

Original Article

Evaluation of frequency of abnormal Urine R.E tests in Pathology Laboratory

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ABSTRACT

Objective

To evaluate the frequency of abnormal urine routine examination (RE) in order to justify the clinician's frequent requests and use of test either as diagnostic aid to confirm provisional clinical diagnosis or a tool for accidental diagnosis.

Material and Methods

A total of 2000 urine samples received from 1st Sept 2008 to 10th May 2009 were processed in Raazi Diagnostics Pathology Laboratory, Rawalpindi. They were examined for proteins, glucose and blood using Combur-10 urine test strips (Roche) and leucocytes using light microscope. The tests with one or more above mentioned abnormal findings were labeled as Positive.

Results

Out of 2000 samples, 39.8% showed positive results. Pyuria was seen in 25.8%, glycosuria in 7.8%, proteinuria in 7.1% and hematuria in 18.35% cases. Tests with positive physicochemical findings were 26.2% and tests with both leucocytes and positive physicochemical findings were 12.25%. 23.7% samples were from male patients, out of which 34% were positive. 76.3% samples were from females, out of which 41.6% were positive. Pyuria was found more in females (29.9%) while hematuria was higher in males (20.9%). 942 (47.1%) samples were received in the morning, 707 (35.4%) in the evening and 351 (17.5%) during the night. Pyuria (30.4%) was detected more in evening and proteinuria (18.8%) more in night shifts. The frequency of positive samples increased with age, more so in physico-chemical than microscopic aspect. The price of urine R.E in private sector laboratory is

Rs 50-150/test. The cost of 2000 tests is estimated at Rs 100000-300000, out of which Rs 40,000-120,000 were for positive tests and Rs 60,000-180,000 for negative tests.

Conclusions

The detection of abnormal findings in urine was 39.8% Urine RE test indicates fairly satisfactory diagnostic yield. Pyuria was the commonest abnormality seen especially in females. The research and better strategies are needed to improve diagnostic yield in children. The guidance of patients and health care professionals to improve current practices of sample collection and examination can yield more positive results. The clinician should order lab investigations after conscientious justifications. (Rawal Med J 2010;35:257-261).

Key words

Urine RE, urinalysis, pyuria, hematuria.

INTRODUCTION

Routine examination of urine is one of the most commonly ordered investigations. The Physico-chemical properties generally examined in Pathology laboratories include specific gravity, pH, color, odor, proteins, glucose, ketones, blood, Bilirubin and other abnormal constituents. Microscopic examination is done for detection of RBCs, leucocytes (pus cells), epithelial cells, bacteria, crystals and casts. A 10 ml sample is sufficient for conducting these tests.¹ For a reliable report, careful collection of mid stream urine sample in sterile container and an early examination is important. Urine being a good culture medium requires preservative measures in case of delay in examination.¹ About 2 hour postprandial samples are likely to contain protein and glucose. Proteinuria can occur after exercise, in highly concentrated urine, fever, severe emotional or thermal stress in healthy persons.¹ Contamination by urethral and vaginal discharges, fecal flora, chemicals and other substances, inadequate mixing and wrong/inadequate preservative are the sources of error in reporting the test.² All abnormal tests may not be clinically significant because they can result from many non pathologic causes. In addition, the false positive and false negative results are common.³ The false results can be limited if certain precautions

are followed ⁴. Urine RE helps in diagnosis of symptomatic and screening of asymptomatic disorders like urinary tract infections, assessment of kidney functions, metabolic disorders, jaundice, hemorrhagic conditions, presence of stones, trauma and malignancy etc.⁵ The aim of this study was to evaluate the frequency of abnormal findings in urine routine examination.

