

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 23 Organism 6:

Moraxella catarrhalis

Synonyms, Key Words, and Related Terms:

Moraxella catarrhalis, *Neisseria catarrhalis*, *N catarrhalis*, *Micrococcus catarrhalis*, *M catarrhalis*, *Branhamella catarrhalis*, *B catarrhalis*, upper respiratory tract infections, lower respiratory tract infections, otitis media, sinusitis, chronic obstructive pulmonary disease, COPD, pneumonia, *Moraxella catarrhalis* infection, *M catarrhalis* infection

Background:

Moraxella catarrhalis is a gram-negative, aerobic, oxidase-positive diplococcus that was described for the first time in 1896. The organism has also been known as *Micrococcus catarrhalis*, *Neisseria catarrhalis*, and *Branhamella catarrhalis*. For most of the 20th century, *M catarrhalis* was considered a saprophyte of the upper respiratory tract with no significant pathogenic consequences.

Although the commensal status of *M catarrhalis* in the nasopharynx is still accepted, the organism is a common cause of otitis media and sinusitis and an occasional cause of laryngitis. *M catarrhalis* causes bronchitis or pneumonia in children and adults with underlying chronic lung disease and is occasionally a cause of bacteremia or meningitis, especially in patients who are immunocompromised. Bacteremia can be complicated by local infections such as osteomyelitis or septic arthritis. *M catarrhalis* is also associated with nosocomial infections.

Pathophysiology:

Colonization of the upper respiratory tract with *M catarrhalis* ranges in different studies from 28-100% in the first year of life. In adults, a colonization rate of 1-10.4% has been observed. Colonization appears to be an ongoing process with an elimination-colonization turnover of various strains. Transmission is believed to be due to direct contact with contaminated secretions by droplets.

The endotoxin of *M catarrhalis*, a lipopolysaccharide similar to those found in *Neisseria* species, may play a role in the disease process. Some strains of *M catarrhalis* have pili or fimbriae, which may aid adherence to the respiratory epithelium. Some strains produce a protein that confers resistance to complement by interference with formation of the membrane attack complex. *M catarrhalis* also expresses specific proteins for iron uptake that act as receptors for transferrin and lactoferrin.

Humeral responses against *M catarrhalis* appear to be age-dependent, with the titre of immunoglobulin G (IgG) gradually increasing in children. Antibody responses to outer-membrane proteins have been obtained, predominantly in the IgG3 subclass.

Frequency:

In the US, *M catarrhalis* is the third most common cause of otitis media and sinusitis in children (following *Streptococcus pneumoniae* and *Haemophilus influenzae*). *M catarrhalis* is estimated to be responsible for 3-4 million cases of otitis media annually, with an associated direct or indirect health care cost of \$2 billion each year.

Mortality/Morbidity:

The most significant infections caused by *M catarrhalis* are upper respiratory tract infections, including otitis media and sinusitis in children and lower respiratory tract infections in adults. Infections with *M catarrhalis* in adults are more common if underlying conditions are present, especially in elderly persons. In a study of 42 cases of pneumonia with *M catarrhalis* isolated as single agent in sputum cultures, the mortality rate attributable to the underlying problems within 3 months of pneumonia was 45%.

Sex:

In one study involving adult patients, the male-to-female ratio was 1.6:1.

Age:

Infections with *M catarrhalis* may occur at any age. Although colonization is more commonly observed in children, only a small percentage of positive culture findings have clinical significance in the paediatric population. In one study, 9% of positive culture findings from children younger than 5 years and 33% of isolates from children aged 6-10 years were found to be clinically significant. However, all culture results positive for *M catarrhalis* had clinical importance in adults.

CPD Questions:

1. What is your own lab's male: female ratio in isolating *M. catarrhalis*?
 2. Discuss and consider the "attack" mechanisms of *M. catarrhalis*.
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