Variability of fungi detection in the respiratory tract of racehorses according to the sampling site

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INTRODUCTION

The potential involvement of fungi in equine asthma was previously investigated based on tracheal wash (TW) rather than bronchoalveolar lavage (BAL) (1). However, the reliability of airway samples and laboratory methods has not been investigated and the clinical relevance of fungal detection in equine airways still remains controversial.

OBJECTIVES

Preliminary study to 1) characterize fungi from upper and lower airways of racehorses and 2) determine the most reliable methodology for fungal detection

HYPOTHESIS

Fungal cytology of a pooled BAL (BAL_P) is representative of corresponding left (BAL_L) and right (BAL_R) samples, and is more reliable than TW for fungal detection.

METHODS

- 30 Standardbred racehorses in active training, aged 4.6 ± 1.6 years, from 3 different training stables
- TW, followed by BAL from each lung separately, collected through a guarded catheter and gastroscope
- Fungi detection, identification and characterization by cytology and culture
- Comparison was made between:
  - Cytology and culture of TW vs BAL_P
  - Cytology of BAL_P vs BAL_L and BAL_R

RESULTS

- **Fungal culture**

TW: 28/30 (93%) positive ; BAL_P: 4/30 (13%) positive
- 4/4 positive in TW
- 3/4 with same fungi in BAL_P and TW
- 9 genus (alone or concomitant)
- *Aspergillus (5 genus) 13/28 (46%)*
- *Penicillium 12/28 (43%)*
- *Chrysosporium, Cladosporium, Scopulariospsis*

- **Fungal cytology (Table 1)**

TW:
- 12/22 (55%) with both spores and hyphae, frequently phagocyted

BAL – Comparison between aliquots (Table 2):
- Poor agreement between BAL_L and BAL_R (κ= 0.015)
- Poor agreement between culture and cytology (κ=0.015) (Figure 1)
- **Substantial agreement between BAL_P and separate lungs** (κ= 0.627; **Se = 0,58 ; Sp = 1,00**)
  - 7/7 BAL_P positive on cytology were positive on BAL_L or BAL_R
  - 5 BAL_p negative on cytology were positive on BAL_L or BAL_R

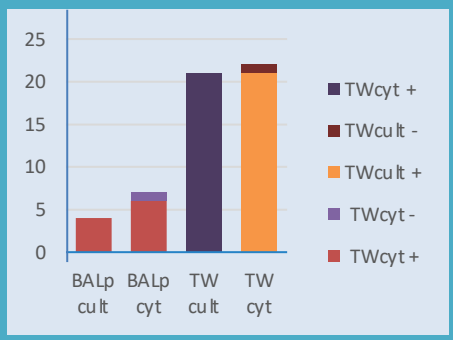

Figure 1: Distribution of results based on sampling site and method of analysis (cyt: cytology ; cult: culture ; - : negative ; + : positive)

Table 1: Cytology of pooled and individual BALF, and of TW

	Cytology positive	Spores	Hyphae	Phagocyted
TW	22/30	18/22	16/22	14/22
BAL_P	7/30 *3 bilateral 4 unilateral*	7/7	2/7	6/7
BAL_R	8/30	5/8	6/8	5/8
BAL_L	7/30	7/7	0/7	6/7

Table 2: Comparison of BALF sample sites, and of BALF methods of analysis

	BAL_L only	BAL_R only	BAL_{L+R}	Agreement (κ)
Cytology	4/7	5/8	3	0,015
	Culture only	**Cytology only**	**Culture + cytology**	**Agreement (κ)**
BAL_P	3/4	6/7	1/7	0,015

DISCUSSION

Despite a similar prevalence of fungi detection in left and right BAL, a large disparity and a poor agreement were found between lungs. BAL_P cytology however exhibited a substantial agreement with corresponding samples from each lung. TW fungal culture was overly positive amongst healthy individuals and most likely poorly specific for fungal detection

CONCLUSION

BAL is preferred over TW for fungal analysis. Pooled BAL is a highly specific while fairly sensitive alternative to combined cytology of individual left/right samples for mold/fungi detection.

ECEIM Virtual Congress, 22nd-23rd October 2021

REFERENCES
1) Dauvillier J, ter Woort F, van Erck-Westergren E. Fungi in respiratory samples of horses with inflammatory airway disease. J Vet Intern Med. 2019;33:968-975