Presentation number: 1563

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Galactomannan Testing and *Aspergillus* PCR in Same-Day Bronchoalveolar Lavage and Blood Samples for Diagnosis of Invasive Mould Infections

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Introduction

- Galactomannan antigen testing (GM) and also PCR have become increasingly important for diagnosis of invasive pulmonary aspergillosis (IPA) (1)
- It remains a matter of debate whether these tests need to be performed with bronchoalveolar lavage fluid (BALF; i.e. primary site of infection) or if testing of blood samples is sufficient
- The objective of this study was to evaluate GM and PCR results in blood and BALF samples obtained at the same day in patients with suspected IPA. In addition we evaluated biomarker combinations.

Methods

- Diagnostic performance of *Aspergillus* PCR (BALF, blood), GM (BALF, serum) and conventional culture (BALF) were evaluated
- Samples were obtained at the same day
- 53 immunocompromised patients were included at the statistical analysis:
  - 16 of 53 (30%) with probable or proven IPA (revised EORTC/MSG criteria)
  - 37 of 53 (70%) with no evidence of IPA (revised EORTC/MSG criteria)
  - 38 of 53 (72%) with hematological malignancies as underlying diseases (prospectively enrolled)
  - 15 of 53 (28%) with mixed underlying diseases (partially retrospectively enrolled)
  - 34 of 53 (64%) of patients overall and 12 of 16 (75%) of patients with probable or proven IPA were receiving mold-active antifungal prophylaxis or therapy at the time of the BALF procedure (median 2 days, IQR 1-10 days)
- Patients with possible IPA were excluded

Results

- Performance of each test as well as combinations is depicted in table 1. Sensitivities for probable/proven IPA are also shown in figure 1.
- Best sensitivity (81%) for detecting probable/proven IPA was achieved when BALF-PCR, BALF-culture and serum-GM were combined (specificity 92%)

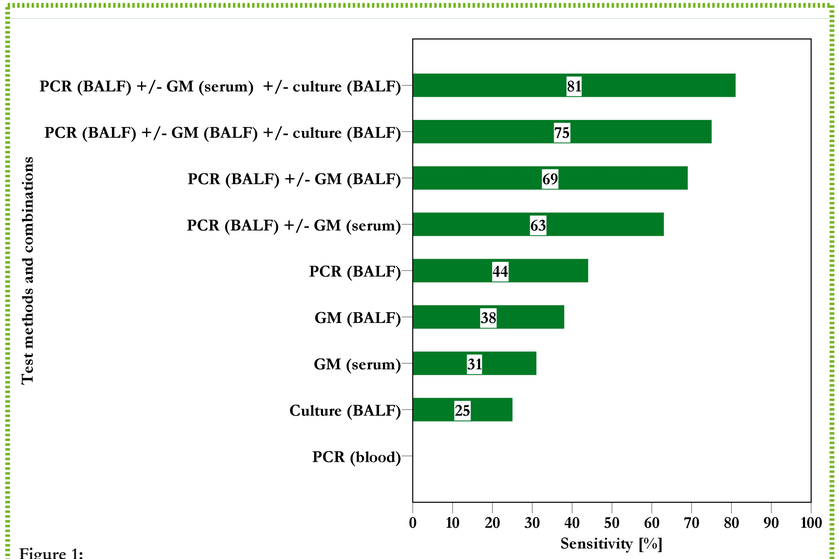

Figure 1:
Comparison of sensitivities of different test combinations

References: Buchheidt, D., Spiess, B., Hofmann, W. et al. Curr Fungal Infect Rep (2013) 7: 273.

Table 1:
Sensitivity (n = 16), specificity (n = 37), positive predictive value (PPV), negative predictive value (NPV) and diagnostic odds ratio (95% confidence interval) for *Aspergillus* PCR, GM (Cut-off: > 0,5 optical density index) and culture for diagnosing probable/proven vs. no IPA (sample material stated in parenthesis)

Test combination	Sensitivity [%]	Specificity [%]	PPV [%]	NPV [%]	DOR
PCR (BALF)	44	100	100	80	59
PCR (blood)	0	100	0	100	--
GM (BALF)	38	92	67	77	7
GM (serum)	31	100	100	77	36
PCR (BALF) and/or GM (BALF)	69	92	79	87	25
PCR (BALF) and/or GM (serum)	63	100	100	86	121
Culture (BALF)	25	100	100	76	27
PCR (BALF) and/or GM (BALF) and/or culture (BALF)	75	92	80	90	34
PCR (BALF) and/or GM (serum) and/or culture (BALF)	81	92	81	92	49

Conclusion

- Sensitivities were low in BAL and even lower in blood when the tests were interpreted on their own
- Sensitivities improved markedly when results of more than one test method were interpreted in combination

Funding: This work was supported by funds of the Gilead Investigator Initiated Study IN-AT-131-1939, and the Oesterreichische Nationalbank (Anniversary Fund, project number 15346). The funders had no role in study design, data collection, analysis, interpretation, decision to publish, in the writing of the manuscript, and in the decision to submit the manuscript for publication.

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