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CMPT Clinical Bacteriology Program

Innovation, Education, Quality Assessment, Continual Improvement

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Challenge M234-1

February 2024

Throat: no group A, C, or G streptococci, no *Archanobacterium haemolyticum*

HISTORY

A simulated throat sample collected from a 7 year old with a sore throat was sent to category A laboratories.

Participants were expected to report no group A, C, or G beta hemolytic streptococci, no *Archanobacterium haemolyticum.*

CMPT QA/QC/STATISTICS

All simulated throat samples are produced at CMPT according to CMPT internal protocols. The sample contained a mixed culture of *Haemophilus parainfluenzae* and *Streptococcus viridans* group

The samples are assessed for homogeneity and stability using in-house quality control methods and random selection of samples before and during production, and post sample delivery. The number of random samples selected is 15% of the total production batch.

The challenge sample lot was confirmed to be homogeneous and stable for 16 days. Organism identification was confirmed by a reference laboratory.

All challenge components have in-house assigned values based on the most clinically appropriate result; the most clinically appropriate result is determined by expert committee evaluation. No further statistical analysis is performed on the results beyond that described under "Suitability for grading."

SURVEY RESULTS

Reference laboratories: 12/13 (92%) labs reported no group A or no group A, C, G Streptococcus isolated, one lab reported *Streptococcus mitis/oralis.*

Participants: 50/53 (94%) processing laboratories reported no group A *Streptococcus* +/- group C, G +/- *A. haemolyticum* isolated.

Suitability for Grading

A challenge is considered suitable for grading if agreement is reached by 80 percent of selected reference group and at least 50 percent of the participants.

Organism identification was correctly performed by at least 80 percent of reference laboratories and greater than 50 percent of all laboratories and was thus, determined to be suitable for grading.

MAIN EDUCATIONAL POINTS from M234-1

1. Negative reports from throat swab should always be pathogen specific (i.e. No Group A, C or G streptococci or *Arcanobacterium haemolyticum* isolated).
2. *Streptococcus pneumoniae, Streptococcus mitis/oralis* do not cause pharyngitis. Reporting these organisms from throat swabs may be clinically misleading resulting in unnecessary treatment.

Grading

Maximum grade: 4

Reporting the absence o pathogens was graded 4.

COMMENTS ON RESULTS

The performance of this survey was very good with 94% of laboratories reporting a "pathogen-specific" negative report. One laboratory reported *S. pneumoniae* and another reported *Streptococcus mitis/oralis*; these labs were graded 0 because *these organism* are not recognized as a cause of pharyngitis.

Table 1. Identification results

Reported	Total	Grade
no (± beta hemolytic) streptococci, group A,C or G, ± *A. haemolyticum*, isolated	24	4
absence de streptocoques bêta hémolytique des groupes A, C, G	3	4
(± normal) oropharyngeal flora. no beta hemolytic Streptococci - group A, C, G ± or *Arcanobacterium haemolyticum* isolated	2	4
no group A Streptococcus (S. pyogenes) isolated	21	4
Streptococcus mitis/oralis	1	0
Streptococcus pneumoniae	1	0
heavy gram positive bacilli, refer	1	0
Microbiology temporarily deferred to regional lab due to staffing shortage.	1	ungraded
Total	**54**	

The laboratory that reported the Gram stain reaction for a throat swab should review their protocols for processing throat samples.

CLINICAL RELEVANCE

Acute pharyngitis is one of the most common conditions encountered in outpatient settings. It is most commonly caused by respiratory viruses such as adenovirus, rhinovirus, and coronaviruses.

Group A Streptococcus (GAS) is the most common cause of bacterial pharyngitis, but other bacteria such as groups C and G β-hemolytic streptococci, and *Arcanobacterium haemolyticum* can also cause acute pharyngitis.

Other rare causes of acute bacterial pharyngitis include Mycoplasma pneumoniae, *Chlamydia pneumoniae*, *Corynebacterium diphtheriae,* and *Francisella tularensis*. *Neisseria gonorrhoeae* can occasionally cause acute pharyngitis in sexually active persons.

Haemophilus influenzae, *Streptococcus pneumoniae*, *Moraxella catarrhalis*, and *Staphylococcus aureus* may be involved in respiratory infections, but they do not cause pharyngitis. [2] They can often be found in throat cultures, however, reporting these species from throat swabs may be clinically misleading, and result in inappropriate antibiotic treatment. [3]

Sore throats are common and have substantial medical and societal costs. Over treatment of non–group A beta-hemolytic streptococcal (GAS) infections is one of the major causes of inappropriate use of antibiotics. [2]

NORMAL OROPHARYNGEAL FLORA

Normal oropharyngeal flora consists of approximately 500 bacterial species. [4] Viridans group streptococci, *Peptostreptococcus, Veillonella, Lactobacillus, Corynebacterium*, and *Actinomyces* species account for more than 80% of the total cultivable oral flora.[5]

The oropharyngeal flora evolves with age with the oropharynx rapidly becomes colonized following exposure to the maternal birth canal. Anaerobic species such as lactobacilli and Veillonella species are detectable within a few hours. Streptococcal species become established within 2 days of birth and predominate throughout early childhood and puberty.[6 7]

REPORTING

Negative reports from throat swab should always be pathogen specific (i.e. No Group A, C or G streptococci or *Arcanobacterium haemolyticum* isolated).

REFERENCES

1. Leber, Amy L.(ed). 2016. Clinical Microbiology Procedures Handbook, Fourth Edition

2. Weber R. Pharyngitis. *Primary Care: Clinics in Office Practice*. 2014;41(1):91-98.

3. Spellerberg BJ, Brandt C. *Streptococcus*. In: Jorgensen ea, ed. *Manual of clinical microbiology*. Vol 1. 9th ed. ed. Washington, DC.: ASM; 2015:383.

4. Schuster GS. Oral flora and pathogenic organisms. *Infect Dis Clin North Am*. 1999;13(4):757-74, v.

5. Roscoe DL, Chow AW. Normal flora and mucosal immunity of the head and neck. *Infect Dis Clin North Am*. 1988;2(1):1-19.

6. Smith DJ, Anderson JM, King WF, van Houte J, Taubman MA. Oral streptococcal colonization of infants. *Oral Microbiol Immunol*. 1993;8(1):1-4.

7. Lucas VS, Beighton D, Roberts GJ. Composition of the oral streptococcal flora in healthy children. *J Dent*. 2000;28(1):45-50.