

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 1:

Moraxella (Branhamella) catarrhalis

After the past three decades, *Moraxella (Branhamella) catarrhalis* has emerged as an important and common human respiratory tract pathogen. *M. catarrhalis* has an interesting and checkered taxonomic history. After having been initially named *Micrococcus catarrhalis*, the organism's name was changed to *Neisseria catarrhalis*. In 1970 it was transferred to a new genus *Branhamella*. The name *Moraxella (Branhamella) catarrhalis* was subsequently proposed¹.

M. catarrhalis is a Gram-negative diplococcus that is indistinguishable from *Neisseria* by Gram stain. The organism grows well on blood agar, chocolate agar and a variety of other media. Colonies display the "hockey puck sign" by sliding along the surface of the agar when pushed. *M. catarrhalis* are oxidase, catalase and DNase positive².

M. catarrhalis has been recovered exclusively from humans. The prevalence of colonization is dependent on age. The organism causes mucosal infections in children and adults. The pathogenesis of infection appears to involve the contiguous spread of the bacterium from its colonizing site in the respiratory tract to cause clinical signs of infection. Several adhesins have been identified, including outer membrane proteins UspA1 and MID (Hag). OMP CD, highly conserved porin protein, that binds to human mucin. Many strains of *M. catarrhalis* express pili, which play a role in adherence to cells³.

M. catarrhalis is the third most common causative agent of otitis media in children. The bacterium causes lower respiratory tract infections in adults, particularly in the setting of chronic obstructive pulmonary disease (COPD). Studies have indicated that *M. catarrhalis* causes a significant proportion of pneumonia in the elderly. Nosocomial respiratory tract infections caused by *M. catarrhalis* have been observed in respiratory units in health care facilities. Studies that have used sinus aspiration to determine the etiology of sinusitis have shown that *M. catarrhalis* is the third most common cause of sinusitis in adults and children after *Streptococcus pneumoniae*, and non-typeable *Haemophilus influenzae*. Published reports have documented the occurrence of bacteraemia caused by *M. catarrhalis*^{4, 5, 6}.

Most strains of *M. catarrhalis* produce beta-lactamase (BRO-1, BRO-2 and BRO-3). These beta-lactamases hydrolyse penicillin/ampicillin and 1st generation cephalosporins. The bacterium is generally susceptible to amoxicillin/clavulanate, 2nd generation cephalosporins, tetracyclines, macrolides and fluoroquinolones⁷.

References

- Berk SL. From *Micrococcus* to *Moraxella* – The reemergence of *Branhamella catarrhalis*. Arch Int Med. 1990; 150:2254-2257.
- Koneman et al. 1997. Color Atlas and Textbook of Diagnostic Microbiology. 5th Edition. Lippincott Williams & Wilkins.
- Ejlertsen T, et al. *Branhamella catarrhalis* in children and adults: A study of prevalence, time of colonization, and association with upper upper and lower respiratory tract infections. J Infect. 1994; 29:23-31.
- DelBeccaro MA, et al. Bacteriology of acute otitis media: A new perspective. J Pediatr. 1992; 120: 81-84.
- Murphy TF, Sethi S. Bacterial infection in chronic obstructive pulmonary disease. Am Rev Resp Dis. 1992; 146: 1067-1083.
- Meyer Ga, Shope TR. *Moraxella (Branhamella) catarrhalis* bacteraemia in children. Clin Pediatr. 1995; 34: 146-150.
- Turnak MR, et al. Antimicrobial susceptibilities of clinical isolates of *Haemophilus influenzae* and *Moraxella catarrhalis* collected during 1999-2000 from 13 countries. Clin Microbiol Infect. 2001; 7: 671-677.

Questions

How would you isolate and identify *M. catarrhalis*?

How does *M. catarrhalis* initiate a respiratory tract infection?

What type of infections is caused by *M. catarrhalis*?

How would you determine if a *M. catarrhalis* isolate produces beta-lactamase?