

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 20 Organism 3

The causative organism was *Acinetobacter* species.

Taxonomy

Currently, the genus *Acinetobacter* comprises at least 23 genomic species (DNA-DNA hybridisation groups; DNA groups), 10 of which have been given species names; other DNA groups are designated by numbers. The numbers 13-15 have been given to sets of strains in two independent studies; DNA group 13 of Bouvet & Jeanjean has been found to correspond to group 14 of Tjernberg & Ursing, whereas no correlation was found for the two other groups. Strains of *A. calcoaceticus*, *A. baumannii*, and the unnamed groups 3 and 13TU are genetically closely related and difficult to separate phenotypically, and are therefore sometimes unified in the so-called *A. calcoaceticus* – *A. baumannii* complex. Apart from the known genomic species, additional strains have been found, some of which are closely related to the *A. baumannii* complex, while the taxonomic status of others has not yet been resolved^{1,2,3}.

General Description

The genus consists of strictly aerobic, Gram-negative coccobacillary rods that are oxidase negative, non-motile, usually nitrate negative, and non-fermentative. Individual cells are 1 to 1.5 by 1.5 to 2.5 in size and frequently arranged in pairs. The organism is sometimes difficult to decolourize and clinical microbiologists should be alert to the fact that



Acinetobacter species may initially appear as Gram-positive cocci in direct smears prepared from positive blood culture bottles⁴. In the stationary growth phase and on non-selective media, coccobacillary forms predominate, while early growth in fluid media yields mostly rods.

Colonies are smooth, opaque, and slightly smaller than those of the members of the family *Enterobacteriaceae*. Most strains grow on MacConkey agar as either colourless or slightly pinkish colonies⁵.

Natural habitat and clinical significance

Acinetobacter species are widely distributed in nature and in the hospital environment. They are able to survive on moist and dry surfaces, and may be present in foodstuffs and on healthy human skin. *Acinetobacter* species are generally considered to be nonpathogenic to health individuals but may cause infections in compromised individuals. The species most commonly isolated from humans is *A. baumannii*, followed by *Acinetobacter lwoffii*, *Acinetobacter haemolyticus* and *Acinetobacter johnsoni*⁶.

The ability of these microorganisms to acquire antimicrobial resistance and ability for survival on most environmental surfaces has led to an increased concern regarding hospital-acquired infections. It has been shown that the digestive tract of intensive care unit patients is an important reservoir for multi-resistant *A. baumannii* infections in hospital outbreaks⁷. Nosocomial infections are most likely to involve the respiratory tract, urinary tract, and wounds, which include catheter sites. These infections may progress to septicemia. Sporadic cases of continuous ambulatory peritoneal dialysis peritonitis, endocarditis, meningitis, osteomyelitis, and arthritis have also been reported. There are an increasing number of reports of *Acinetobacter* species as agents of nosocomial pneumonia, particularly ventilator-associated pneumonia in patients confined to intensive care units⁸.

Risk factors are antibiotic treatment and /or surgery, instrumentation, mechanical ventilation, and length of stay in ICU. *Acinetobacter* species are often colonizers rather than infecting agents⁸.

Antibiotic Susceptibility



Cephalothin is not effective against *Acinetobacter* species. Imipenem, trimthoprim-sulfamethoxazole, piperacillin-tazobactam, amoxicillin-clavulanate, doxycycline, and fluoroquinolones are effective against most strains. It is important that each clinically significant isolate should be tested against the relevant antimicrobial agents. The carbapenems are the most active agents against *Acinetobacter* species. Multi-resistant strains including carbapenem-resistant species have been reported in nosocomial outbreaks⁹.

References

1. Bouvet PJM, Jeanjean, S. 1989. Delineation of new proteolytic genomic species in the genus *Acinetobacter*. *Res Microbiol* **140**: 291-299.
2. Tjernberg I, Ursing J. 1989. Clinical strains of *Acinetobacter* classified by DNA-DNA hybridization. *APMIS* **97**: 595-605.
3. Gerner-Smidt P, Tjernberg I, Ursing J. 1991. Reliability of phenotypic tests for identification of *Acinetobacter* species. *J Clin Microbiol.* **29**: 277-282.
4. Harrington, BJ. 1997. Letter, *Clin Microbiol Newsl.* **19**: 191.
5. Weyent, RS, Moss, R, *et al.* 1996. Identification of Unusual Pathogenic Gram-negative Aerobic and Facultative Anaerobic Bacteria. 2nd ed. The Williams & Williams Co., Baltimore, Md.
6. Houang ET, Chu CM, *et al.* 2001. Epidemiology and infection control implications of *Acinetobacter* spp. In Hong Kong. *J Clin Microbiol.* **39**:228-234.

Questions

1. What problems may one encounter when performing a Gram-stain on a positive blood culture where the isolate is an *Acinetobacter* species?
2. How would you differentiate an *Acinetobacter* species from a *Pseudomonas* species?
3. What infections are caused by *Acinetobacter* species in the hospital setting?

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