

Please read this bit first

The HPCSA and the Med Tech Society have confirmed that this clinical case study, plus your routine review of your EQA reports from Thistle QA, should be documented as a "Journal Club" activity. This means that you must record those attending for CEU purposes. Thistle will **not** issue a certificate to cover these activities, nor send out "correct" answers to the CEU questions at the end of this case study.

The Thistle QA CEU No is: **MT00025**.

Each attendee should claim **THREE** CEU points for completing this Quality Control Journal Club exercise, and retain a copy of the relevant Thistle QA Participation Certificate as proof of registration on a Thistle QA EQA.

Cycle 21 Organism 12:

Pseudomonas aeruginosa

Pseudomonas species are aerobic, non-spore-forming, Gram-negative rods. They possess a strictly respiratory metabolism with oxygen as the terminal electron acceptors. They are motile by means of one or more polar flagella. Clinical isolates are oxidase positive, catalase positive and grow on MacConkey agar, appearing as non-lactose fermenting colonies. Certain species have distinctive colony morphologies or pigmentation¹.

Pseudomonas aeruginosa is the most important human pathogen in the genus *Pseudomonas* with respect to numbers and types of infections and their associated morbidity and mortality. The spectrum of disease caused by this bacterium ranges from colonization, superficial skin infections to fulminant sepsis².

The most prominent superficial infection associated with this bacterium is folliculitis, acquired in swimming pools, water slides, Jacuzzis and contaminated sponges. Superficial infections of the ear canal frequently develop in those involved in aquatic sports. This condition is aptly known as "swimmer's ear". A more severe ear infection is called malignant otitis externa, found in diabetics and the elderly¹.

P. aeruginosa can cause eye infections, especially after trauma, or association with contact lens use³.

S A N A S



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P. aeruginosa is the leading cause of nosocomial respiratory tract infections. Patients on ventilators have a 20-fold-higher likelihood of developing nosocomial pneumonia. In this patient population, mortality is 40 – 50%. *P. aeruginosa* also causes nosocomial urinary tract infections, wound infections, peritonitis in patients on chronic ambulatory peritoneal dialysis. Mucoid phenotypes of *P. aeruginosa* chronically infect approximately 70 – 80% of adolescents and adults with cystic fibrosis. Once infected, these patients rarely, if ever, clear this organism. Bacteraemia and septic shock due to *P. aeruginosa* continue to be a major problem in hospitalized patients with underlying malignancies, cardiopulmonary disease, renal failure, or diabetes. *P. aeruginosa* can also cause bone and joint infections, central nervous system infections, skin and soft tissue infections, endovascular infections, and infections in neutropenic patients^{2, 4}.

Nosocomially acquired *P. aeruginosa* isolates tend to be more resistant to antimicrobial agents than do community acquired strains, frequently displaying resistance to multiple classes of antimicrobials. Development of resistance may develop during antimicrobial therapy, and is particularly well documented during monotherapy. Resistance development in *P. aeruginosa* is multifactorial, with mutation in genes encoding for porins, efflux pumps, penicillin-binding proteins, and chromosomal beta-lactamases, all contributing to resistance to beta-lactam antibiotics, carbapenems, aminoglycosides, and fluoroquinolones^{1, 5}.

References

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Questions

1. What is the difference between the Fluorescent Group of *Pseudomonas* and the Non-fluorescent Group?
2. Name the different infections *P. aeruginosa* may cause?
3. What mechanisms of resistance are found in *P. aeruginosa*?