

MALDI-TOF identification from urine direct samples

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INTRODUCTION

Urinary tract infections (UTI) are among the most common infections as much as on a community level as on a hospital level. Microbiological confirmation of a UTI takes 24-48 h after receiving the sample.

In recent years the use of MALDI-TOF mass spectrometry has been implemented for the rapid identification of bacterial species. We pretend to take advantage of this new technology to evaluate the use of it for the diagnosis of UTI.



MATERIALS AND METHODS

From July to September 2015 we have received 6.485 urine samples at the microbiology laboratory of the HRU of Málaga. Of these, we selected 218 urine samples from patients with UTI symptoms and cared for in the emergency department (compatible clinic and leucocyturia). As selection criteria a gram stain was performed on all uncentrifugated samples and those with bacteria of a single morphotype per 20 oil-immersion fields were processed for MALDI-TOF spectrometry. The samples were cultivated in blood and MacConkey agar during 18-24h in 35-37°C ambient air. Bacterial identification was done using mass spectrometry MALDI -TOF Microflex (Bruker Daltonics, Bremen-Germany). For direct strain diagnostic by MALDI- TOF we first use a differential centrifuge and ethanol/formic acid extraction, following the Ferreira et al (2010) modified protocol.

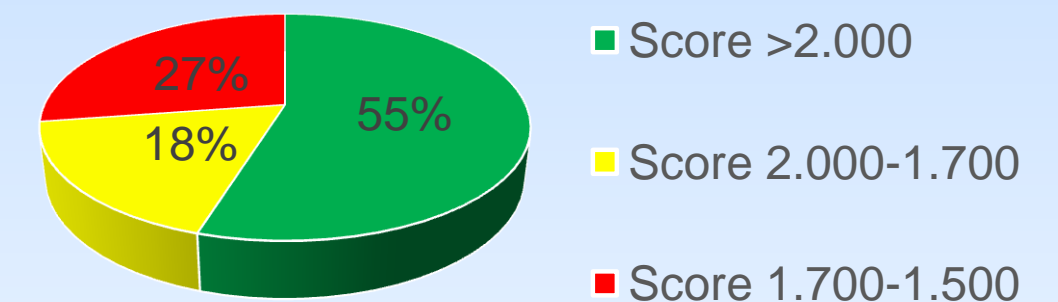
RESULTS

Out of 218 samples examined, 124 (56.88%) were positive with more than 100.000 cfu/ml, of which 93(75%) were correctly identified by MALDI-TOF directly from the clinical sample. (54.76% with score > 2.000, 17.85% 2.000-1.700 and 27.38% 1700-1500). From the 93 positive cultures 84 gram negative rods (82 enterobacteriaceae and 2 Pseudomonas), 7 gram positive cocci (4 enterococcus and 3 Staphulococcus) and 2 yeasts (C.albicans) were isolated.

From the 31 unidentified samples by MALDI-TOF 25 gram negative bacteria (22 enterobacteriaceae and 3 P. aeruginosa) and 6 gram positive cocci were isolated. The 94(43.11%) negative cultures or bacteriuria < 100.000 agreed with inconclusive results from MALDI-TOF (score < 1500 or absence of peaks).

MALDI TOF	CULTURE		
	Positive	Negative	Total
Identified	93	0	93
Unidentified	31	94	115
Total	124	94	218

Microorganisms	Identified	Unidentified
Enterobacteriaceae	82	2
Pseudomonas	2	3
Enterococcus	4	3
Staphulococcus	3	3
Candida	2	
Total	93	31



CONCLUSIONS

- MALDI-TOF is a quick and reliable technique capable of identifying microorganism with counts > 100.000 cfu/ml in urine samples.
- In our environment 75% of the positive urines could be identified with direct sample MALDI-TOF
- MALDI-TOF and knowledge of local susceptibility patterns allow us to set up a focused early treatment.

GOAL

To assess the degree of concordance between MALDI – TOF mass spectrometry directly on urine samples and cultivation.