

利用尿液化學試紙和沉渣的檢驗來預測不同年齡層的兒童尿道感染 Prediction of Urinary Tract Infection in Children of Various Ages By Urine Dipstick and Sediment Examination

程菊英, 曹玫芬, 張慧文, 林秀真

臺北醫學大學附設醫院 實驗診斷科, 台北台灣

Chu-Ying Cheng, Mei-Fen Tsao, Hui-Wen Chang, Hsiu-Chen Lin

Department of Laboratory Medicine, Taipei Medical University Hospital,
Taipei, Taiwan, ROC

Objective

In this study, we compared the results of urine dipstick with/without microscopy tests in infants versus older children for UTI diagnosis. We calculated the AUROC and several parameters statistically to compare the predictive value of different combinations of these urine tests.

Background

The urinary tract infection (UTI) is a common disease in children of various ages. Most cases are readily treated with antibiotics when diagnosis is prompt. The gold standard test for diagnosis of patients with suspected UTI is the yielding a bacterial colony-forming unit (CFU) count of greater than 105 CFU/mL in urine cultures. Urine cultures should be performed before antibiotic therapy is initiated. However, many microorganisms require 2 days or more to grow and identification in the laboratory and this may delay the antimicrobial treatment of the children with acute UTI. Therefore, prompt diagnosis of UTI in children is important clinically. The urine dipsticks are often used as an alternative to microscopy, although the diagnostic performance of dipsticks of patients at different ages has not been established systematically.

Methods

We collected reports of urine dipsticks/microscopy and accompanied urine cultures from April 2008 to May 2010 in our hospital. These laboratory tests results were not duplicated, only patients under 18-years-old with one pair of urine analysis and urine culture were collected. Total of 436 patients are enrolled in this study, 214 cases (49.1%) are infants under one-year-old. The rest of cases are between 1 to 5 years-old (17.9%) and 5 to 18 years-old (33.0%). The reports of urine analyses including both of urine dipstick (nitrite, leukocyte-esterase) and microscopic examination of urine sediment (leukocytes and bacteria). The cases of UTI were confirmed by urine cultures of > 105 CFU /ml with pathogenic bacteria.

Main Results

In all ages of children (from 0 to 18 years-old), the results of dipstick leukocyte-esterase and/or microscopy leukocytes had the highest predictive value for UTI, but did not perform well with statistical analyses (AUROC= 0.632 and 0.646, respectively). In infant group, there was no significant difference of predictive values between single urine dipstick or microscopy and combination of both tests; the AUROCs were all around 0.6. The predictive value of dipstick nitrite test was almost equal to the microscopy bacteria seen in each age group. Both of these two tests performance were poor than leukocyte-esterase and microscopy leukocytes. The best performance of urine tests to predicting UTI was the combination of urine dipstick and microscopy results in 5 to 18 years-old group (AUROC=0.82).

Conclusion

Although the routine urine analysis, include both urine dipstick and microscopy examination, can provide much clinical information, but only the leukocyte-esterase and microscopy leukocytes were the most informative tests to predicting UTI in children, even in infants group.