Evaluation of new fully automated system for rapid bacterial culture and direct antimicrobial susceptibility testing

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Objectives

As a study result "Rapid Antimicrobial Susceptibility Test (AST) on Pediatric Urine Culture", performed in 2010 in our Laboratory in which the concordance of results obtained by Alifax AST vs Kirby Bauer method was previously demonstrated, we evaluated the reduction of turn around time (TAT) and the consequences of this reduction at clinical level and on Lab organization by introducing in routine Alfred60 AST with fully automation of process steps.

Material & Methods

252 samples coming from ER, Nephrology and Pediatric wards of Meyer Pediatric Hospital were tested between August and November 2012.

All the processes as urine bacterial screening, positive sample 0.5 McFarland concentration and direct susceptibility testing with customized antibiotics panel were automatically executed by Alfred 60 AST (Alifax, Italy); Gram staining was manually performed for preliminary identification. Panel set for Gram negative included the following antibiotics: cefuroxime, meropenem, ceftriaxone, amikacin, levofloxacin, ceftazidime; for Gram positive: cotrimoxazole, vancomycin, levofloxacin, gentamicin, ampicillin e cefoxitin.

Alfred60 AST results were compared with those of VITEK 2 (Biomerieux, France).

Flow Chart

51 positive (20.23%) urine cultures have been detected: 43 Gram negative and 8 Gram positive.

For each molecule the concordance of the two methods was for the Gram negative panel:
- cefuroxime 100%, meropenem 100%, ceftriaxone 100%, amikacin 95% (1 minor error and 1 mayor error), levofloxacin 97.5% (1 minor error), ceftazidime 97.5% (1 minor error) and for the Gram positive panel: cotrimoxazole 85% (1 mayor error), vancomycin 85% (1 mayor error), levofloxacin 100%, Teicoplanina 100%, ampicillin 100% and cefoxitin 100%.

The reduction in susceptibility testing report time compared with Lab’s current method was of 24 hours for 43% of the total samples, 48 hours for 45.1%, 72 hours for 3.9% and 96 hours for 7.9%. With the data obtained in this study an early narrowed therapy would have been possible for the 82% of patients, among those, 32% would have been earlier discharged and 14% would have avoided hospitalization.

Conclusions

Alfred 60 AST permits to supply results for cultural test and susceptibility testing in only 4-8 hours from sample arrival in the Lab instead of 36-92 hours of traditional methods. Such a reduction in a test reporting time, besides allowing the advanced administration of an effective molecule and therefore an advantage for the patient, would make possible the early discharge in many cases with a significant economic saving for the hospital.