classes of medications that have greater activity against the pathogenic strain. Nosocomial infections are challenging to treat because they may include a high concentration of drugs that can confer natural bacterial resistance. The overuse of less-conventional antibiotics without a prescription and incorrect antibiotic prescription regimens are the main causes of resistance.

KEYWORDS: Pseudomonas aeruginosa, antibiotic resistant, nosocomial infection, hospitalized infection.

INTRODUCTION

The opportunistic pathogen Pseudomonas aeruginosa [Pa] is one of the most prevalent ones connected to cystic fibrosis [CF].[1] Pseudomonas aeruginosa is an incredibly adaptable environmental bacterium that has an exceptional ability to infect the lung of people with cystic fibrosis [CF].[2] A member of the Pseudomonadaceae family, Pseudomonas mendocina is a Gram-negative bacillus. In 1992, there was a first case of P. Mendocino-related infection.

P. mendocina is a very uncommon source of infections, although it has been known to result in serious infections that call for aggressive care.[3]



Gram stain of *Pseudomonas aeurgunosa* showing gram negative rod.[30, 31]

Nosocomial Infections

Multiple epidemic several global P. aeruginosa strains have been identified, and they frequently exhibit an antibiotic-resistant phenotype.[4] For treating lung infections brought on by pseudomonas and staphylococcus in cystic fibrosis, the best antibiotic course of treatment remains unknown [CF].[5] CF is a multi-organ, complicated hereditary disease that primarily affects the respiratory system but also affects the pancreas, liver, gastrointestinal tract, and reproductive system. The most common cause of persistent airway infection is Pseudomonas aeruginosa.[6] Expected to extend longevity even further are new, very effective modulator medicines that target the underlying flaw in the cystic fibrosis transmembrane conductance regulator protein. On the other hand, persistent Pseudomonas aeruginosa pulmonary infections continue to endanger the lung health and death rate of CF patients.[7] Most cystic fibrosis [CF] individuals acquire chronic lung infection with P. aeruginosa; by maturity, 80% of patients are infected, and chronic P. aeruginosa infection is the main contributor to increased morbidity and mortality in CF. Chronic infection is preceded by an intermittent stage of infection.[8] The well-known bacterial pathogen P aeruginosa exhibits an unusual cytomorphologic look in this example that could be mistaken for that of other microorganisms, like septate fungus. P aeruginosa mucoid variations have not been previously reported in feline respiratory tract disease, but they are frequently linked to progressive lung or airway disease in individuals with cystic fibrosis.[9] Hospital care is plagued by the problems of nosocomial infections [NI]. The foremost expert in this field is the centres for disease control and prevention [CDC] of the United States. The most generally adopted global standard is the CDC's protocols and guidlines. During the 1970s, a

comprehensive N surveillance system has been set up in the USA. The management of NI which is structured under the British public health services' laboratory service system has a long history in the United Kingdom as well public health laboratory service.[10]

Urinary Tract Infections [Uti]

Each year, millions of people are affected by the serious health issue known as urinary tract infections [UTIs]. The second most frequent kind of infection in the body is urinary tract infection. The most typical factor that predisposes the person to these infections is catheterization of the urinary system. The most frequent cause of nosocomial infections, catheter-associated UTI [CAUTI], accounts for 40% of these infections.[11] The pathogen is an important antibiotic-resistant cause of nosocomial infections. P. aeruginosa damages the epithelium and eludes innate and adaptive immune responses in the lung, which causes disruption of upper and lower airway homeostasis.[12] Across the entire world, Pseudomonas aeruginosa [P. aeruginosa] is one of the most prevalent nosocomial infections. Although the rise of MDR P. aeruginosa is a serious issue in medical practise,[13] One of the most prevalent gram-negative bacteria linked to nosocomial illnesses is Pseudomonas aeruginosa. Since there are few effective antibiotic alternatives, the prevalence of multi-drug resistant Pseudomonas aeruginosa [MDRPA] strains is alarming.[14] One of the main causes of severe nosocomial infections, Pseudomonas aeruginosa mostly affects critically ill and immunocompromised individuals. While underlying disease, source of infection, and severity of acute presentation are key host factors influencing outcome, intestinal colonisation and prior antibiotic use are major risk factors for P. aeruginosa infections. Delayed adequate antimicrobial therapy is also independently associated with increased mortality.[15]

