

Background & Objectives: Accuracy of pyuria for urinary tract infection (UTI) varies with urine concentration. Objective of this study is to determine the optimal white blood cell (WBC) cutoff for UTI in young children at different urine concentrations as measured by urine specific gravity.

Methods: Retrospective cross-sectional study of children <24 months of age evaluated in the emergency department for suspected UTI with paired urinalysis and urine culture during a 6-year period. The primary outcome was positive urine culture result as described in the American Academy of Pediatrics clinical practice guideline culture thresholds. Test characteristics for microscopic pyuria cut points and positive leukocyte esterase (LE) were calculated across 3 urine specific gravity groups: low <1.011, moderate 1.011 to 1.020, and high >1.020.

ACADEMIC P.E.A.R.L.S

Pediatric Evidence And Research Learning Snippet



UTI identification : Does urine concentration matter?

Results:

- Of the total 24 171 patients analyzed, urine culture result was positive in 2003 (8.3%). Urine was obtained by transurethral in-and-out catheterization in 97.9%.
- Optimal WBC cutoffs per high-power field (HPF) were 3 (positive likelihood ratio [LR+] 10.5; negative likelihood ratio [LR-] 0.12) at low, 6 (LR+ 12; LR- 0.14) at moderate, and 8 (LR+ 11.1; LR- 0.35) at high urine concentrations.
- Likelihood ratios for small positive LE from low to high urine concentrations (LR+ 25.2, LR- 0.12; LR+ 33.1, LR- 0.15; LR+ 37.6, LR- 0.41) remained excellent.

Conclusions: Optimal pyuria cut point in predicting positive urine culture results changes with urine concentration in young children. Pyuria thresholds of 3 WBCs per HPF at low urine concentrations whereas 8 WBCs per HPF at high urine concentrations have optimal predictive value for UTI. Positive LE is a strong predictor of UTI regardless of urine concentration.

Key message: In urinalysis, specific gravity is to be kept in mind while interpreting WBC.

EXPERT COMMENT

“Urine culture is the definitive test for diagnosing UTI, but till results come, rapid urine tests (also known as dipsticks or microscopic urinalysis) remain useful. Urinalysis may vary according to the concentration of urine and should be kept in mind before analyzing. Also a “normal” urine microscopy does not rule UTI. An appropriate collected urine sample must be sent for culture in every child with a suspected UTI.”

DR SATYEN GYANI

DNB (Pediatrics), FNB (Pediatric Intensive Care)
Pulse Hospital, Bhilai.



Dr. Sidharth Sethi, Section Editor : “ Indian society of pediatric nephrology suggests – rapid dipstick based tests, which detect leukocyte esterase and nitrite, they are useful in screening for UTI. A combination of these tests has moderate sensitivity and specificity for detecting UTI, and is diagnostically as useful as microscopy.”

**DR MANINDER S
DHALIWAL**

With warm regards,

DR. PIYUSH GUPTA
IAP NATIONAL PRESIDENT
2021

DR REMESH KUMAR
IAP PRESIDENT ELECT
2021

DR G.V. BASAVARAJ A
HON. SECRETARY GEN.
2021 - 22

**DR BAKUL JAYANT
PAREKH**
IAP PRESIDENT 2020

Reference

Shahid Nadeem, Mohamed Badawy. Pyuria and Urine Concentration for Identifying Urinary Tract Infection in Young Children. Pediatrics. February 2021, 147 (2) e2020014068; DOI: <https://doi.org/10.1542/peds.2020-014068>