

A Study of Pyuria, Bacteriuria, Nitriteuria to Evaluate Initial Screening Test for Urinary Tract Infection

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Urinary tract infection (UTI). a common ailment in children, women and elderly people is associated with pyuria, bacteriuria and nitriteuria^{1,2}. Its diagnosis, based on urine culture with significant bacteriuria, needs a good microbiological laboratory and trained microbiologist. Such facility is only available in urban areas of developing countries. Therefore, for rural areas, a simple and cost effective test is needed for rapid screening and referral of cases of UTI for culture and sensitivity test. This study was undertaken to determine the sensitivity, specificity, positive (PPV) and negative predictive value (NPV) of pyuria, bacteriuria and nitriteuria individually and in combination by using urine culture as a gold standard in order to assess their use for initial screening of urinary tract infection.

Material, Method and Results

One hundred midstream specimens of urine were cultured on SLED media, using 5mm wireloop, for bacteriuria at the Kidney Centre, Karachi. Urine was also examined for pus cells per high power field (PHF); bacteria by Gram staining of centrifuged urine and nitriteuria using multistrips (Bayer Diagnostics). Sensitivity, specificity, PPV and NPV of the test were calculated according to the method described by Galen and Gambino⁴. Out of 100 urinary samples cultured on CLED media, 25 yielded significant growth (Table).

Table. Test result of urine samples.

Test	Samples size	No. of +ve sample	No. +ve culture	No. of -ve sample	No. +ve by culture %	Sensitivity %	Specificity %	PPV %	NPV %
Pyuria	100	35	18 (51.4%)	65	7 (10.76)	78.12	81.52	59.52	91.46
Bacteriuria	100	33	21 (63.63%)	67	4 (5.97)	86.20	86.20	67.56	94.93
Nitriteuria	100	8	5 (62.5%)	92	20 (21.7)	55.55	96.15	89.28	78.94
All combine	100	54	25 (46.3%)	46	0	100	72.11	46.30	100

Nitriteuria detected in 20%, pyuria in 72% and bacteriuria in 84% of all cases of urinary tract infection. While combination of these tests identified all cases of urinary tract infections, i.e., 100%. In combination pyuria, bacteriuria and nitriteuria showed 100% sensitivity, 72% specificity, 46% PPV and 100% NPV. To test 100% sensitivity and NPV of bacteriuria, pyuria and nitriteuria, 50 symptomatic and 50 asymptomatic cases, having no bacteriuria, pyuria or nitriteuria were selected. Their urine specimen were cultured on CLED media, but none of them showed significant growth proving the reliability of the test for initial screening of urine.

Comments

Observations of this study suggest that in the areas with no facilities for microbial culture urine may initially be screened for UTI. Only positive urine samples for pyuria, bacteriuria and nitrite urine

should be sent to referral centres for culture and sensitivity. This procedure can also be used as most cost effective technique for rapid exclusion of UT! in urban areas as well.

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