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

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INTRODUCTION

- The clinical relevance of colonization of equine airways by fungi is unclear.
- Diagnosis of fungi in the respiratory tract is fastidious and there is no method of reference.

OBJECTIVES

- To characterize fungi from upper and lower airways of racehorses
- To 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.

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
 - Positive culture: ≥ 1 mold identified
 - Positive cytology: ≥ 1 fungal element (hyphae, spore) observed

RESULTS

- Fungal culture (Table 1)
 - TW: 28/30 (93%) positive
 - BAL_P: 4/30 (13%) positive \rightarrow All positive in TW, 3/4 with same fungi
 - 9 genus (alone or concomitant) : *Aspergillus* (5 genus) 13/28 (46%), *Penicillium* 12/28 (43%)

Table 1: Identification of fungi in horses with a positive BAL_P culture

Case number	9		17		18		21	
Fungi genera	TW	BAL _P	TW	BAL _P	TW	BAL _P	TW	BAL _P
<i>A. fumigatus</i>							x	
<i>A. nidulans</i>	x		x	x	x			
<i>A. versicolor</i>							x	
<i>Penicillium</i>	x		x		x	x	x	x
<i>Aureobasidium</i>		x						
<i>Chrysosporum</i>	x							

Table 2: Cytology of pooled and individual BALF, and of TW

	Cytology positive	Spores	Hyphae	Phagocytosed
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

Fungal cytology (Table 2)

- TW: 22/30 (73%) positive ; 12/22 (55%) with both spores and hyphae, frequently phagocytosed
- BAL: Large disparity between lungs

Table 3: 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

Comparison of sample sites (Table 3)

- Poor agreement between BAL_L and BAL_R
- Poor agreement between culture and cytology
- BAL_P vs separate lungs:
 - Not equivalent ($p = 0.025$ by McNemar Test)
 - Sensitivity = 0,58 ; Specificity = 1,00

DISCUSSION

- Despite a similar prevalence of fungi detection in left and right BAL, a large disparity was found between lungs on cytology.
- Detecting fungi by cytology on either BAL_P or BAL_L + BAL_R was not equivalent

CONCLUSION

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