EP0297
ePoster Session
MALDI-TOF: driving change in microbiology laboratories

Comparison of PCR/16S rRNA gene sequencing with PCR/ESI-MS for the detection of bacteria in excised heart valves

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Background: Identification (ID) of the causative agent in infective endocarditis (IE) is crucial for adequate therapy. Blood culture (BC) is negative in 2-30% of IE patients and heart valve culture (VC) is insensitive. Performance of two molecular techniques was compared in surgically treated patients fulfilling definite IE criteria according to Duke and/or valve histopathology.

Material/methods: 40 heart valves, collected at University Hospitals of Leuven, were analysed with PCR/16S rRNA sequencing (UMD-Tissue; Molzym) and PCR/ESI-MS (BAC-SFT/IRIDICA; Abbott). BC, VC and serology results were collected. Six valves originated from patients not having IE. Criteria of Shrestha et al. (Ann Thorac Surg 2015) were used, defining the microbial IE cause.

Results: Four IE patients had double negative molecular results likely due to late valve surgery after long-term adequate antibiotic therapy (4-10 weeks). 16S rRNA additionally had 2 false negative results (Table). One patient without IE had double positive molecular results with coagulase negative staphylococci. PCR/ESI-MS, 16S rRNA PCR, BC and VC had sensitivity/specificity of 85%/83%, 79%/83%, 71%/83% and 18%/100% respectively, for diagnosing IE with the correct bacterial genus. PCR/ESI-MS detected P. acnes and P. acnes/viridans streptococci in two culture and 16S PCR negative IE patients whereas 16S PCR detected S. gallolyticus and P. acnes in 2 other culture and PCR/ESI-MS negative IE patients. PCR/ESI-MS and 16S rRNA PCR detected and identified additional micro-organisms in 2 (S. saccharolyticus; S. caprae) and 1 (P. micra) IE valve, respectively. Turn-around-time of PCR/ESI-MS and 16S rRNA testing was 7 and 36 hours, respectively.

Conclusions: PCR/ESI-MS and 16S rRNA are complementary molecular techniques, accurately identifying bacteria in IE valves. Each technique had diagnostic impact in 2 different IE cases. Due to short turn-around-times, PCR/ESI-MS might have higher diagnostic potential. BC remains a necessary diagnostic test in the endocarditis setting.

Table: Performance of PCR/ESI-MS and 16S rRNA.

		Causative pathogen IE (n=34)								
		Staphylococcus spp.	viridans streptococci	*E. faecalis*	*P. acnes*	*C. burnetii*	*P. acnes* and viridans streptococci (mixed)	*G. adiaciens*	Unknown	**Total**
PCR/16S	Genus but no species ID	1	3	0	0	0	0	0	0	**4**
	Species ID	7	9	3	2	1	0	1	0	**23**

rRNA	Detected but no ID	0	0	0	0	1	0	0	0	**1**
	False negative	1	1	0	1	0	1	0	2	**6**
PCR/ESI-MS	Genus but no species ID	0	5	0	0	0	0	0	0	**5**
	Species ID	8	6	3	3	2	1	1	0	**24**
	Incorrect ID	0	1*	0	0	0	0	0	0	**1**
	False negative	1	1	0	0	0	0	0	2	**4**
BC positive†		8	12	3	0	0	0	1	0	**24**
VC positive†		3	1	1	1	0	0	0	0	**6**

†: growth of causative pathogen; **Enterococcus spp.*