MATERIALS AND METHODS

The study was carried out in Raazi Diagnostics Pathology Laboratory, a subsidiary of Raazi Hospital Rawalpindi. A total of two thousand urine samples were collected in sterile disposable plastic containers, over a period of seven and a half months from 1st September 2008 to 10th May 2009. The study included all samples received irrespective of age, gender or provisional diagnosis, during all three working shifts. They were examined for proteins, glucose and blood using Combur-10 urine test strips (Roche) and leucocytes using light microscope. All the tests with one or more above mentioned abnormal findings were labeled as positive. The results were recorded on Access data base and analyzed.

RESULTS

Out of total of 2000 samples, 1204 (60.2%) tests had normal findings (Negative tests). Total positive tests were 796 (39.8%). Tests with both leucocytes and physicochemical positive findings were 245 (12.25%).

Table1. Frequency of abnormal urine tests within gender and age groups.

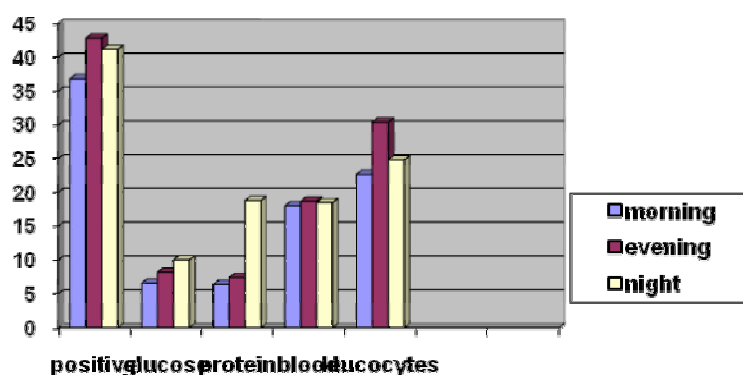
Age (yrs)	Gender	Number	Glucose	Protein	Blood	Leucocytes	Positive
01 -10	Male	116	0	4(3.4%)	10(8.6%)	12(10.3%)	61
	Female	127	0	8(6.3%)	20(15.7%)	32(25.2%)	(25.1%)
	Total	243	0	12(4.9%)	30(12.3%)	44(18.1%)	
11 -20	Male	69	0	6(8.7%)	9(13%)	6(8.7%)	77
	Female	166	6 (3.6%)	15(9%)	23(13.9%)	36(21.7%)	(22.8%)
	Total	235	6 (2.6%)	21(8.9%)	32(13.6%)	42(17.9%)	
21 – 30	Male	89	4 (4.5%)	10(11.2%)	20(22.5%)	10(11.2%)	315
	Female	718	32 (4.5%)	24(3.3%)	103(14.3%)	221(30.8%)	(39%)
	Total	807	36 (4.5%)	34(4.2%)	123(15.2%)	231(28.6%)	
31 -40	Male	54	7 (13%)	1(1.9%)	15(27.8%)	9(16.7%)	120
	Female	244	20 (8.2%)	15(6.1%)	53(21.7%)	64(26.2%)	(40.3%)
	Total	298	27 (9%)	16(5.4%)	68(22.8%)	73(24.5%)	
41 – 50	Male	52	13(25%)	7(13.5%)	14(26.9%)	7(13.5%)	88
	Female	130	14(11%)	11(8.5%)	38(29.2%)	42(32.3%)	(48.4%)
	Total	182	27(15%)	18(9.9%)	52(28.6%)	49(26.9%)	
51 – 60	Male	49	16(32.6%)	11(22.4%)	17(34.7%)	13(26.5%)	80
	Female	83	23(27.7%)	11(13.3%)	23(27.7%)	28(33.7%)	(60.6%)
	Total	132	29(29.5%)	22(16.7%)	40(29.9%)	41(31%)	
> 60	Male	45	10(22.2%)	9(20%)	14(31.1%)	13(28.9%)	55
	Female	58	10(17.2%)	11(9%)	9(15.5%)	23(37.7%)	(53.4%)
	Total	103	20(19.4%)	20(19.4%)	23(22.3%)	36(35%)	

Tests with positive Physicochemical aspects were 525 (26.2%). Pyuria was seen in 516 (25.8%), glycosuria in 155 (7.8%), proteinuria in 143 (7.1%) and hematuria in 367 (18.35%) cases (Table 1).

