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Is urine dipstick testing still useful in evaluating the presence of bacteriuria in a post antibiotic era?

Taktak S. , Gall Z.J. , Dyer J.E.

Stepping Hill Hospital, Dept. of Urology, Stockport, United Kingdom

Introduction & Objectives: Urine dipstick is widely used to evaluate the presence of bacteriuria. Previously reported reviews have suggested high levels of sensitivity and specificity. In a post antibiotic era, with increasing resistance patterns, we aim to re-evaluate the diagnostic accuracy across an entire hospital.

Materials & Methods: Consecutive results of paired urine dipstick tests and MSU received in our laboratory were evaluated between 20/12/17 and 31/12/17. All dipstick analysis was undertaken using an automated Roche analyser as a near patient test and reported on a central server. Significant bacteriuria was defined as single culture >10*5 cfu/ml. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated for nitrites, leukocytes and combinations of them. Finally, the diagnostic accuracy was stratified according to resistance profiles.

Results: 1000 urine dip and 1030 MSU results were analysed revealed yielding 237 paired results. In the whole cohort the test performances are given in table 1. 57/237 MSU specimens were positive and 35/57 demonstrated resistance to either trimethoprim, nitrofurantoin, ciprofloxacin or amoxicillin.

Test	Sensitivity	Specificity	PPV	NPV	Accuracy
Nitrite +	28.1 (17.0, 41.5)	86.1 (80.2, 90.7)	39.0 (26.9, 52.7)	79.1 (76.1, 81.8)	72.2 (66.0, 77.8)
Leucocyte +	89.5 (78.5, 96.0)	38.3 (31.2, 45.9)	31.5 (28.4, 34.7)	92.0 (84.1, 96.2)	50.6 (44.1, 57.2)
Nitrite and leucocyte +	89.5 (78.5, 96.0)	38.3 (31.2, 45.9)	31.5 (28.4, 34.7)	92.0 (84.1, 96.2)	50.6 (44.1, 57.2)

Where tested for 22/45 (48%) specimens were resistant to trimethoprim. The sensitivity of the nitrite test for trimethoprim resistant bacteria (22.7%) was almost half that for trimethoprim sensitive bacteria (39.1%). Additionally, resistance rates to other tested antibiotics was low (<15%). In this subset no differential effect was seen on sensitivity between antibiotic sensitive and resistant bacteria.

Conclusions: In a real-world setting, the presence of nitrites on urine dipstick analysis carries a much higher false negative rate than previously reported. Whilst previous reports had suggested that combining the results of nitrites and leucocytes can improve the combined sensitivity and specificity this was not found in our study. Additionally, this false negative rate appears higher in trimethoprim resistant bacteria. Whilst many explanations could account for this our findings may suggest that continued antibiotic pressures and misuses may impact on the diagnostic accuracy of routinely available urine dip analysis.