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Mini Review

Medical Microbiology: *Pseudomonas aeruginosa*

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Abstract

Gram-negative pathogen *Pseudomonas aeruginosa* has emerged as a significant human infection that can be associated with significant morbidity and mortality. Immuno compromised patients or those with chronic, debilitating conditions typically suffer from severe infections. Its ability to adapt to a wide range of environments, virulence factors, and antibiotic resistance increase its significance as a pathogen. *P. aeruginosa* can exhibit multiple acquired or intrinsic resistance mechanisms, frequently exhibiting high rates of resistance to various antimicrobial classes. The so-called "high-risk clones" of *P. aeruginosa* that are multidrug-resistant or extensively drug-resistant have become a public health threat in recent years and require urgent and determined research and management. One of the most prevalent Gram-negative bacteria that causes nosocomial and healthcare-associated infections in hospitalized patients is *P. aeruginosa*. Hand hygiene (with the appropriate use of alcohol-based solutions), contact precautions, patient isolation (single room or cohort), environmental cleanliness, and surveillance should all be implemented in healthcare facilities to prevent the spread of multi resistant *P. aeruginosa*.

Keywords: *P. aeruginosa*, Gram-negative, Pathogen, Healthcare, Environment

INTRODUCTION

Gram-negative pathogen *Pseudomonas aeruginosa* has emerged as a significant human infection that can be associated with significant morbidity and mortality. One of the most common and severe causes of hospital-acquired infections is this microorganism, particularly affecting immunocompromised (particularly neutropenic) patients and ICU patients. The majority of *P. aeruginosa* strains are resistant to the majority of commonly used antibiotics. *P. aeruginosa* infections can be life-threatening and are emerging as a global public health threat due to a variety of adaptation, survival, and antibiotic resistance mechanisms. The purpose of this narrative review is to describe the infectious risk posed by *P. aeruginosa* in healthcare facilities. PubMed.gov and Scopus were searched for published papers on the bacteriology, ecology, reservoir, infection, and prevention and control of *P. aeruginosa* in healthcare.

DISCUSSION

Infections of *Pseudomonas aeruginosa*

Infections caused by *P. aeruginosa* are uncommon in healthy individuals and typically mild. For instance, skin infections acquired in swimming pools are short-lived and self-limiting. Patients with compromised immune systems or those with chronic, debilitating conditions typically suffer from severe infections. In most cases, the outcome of a *P. aeruginosa* infection is determined by the patient's overall health and condition. Its ability to adapt to a wide range of environments, virulence factors, and antibiotic resistance increase its significance as a pathogen. Patients with carbapenem-resistant and extensive -lactam-resistant *P. aeruginosa* infections are more likely to delay receiving the appropriate antibiotic treatment, which can lead to prolonged hospitalization, an increased risk of subsequent infections that are resistant to antibiotics, as well as

morbidity and mortality (de Jonge P et al., 2018) (Park C et al., 2013).

The bacteria have a huge advantage when it comes to infecting susceptible hosts because they can form biofilms. *P. aeruginosa* biofilms found in the lungs of people with CF are one type of biofilm-related infection that is of particular medical concern. *P. aeruginosa* in the airways of CF patients causes chronic infections that typically last for an indefinite amount of time once they are established. 60-80% of adults will eventually contract *P. aeruginosa* on a regular basis. Acquisition of *P. aeruginosa* is a significant contributor to the onset and progression of CF respiratory disease and is linked to increased morbidity and mortality in CF patients. Malignant blood cancers, neutropenia following immunosuppressive therapy, bacteremia pneumonia, and other conditions are also thought to increase the risk. In a similar manner, prolonged venous or urinary catheterization, invasive surgical procedures, severe burns, and wounds permit the microorganism to enter the various tissues and colonize them; Septicaemia can result from this (Sarris J et al., 2014) (Liem A et al., 2017) (Vohra S et al,. 2005)

Pathogens that are responsible for infections that are linked to healthcare, such as *P. aeruginosa*, are frequently present in water sources and devices that are related to water. This could occur as a result of endpoint contamination or microorganisms surviving treatment protocols. It was reported a clonal multidrug-resistant outbreak of *P. aeruginosa* in a tertiary care hospital's interdisciplinary surgical intensive care unit. The authors discovered evidence of a transmission route associated with sink-based working procedures, particularly patient grooming (Grace S et al., 2010) (Templeman K et al., 2011).

