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TO *DIP* OR *NOT TO DIP*?

RELEVANCE OF ROUTINE URINALYSIS AT POINT-OF-CARE

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Introduction

For several decades, nurses have been performing routine urine dipstick analysis for all inpatients upon admission. The test was commonly performed at point-of-care (POC) in order to screen for diabetes mellitus, renal disorders and/or urinary tract infections. Any abnormal results/ positive findings are then communicated to the primary medical team for follow-up actions.

This practice was flagged up for its continued relevance given availability of better technologies and more accurate tests to diagnose diabetes mellitus, renal disorders and urinary tract infections.

Methodology

We adopted the following strategies to garner the necessary information to inform practice.

- Comprehensive literature review
- Poll of doctors to find out if they had base their treatment plans on urine dipstick analysis results.

1. Literature Review

Participants:
All adult patients admitted to acute hospitals
Intervention:
Routine urine dipstick
Comparison:
No routine urine dipstick
Outcomes:
Missed infections, missed diagnosis of diabetes mellitus, renal conditions

Databases: Cochrane, CINAHL, PubMed, ClinicalKey (Nursing) and DARE (CRD) databases in July 2015.
Search Keywords: "routine" OR "urine dipstick" OR "point-of-care testing".
Articles which were published in English between 2005 and 2015 were included.
The initial search revealed 477 titles, of which 13 articles were selected.
The studies included were: meta-analysis (N=1), systematic reviews (N=5), cross-sectional studies (N=6) and clinical practice guidelines (N=1).

Results*

Effectiveness in detecting urinary tract infection		
Author, date	***Level of evidence***	***Findings***
Krogsboll et al. 2015	**Systematic review**	• No study was found comparing urinary dipstick screening with no dipstick screening. • Unable to determine benefits and harms.
Krogsboll et al. 2014	**Systematic review**	**European Association of Urology [25]** • Recommends screening for asymptomatic bacteriuria in pregnant women and before genitourinary procedures. **Royal Australian College of General Practitioners [28]** • Identifying and treating non-pregnant adults with asymptomatic bacteriuria does not improve outcomes.
St John et al. 2006	**Systematic review**	• Despite significant heterogeneity between the studies, 7 of the 14 studies demonstrated significant decrease in pretest to posttest probability for negative results.
Deville et al. 2004	**Meta-analysis**	• Urine dipstick alone seems to be useful in all populations to exclude the presence of infection if both nitrites & leukocyte-esterase are negative. • However, usefulness as a RULE IN test remains doubtful.

Results*

Effectiveness in detecting diabetes mellitus		
Ooi et al. 2006	**Systematic review**	• Dipstick testing for urinary glucose is insufficiently sensitive to be used as a screening tool for DM. • Although specificities are high, this is a reflection of the chances of finding glycosuria in a diabetic rather than the quality of urine dipsticks.
Effectiveness in detecting renal impairment		
McTaggart et al. 2014	**Systematic review**	• Sensitivity and specificity estimates 76% and 93% for semi-quantitative test respectively. • Negative semi-quantitative POC test result does not rule out albuminuria whereas quantitative POC testing can be used to rule out albuminuria.
BMJ Best Practice	**Practice Guidelines**	• The testing of large-volume, diluted urine underestimates the degree of albuminuria. • Similarly, testing highly concentrated urine may overestimate the degree of albuminuria.

**Only meta-analysis, systematic reviews and clinical practice guidelines were included in this presentation.*

2. Poll on Doctors

Poll on doctors (N=47)		**Do you evaluate urine dipstick analysis results?**			**Has the test results influenced plan of care?**		
		Yes	No	Sometimes	Yes	No	Sometimes
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
House Officer	8 (17)	3 (38)	5 (63)	0 (0)	3 (38)	5 (63)	0 (0)
Medical Officer	23 (48.9)	9 (39)	10 (44)	4 (17)	9 (39)	12 (52)	2 (9)
Resident	4 (8.5)	0 (0)	4 (100)	0 (0)	0 (0)	4 (100)	0 (0)
Registrar	11 (23.4)	2 (18)	8 (73)	1 (9)	2 (18)	8 (73)	1 (9)
Consultant	1 (2.2)	0 (0)	1 (100)	0 (0)	0 (0)	1 (100)	0 (0)
Total	47 (100)	14 (30)	28 (60)	5 (10)	14 (30)	30 (64)	3 (6)

Summary of Findings

Urinary Tract Infections: Dipstick testing seems useful in ruling out the presence of infection (if both nitrites and leukocyte-esterase are negative). However, its usefulness as a tool to detect infection remains doubtful.

Diabetes Mellitus: Dipstick testing for urinary glucose is insufficiently sensitive to be used as a screening tool for diabetes.

Renal disorders: Dipstick testing has limited sensitivity for non-albumin protein. The results are also affected by concentration of urine, pH level of urine and administration of iodinated radiocontrast agents.

Forty-seven doctors were interviewed. More than half of the doctors did not evaluate urine dipstick analysis results and suggested that the test result will not influence their plan of care.

Translating Knowledge into Practice

With effect from November 2015, routine urine dipstick analysis was discontinued for all inpatients upon admission to the Singapore General Hospital.

However, the test is still performed to inform treatment for selected patients (e.g. checking of urine pH level for patients on chemotherapy), as a rapid screening tool for symptomatic patients and upon doctors' prescription for the test.

Routine urine dipstick analysis is also continued for selected patients in the Department of Emergency Medicine and outpatient settings such as the Obstetrics & Gynecology Centre.