

Nitrites positive in urine: Pre-operative implications for anesthesiologist's

To the Editor,

Pre-operative urinary tract infection (UTI) is alarming, and clinicians treat the UTI with appropriate antibiotics prior to elective surgery in symptomatic patients. Complete urine examination (CUE) is usually a part of preoperative surgical profile in many hospitals which is performed with dipstick method. Dipstick method estimates presence of nitrites in urine which is usually suggestive of UTI unless proved otherwise by a negative urine culture. Urine dipsticks are able to detect nitrites in the presence of bacteria >105 CFU/ml.

Urine culture is definitive for diagnosis of UTI but is costly and takes 48–72 h for the report. Bacteria like *Escherichia coli* and *Klebsiella pneumoniae* produce nitrate reductase which converts the nitrate in urine to nitrite which is detected by the dipstick test during CUE. Certain urinary pathogens like *Pseudomonas aeruginosa*, Enterococci, Acinetobacter species and staphylococcus saprophyticus has shown to have low propensity to produce nitrite and thus could lead to false negative test. The sensitivity of a urine dipstick showing nitrites positive was demonstrated as 75% and specificity that is, those without UTI who test negative was 82% with a positive predictive value and negative predictive value of 79% and 76%, respectively.^[1]

Several studies have shown that screening with dipstick leukocyte esterase and nitrite particularly in presence of asymptomatic bacteriuria was associated with many false positive and negative results. This leads to unnecessary postponement of surgeries and thus adds to overall cost of treatment.^[2] The reason for false negative results is short time between urine collection and testing, amount of bacteriuria, urine pH less than 6.0, organisms that further reduce nitrites to ammonia, blood, dilute urine, proteinuria, glycosuria, presence of urobilinogen, certain medications like ascorbic acid. The sensitivity of this test in the neonates and infants is very low thus not reliable because the time required for reduction of nitrate to nitrite is at least 4 h stay of urine in bladder. False positive nitrite is observed in contaminated urine sample, exposure to air, and use of phenazopyridine.^[3]

The principle of using nitrite estimation in urine is that most of the micro-organisms causing UTI has the ability of

converting urinary nitrate to nitrite. The conversion occurs in urine which stays in the urinary bladder for a few hours (3-4 h). However, someone with more frequent urination will have less stasis in urinary bladder and thus will have false negative result. Therefore, an early morning sample is preferable than a random sample at any time of the day.^[4]

Asymptomatic bacteriuria in pregnancy is very common and treating this based on urine culture and antibiogram is still controversial and is treated by many centers during antenatal period especially in high risk parturient.^[5] There are certain situations where asymptomatic bacteriuria needs to be investigated by ordering a urine culture and to treat it upfront. This is suggested prior to endo-urological procedures, prostatic surgeries, and prior to renal transplantation.^[6,7]

To conclude, urine dipstick method to detect nitrite is a cost-effective and rapid way of confirming UTI. But the decision to investigate a nitrite positive urine sample by sending urine culture should be decided on symptoms, type of surgery planned and general condition of the patient.

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Conflicts of interest

There are no conflicts of interest.

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