CONCLUSION

In accordance with WHO guidelines, healthcare facilities should implement at least the following measures to prevent the spread of multiresistant *P. aeruginosa* Hand hygiene (using alcohol-based solutions appropriately), contact precautions, patient isolation (in a single room or in a group), environmental cleanliness, and surveillance are all important. In order to limit the spread of multiresistant bacteria like *P. aeruginosa*, the European Centers for Disease Control and Prevention (ECDC) recommends enhancing and expanding screening, preventive isolation, and surveillance in healthcare facilities for patients who have been transferred from or have recently been in contact with such facilities. At the time patients are transferred, having documentation regarding multiresistant *P. aeruginosa* infection or carrier status would aid in the swift and efficient implementation of measures to prevent the microorganism's spread (Lake J et al., 2012) (Pengpid S et al., 2018).

In order to account for the increased risk of infection and transmission that is associated with ICU-specific working procedures (such as ventilator support and central-line catheters), Intensive Care Units (ICUs) require specific infection prevention measures, which are distinct from standard care wards. In addition, in order to manage water-related risk in healthcare facilities, WHO guidelines for the prevention of nosocomial infections by water-borne microorganisms state that a Water Safety Plan (WSP) must be implemented. The essential components of this plan include active monitoring of infections, the adoption of sanitization procedures, maintenance and testing of the water supply, and scheduled testing of water taken from the most significant points in the hospital water system. To ensure that the WSP meets health-based goals and works effectively, validation procedures should be established (Stepleman LM et al., 2015).

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CONFLICT OF INTEREST

None

REFERENCES

1. de Jonge P, Wardenaar KJ, Hoenders H, Evans-Lacko S, Kovess-Masfety V, et al (2018). Complementary and alternative medicine contacts by persons with mental disorders in 25 countries: results from the world mental health surveys. Epidemiol Psychiatr Sci. 27: 552-567.
2. Park C (2013). Mind-body CAM interventions: Current status and considerations for integration into clinical health psychology. J Clin Psychol. 69: 45-63.
3. Sarris J, Glick R, Hoenders R, Duffy J, Lake J, et al (2014). Integrative mental healthcare White paper: establishing a new paradigm through research, education, and clinical guidelines. Adv Int Med. 1: 9-16.
4. Liem A, Rahmawati KD (2017). The meaning of complementary, alternative and traditional medicine among the Indonesian psychology community: a pilot study. J Int Med. 15: 288-294.
5. Vohra S, Feldman K, Johnston B, Waters K, Boon H, et al (2005). Integrating complementary and alternative medicine into academic medical centers: experience and perceptions of nine leading centers in North America. BMC Health Serv Res. 5: 78-84.
6. Grace S, Higgs J (2010). Integrative medicine: enhancing quality in primary health care. J Altern Complement Med. 16: 945–950.
7. Templeman K, Robinson A (2011). Integrative medicine models in contemporary primary health care. Complement Ther Med. 19: 84-92.
8. Lake J, Helgason C, Sarris J (2012). Integrative mental health (IMH): paradigm, research, and clinical practice. The Journal of Science and Healing. 8: 50-57.
9. Pengpid S, Peltzer K (2018). Utilization of traditional and complementary medicine in Indonesia: results of a national survey in 2014-15. Complement Ther Clin Pract. 33: 156-163.
10. Stepleman LM, Penwell-Waines L, Valvano A (2015). Integrated care psychologists and their role in patient transition from medical to psychiatric specialty care settings: a conceptual model. Health Psychol Behav Med. 3: 154-168.