

**P0581**

**Poster Session II**

**Automation of diagnostics**

**COMBINATION OF URINE FLOW-CYTOMETRY (UF) AND MATRIX-ASSISTED LASER DESORPTION/IONIZATION-TIME OF FLIGHT MASS-SPECTROMETRY (MALDI-TOF) DIRECTLY FROM URINE SPECIMENS ALLOWS RAPID IDENTIFICATION OF BACTERIAL PATHOGENS**

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**Objectives:**

Timely and specific diagnosis of urinary tract infection (UTI) is central to justify early commencement of appropriate antimicrobial therapy. Conventional urine culture requires up to 72 hours from sample collection to pathogen identification. UF offers a fast method to determine the quantity of urinary bacteria and leucocytes. MALDI-TOF is able to rapidly identify bacterial species. Combining these technologies may significantly shorten the time to (i) UTI diagnosis and to (ii) early streamlined antimicrobial therapy. We aimed to compare the performance of UF with MALDI-TOF versus conventional culture methods.

**Methods:**

Randomly selected routine urinary specimens (n=670) referred to the laboratory were analysed by UF (UX-2000, Sysmex). Urine samples with bacterial loads  $\geq 10^5$ /mL and significant leucocyte counts (male  $\geq 20$ /uL and female  $\geq 40$ /uL) in UF were considered positive for UTI. Next, in urine specimens, leucocytes and cell debris were removed and bacteria enriched using a 30-min protocol followed by MALDI-TOF (Biotyper, Bruker Daltonik). In parallel, standard culture methodologies including VITEK 2 identification system were performed.

**Results:**

UF-positive samples (n=215/670; 32.1%): 130/215 (60.5%) had pure culture with a single species  $\geq 10^5$ /mL. In 95/130 samples, MALDI-TOF correctly identified the species, which were ultimately isolated providing a sensitivity of 73.1% and a specificity of 100%. Predominant species were: *Escherichia coli* (72/77 correct) and *Klebsiella pneumoniae* (7/8 correct). For mixed or single species  $< 10^5$ /mL (74/215), MALDI-TOF did not result in a reliable identification. 11/215 showed no growth.

UF-negative samples (n=455/670; 67.9%): Only 21/455 (4.6%) had  $\geq 10^5$ /mL bacteria in culture. 49.2% showed no growth. 46.3% had mixed or single species  $< 10^5$ /mL. In these samples, MALDI-TOF showed no organism identification, highlighting a high negative predictive value (95.4%).

**Conclusions:**

In urine samples pre-selected by UF, MALDI-TOF analysis demonstrated high sensitivity and specificity for bacterial species identification. This approach could lead to targeted adjustment of antimicrobial treatment strategies at early stages of infection.