Rapid microbiologial diagnosis of orthopedic implant-associated infections (OIAI) by MALDI-TOF of sonication fluid

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Introduction

- We assessed MALDI-TOF of sonication fluid from positive blood culture bottles and compared it with periprosthetic tissue cultures and sonication fluid culture for the diagnosis of OIAI

Materials and Methods

- **Study population:** April 2015 - August 2015, in whom the implants was removed for aseptic failure (AF) or OIAI.
- **OIAI definition:** Presence > = 1 of the following criteria: (i) visible purulence, (ii) sinus tract, or (iii) clinical signs of infection. In addition, in prosthetic joint infection cases, (iv) increased synovial fluid leukocyte count and/or neutrophil % and (v) histopathology.
- **AF definition:** When none of the previous criteria of infection was fulfilled.
- **Diagnostic method:** (i) Sampling of 5 periprosthetic tissues, (ii) sonication of removed implants and (iii) inoculation of sonication fluid into BD BACTEC™ Plus blood culture bottles with antimicrobial removal systems. Lysis and centrifugation procedure was performed for direct MALDI-TOF from positive blood culture bottles.

Results

Table 1. Characteristics of the patients with OIAI and AF

	AF (n = 36)	OIAI (n = 11)
Patient age, years, median (range)	53 (22 - 74)	69 (59 - 86)
Male sex	19 (53%)	5 (45%)
Type of prosthesis		
Joint prosthesis (n = 20)	13 (36%)	7 (64%)
Hip (n = 10)	7	3
Knee(n = 10)	6	4
Fracture fixation device (n = 27)	23 (64%)	4 (36%)
Osteosynthesis ankle	8	2
Osteosynthesis hip	1	1
Osteosynthesis tibia	5	0
Osteosynthesis elbow	1	0
Osteosynthesis hand	2	0
Osteosynthesis humerus	3	0
Osteosynthesis foot	3	1
No. of patients with antibiotics before surgery	0	10 (91%)

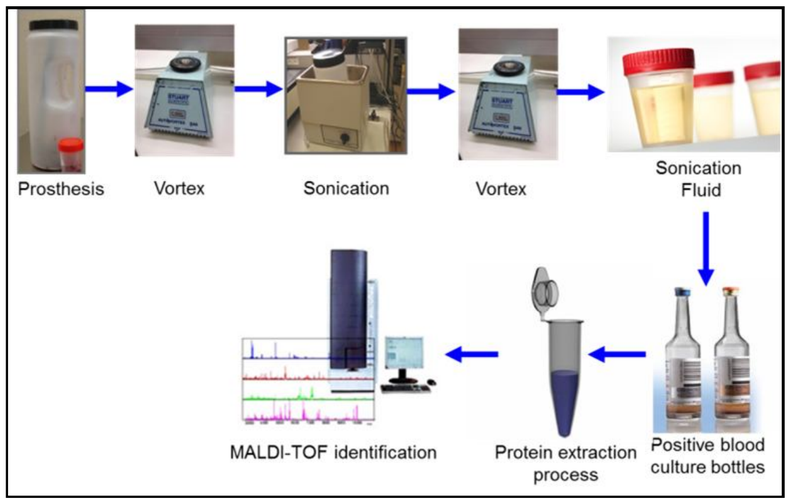

Figure 1. MALDI-TOF workflow

Table 2. Microorganisms isolated in OIAI

	Tissues	Sonication	MALDI-TOF
No. of all detected pathogens (Sensitivity)	3 (27%)	7 (64%)	7 (64%)
Type of organism			
S. epidermidis	1	1	1
S. aureus	1	1	1
E.faecalis	0	2	2
E. coli	1	1	1
E.cloacae	0	1	1
P.aeruginosa	0	1	1
Type of infection			
Monomicrobial	3 (100%)	7 (100%)	7 (100%)
Polymicrobial	0	0	0
Negative culture	8 (73%)	4 (33%)	4 (33%)

Conclusion

- **MALDI-TOF of sonication fluid from blood culture bottles is a reliable and rapid method for the diagnosis of OIAI**

References

1-Portillo M.E. et al. Advantages of sonication fluid culture for the diagnosis of prosthetic joint infection.J Infect. 2014

2-Portillo M.E. et al. Improved diagnosis of orthopedic implant-.associated infection by inoculation of sonication fluid into blood culture bottles. J Clin Microbiol 2015