



Frequency and Possible Determinants of Infections Caused by Beta-Hemolytic Streptococci of the Respiratory Tract in Horses with Clinical Signs in Northwestern Breeding Centers of Iran: A Cross-Sectional Survey

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Abstract

BACKGROUND: Respiratory pathogenic beta-hemolytic streptococci in horses, including *Streptococcus equi subsp. equi*, the causative agent of strangles disease, *Streptococcus equi subsp. zooepidemicus* is an important cause of respiratory disease and *Streptococcus dysgalactiae subsp. equisimilis* has been isolated from nasal swabs taken from horses with a history of respiratory disease.

OBJECTIVES: The present study aimed to determine the frequency and risk factors of respiratory tract infections originating from beta-hemolytic streptococci in the provinces of West Azerbaijan, East Azerbaijan, and Ardabil.

METHODS: During this study, 121 horses with clinical respiratory symptoms were sampled. After performing clinical examinations and recording clinical signs in special worksheets, sampling of the upper part of the respiratory tract was performed using nasopharyngeal swabs. The samples were sent to the laboratory in a standard transfer medium with cold chain.

RESULTS: In this study, out of 121 samples collected from horse breeding clubs from 10 different regions of northwestern Iran, 51 were negative for beta-hemolytic streptococci while the results were positive for the other 70 samples ($P < 0.001$). Regarding the positive samples for beta-hemolytic streptococci, the results of differential cultures were as follows: eight cases of *Streptococcus equi subsp. equi*, 57 cases of *Streptococcus equi subsp. zooepidemicus*, and five cases of *Streptococcus dysgalactiae subsp. equisimilis*. There was no significant relationship between the frequency of beta-hemolytic infections with variables of gender, race, and geographical area ($P > 0.05$). Meanwhile, the statistical test showed a significant relationship between the frequency of infection with these bacteria and the variable of clinical symptoms ($P < 0.001$). Moreover, the frequency of beta-hemolytic streptococcal infections was significantly associated with age ($P < 0.05$).

CONCLUSIONS: The results herein suggested that the bacterial cause of the majority of respiratory infections in infected and sampled horses in the provinces of West Azerbaijan, East Azerbaijan, and Ardabil at the time of sampling was *Streptococcus equi subsp. zooepidemicus* and that this organism is a potential pathogen for respiratory diseases in horses in these provinces.

Keywords: Bacterial culture, Beta-hemolytic streptococci, Horse, Nasopharyngeal swabs, Respiratory tract infections

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Figure Legends and Table Captions

Table 1. Distribution of absolute and relative frequency of the positive and negative cases of beta-hemolytic infections.

Table 2. Distribution of absolute and relative frequency of the positive and negative cases of beta-hemolytic infections by age (by year).

Table 3. Distribution of absolute and relative frequency of the positive and negative cases of beta-hemolytic infections by gender.

Table 4. Distribution of absolute and relative frequency of the positive and negative cases of beta-hemolytic infections by race.

Table 5. Distribution of absolute and relative frequency of the positive and negative cases of beta-hemolytic infections by geographical area.

Table 6. Distribution of absolute and relative frequency of the positive and negative cases of beta-hemolytic infections by clinical signs (9,10).

Figure 1. A: Body temperature measurement; B: Hearing breathing sounds; C: Purulent discharge from the nostrils.

Figure 2. A: Designed swab; B: Liquid BHI medium (pre-enrichment); C: The outcome of differential culture for *Streptococcus equi* (Trehalose negative, Sorbitol negative, Lactose negative, Maltose positive); D: Light microscope view of the organism, E: *Streptococcus equi* colonies on blood agar.