Resistance Get Severe

Antibiotic abuse and overuse have also contributed to the selection of resistant strains for which there are few effective therapeutic choices. Notwithstanding the tremendously significant progress that has been achieved in the biology of P. aeruginosa over the past ten years, the fundamental question of how an environmental bacterium may cause human infections still needs to be clarified.[16] P. aeruginosa infection can cause a significant level of morbidity and mortality in these populations. Due to P. aeruginosa's intrinsic resistance to several antibiotics, infection management is challenging. However, the few remaining therapeutic medicines are becoming increasingly difficult to use as a result of the establishment and spread of resistance to them.[17] Significant morbidity and death are linked

to the multidrug-resistant [MDR] or extensively drug-resistant [XDR] Pseudomonas aeruginosa strains' rising incidence of chronic and hospital-acquired infections.[18] Nosocomial infections [NIs] are infections contracted while being treated in a hospital. A high rate of antibiotic resistance defines them. Pneumonia, urinary tract, surgical site, and bloodstream infections are the most typical NIs.[19] A popular definition of healthcare-associated infections [HAI] is unfavourable outcomes from the delivery of healthcare. A significant problem in the context of the efficient operation of the medical services industry is the reduction of risk resulting from the transmission of harmful microorganisms in the hospital environment.[20] In neonatal intensive care units [NICUs], nosocomial acquisition of infection is now the most prevalent method of infection transmission.[21] Invasive fungal infections are a significant source of morbidity and mortality in the immunocompromised population and in hospitalised patients.[22] All of the pathogens linked with nosocomial infections are primarily bacteria, so several antibiotics, including aminoglycosides, penicillins, cephalosporins, and carbapenems, are used in clinical treatment.[23] The goal of treating P. aeruginosa infections is to prevent them wherever feasible, get cultures, and start antibiotic medication right away. Depending on the clinical situation, combined therapy may also be used.[24]

Treatement

One of the most crucial safeguards for the security of medical care is infection control. The clinical laboratory's microbiology section serves as the first line of defence against nosocomial infection. Our infection control procedures are based on the availability of microbiological data, and our infection control staff is a part of the clinical laboratory.[25] A significant pathogen in nosocomial infections has been identified as Pseudomonas aeruginosa. Nosocomial infections have been linked to the microorganism's prolonged persistence in hospital water systems due to biofilm formation.[26] On the basis of factors like incidence, case fatality rates, chronicity of illness, available options for prevention and treatment, use of healthcare, and societal impact, infections with Pseudomonas aeruginosa have been designated as having the highest priority for surveillance and epidemiological research.[27] ICU patients are most at risk for both endemic and epidemic nosocomial infections among all hospitalised patients. Infection rates are highest in neonatal, burn, surgical, and burn ICUs. The length of an ICU stay is increased by infection, which is a major factor in death in ICUs. Pseudomonas aeruginosa, Enterobacter cloacae, Staphylococcus aureus, enterococci, and Candida spp. are the main pathogens.[28] The infection control

programme relies heavily on the active participation and collaboration of the microbiology laboratory, especially when it comes to surveillance and the utilisation of laboratory services for epidemiologic objectives. Monitoring infection trends, looking for potential infection issues, and evaluating the calibre of hospital care are all done through surveillance. It requires quick and conveniently available high-quality laboratory data.[29] The primary challenge in treating nosocomial infections is the decreasing availability of effective medicines due to the growing drug resistance of the microorganisms that cause them. The majority of serious hospital-acquired infections caused by Pseudomonas aeruginosa bacilli affect individuals in high-risk groups.[30]

CONCLUSION

The current review study is based on the nosocomial infection source and the severity of the infection when a severe pathogenic strain is mixed in. When maintaining cleanliness is not given priority, the pyogeinc condition is most easily associated with a nosocomial infection. Safety is therefore a crucial consideration for the clinical proposal.

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