

Pharyngotonsillitis due to *Arcanobacterium haemolyticum* in Northern Israel

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Abstract

Background: *Arcanobacterium haemolyticum* is a well-recognized but uncommon cause of pharyngitis and skin rash in adolescents and young adults. To date, no data regarding its frequency in Israel have been published.

Objective: To establish the frequency of *A. haemolyticum* in throat cultures in a northern Israeli population and to estimate the clinical significance of this pathogen in patients with sore throat.

Methods: We examined suspected colonies for *A. haemolyticum* by gram stain, catalase test and reverse CAMP test in 518 throat cultures sent to the microbiologic laboratory of HaEmek Medical Center.

Results: Of the throat cultures tested, *A. haemolyticum* was recovered from one patient (0.2%). In contrast, group A Streptococcus (*Streptococcus pyogenes*) was recovered from 135 patients (26%).

Conclusion: *A. haemolyticum* is an uncommon pathogen implicated in acute pharyngitis, therefore routine screening in throat swabs is not required.

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Arcanobacterium haemolyticum, formerly classified in the genus Corynebacterium, is a member of the defined taxon "coryneform" bacteria. Organisms are gram-positive rods, facultatively anaerobic and catalase negative. *A. haemolyticum* infections are a relatively rare cause of pharyngitis and/or tonsillitis and skin rash in people aged 15–25 years old [1]. This pathogen is responsible for 0.5–3% of cases of pharyngitis, depending on the population studied, with the highest incidence occurring among those 15–18 years old [2]. The diagnosis is often made only after recurrent infections that were initially misdiagnosed as beta-hemolytic streptococcal or viral infection.

When *A. haemolyticum* is involved in infection, it is relatively often part of a polymicrobial infection, together with typical respiratory pathogens such as streptococci [3]. Thus, the isolation of classical pathogens from specimens that also contain *A. haemolyticum* magnifies the tendency to overlook the organism. Less frequent infections caused by *A. haemolyticum* include osteomyelitis [4], cellulitis [5,6], sinusitis [5], endocarditis [7], soft-tissue and wound infections [8], meningitis [4] and septicemia [4,5].

Since there are no data regarding the frequency of this bacterium in Israel, we attempted to estimate the clinical significance of *A. haemolyticum* in patients suffering from acute sore throat.

Materials and Methods

HaEmek Medical Center is located in northern Israel and serves a population of about 500,000. The microbiologic laboratory of

HaEmek Medical Center routinely examines the throat swabs for growth of group A Streptococcus only.

For the present study, all throat cultures sent to the laboratory from patients with sore throat were cultured for *A. haemolyticum*. The swabs were plated on Streptococcus Select medium (HyLab, Rehovot, Israel), a semiselective sheep blood supplemented medium primarily designed for the isolation of beta-hemolytic streptococci in heavily contaminated samples. This medium is casein-beef extract-based, supplemented with neomycin and polymixin B sulfates for the inhibition of gram-negative rods. The fact that *Arcanobacterium haemolyticum* grows well in this medium was verified prior to the beginning of the study. Following inoculation, plates were incubated for 48 hours under aerobic conditions. *A. haemolyticum* was suspected on the basis of the appearance of colonies (chalky-white small colonies with a narrow zone of beta-hemolysis after 48 hours incubation). Definite identification was made on the basis of the microscopic appearance (coryneform gram-positive rods), negative catalase test, and reverse CAMP test (partial hemolysis by *Staphylococcus aureus* is inhibited in the proximity of *A. haemolyticum*).

Results

Altogether, 518 throat cultures were included in the survey. Patients' ages ranged from 1 to 90 years (median 14 years, mean 21). Of the throat cultures examined only one isolate (0.2%) was definitely identified as *A. haemolyticum*, in a 9 year old patient. In contrast, group A streptococci grew in 135 cases (26%) [Table 1].

Discussion

Arcanobacterium haemolyticum infection is a relatively uncommon cause of pharyngitis and exanthem in adolescents and young adults, with a maximum incidence seen in the 15–18 year old age group, where the incidence may reach 2.5% [2]. Carlson et al. [9]

Table 1. Age distribution of the patients and positive throat cultures for *S. pyogenes*

Age (yrs)	No. of patients (%)	No. of patients with streptococcal pharyngitis N=135 (100%)
<3	29 (5.6)	6 (4.4)
3–12	213 (41.1)	74 (54.8)
13–18	62 (12)	17 (12.6)
19–45	153 (29.5)	32 (23.7)
>46	61 (11.8)	6 (4.4)

recovered *Arcanobacterium haemolyticum* in 0.5% of throat cultures from 3,922 patients, and also in their study most of the patients positive for *A. haemolyticum* were 15–25 years old. Most cases are probably not diagnosed since signs and symptoms of pharyngitis due to *A. haemolyticum* are not specific and may resemble those caused by beta-hemolytic streptococci or viral agents, and the organism is very often overlooked in culture. The prevalence in throat swabs in the general population is as low as 0.3–0.4% [2,10].

In the present study we examined 518 throat swabs from symptomatic patients, and *A. haemolyticum* was recovered from only one patient (0.2%), as compared to group A Streptococcus (*S. pyogenes*) that was isolated from 135 patients (26%) ($P < 0.0001$). The results of this study confirm that also in Israel *A. haemolyticum* is an uncommon pathogen and support the microbiology laboratory policy not to perform routine screening for *A. haemolyticum* in throat cultures from patients with sore throat. The organism should be specifically sought only in appropriate cases such as recurrent pharyngitis or treatment failure without an identified pathogen.

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