The samples received in morning were 942 (47.1%), in evening 707 (35.4%) and in night 351(17.5%).

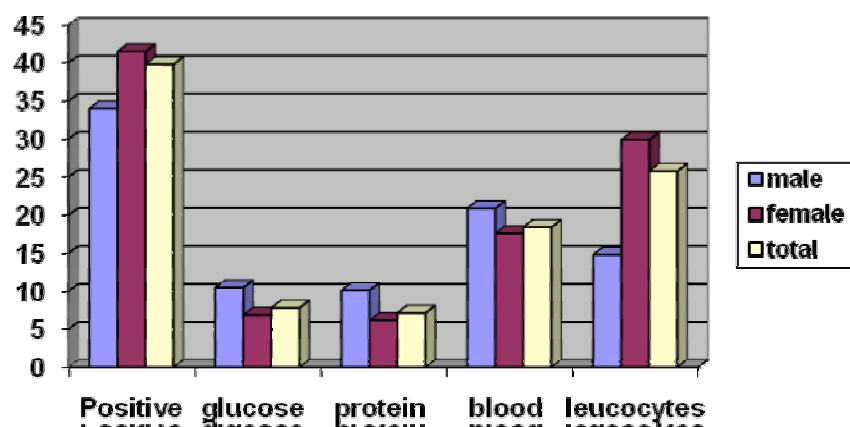
The comparison of frequency of abnormal urine tests in all three working shifts is shown in Fig. 1.

Fig 1. Frequency of abnormal urine tests in working shifts.



Pyuria was detected more in evening (30.4%) and proteinuria more in night shift (18.8%). Out of 474 (23.7%) samples from males, 161 (34%) tests were positive. Out of 1526 (76.3%) samples from females, 635 (41.6%) tests were positive.

Fig 2. Comparison of abnormal urine tests in gender groups.



Pyuria was found more in females (29.9%) while hematuria was higher in males (20.9%) (Fig. 2). The price of urine RE in private sector laboratory is Rs 50-150 / Test. 2000 tests cost Rs 100000-300000, out of which Rs 40,000-120,000 for positive tests and Rs 60,000-180,000 for negative tests.

DISCUSSION

The percentage of positive urine RE tests was found to be fairly acceptable when compared with the efforts exerted by both patient and laboratory staff. By careful inquiry, physician can interpret false positive tests which may further decrease the number of positive tests. In most cases, the commonly

found abnormalities on urine screening tests are transient or due to false positive readings.⁶

Furthermore, judicious discrimination of false positive and false negative test remains a challenge for the physician.

The results of abnormal findings in all categories were much higher in this study as compared to an earlier study from Rural Health Centers Abbotabad.⁷ This may account for better diagnostic environment or more disease incidence in urban areas. Except for proteinuria, the results were also higher as 10.6%, 4.7%, 11.7% and 11% respectively when compared with a study from Saudi Arabia.⁸ The percentage of abnormal findings increased with age, more so in physicochemical than microscopic aspect. The old age group with minimum number of patients had maximum positive percentage. The lowest percentage of positive tests in children needs evaluation of factors responsible and measures to rectify them. One of the causes may be difficulty in obtaining adequate sample in children. In a study using urine analysis test sticks (for nitrite and leucocyte estrase), prevalence of pyuria was found to be 21.8% as pressing these sticks on the panty liners soaked with urine can achieve consistent results compared with sample in container.⁹

Hematuria and proteinuria in 11-21 yrs group was much higher when compared with 0.55%¹⁰ and 4.7%¹⁰ in a Nigerian study and 4.2% and 2.3% of a local study.⁷ Morning shift received maximum number of samples but contrary to expectations it had minimum positive results. The positive test percentage in all working shifts was almost uniform. This may be due to similar modes of sample collection being practiced throughout the day. Health education programs should include guidance for patients and refresher courses for health care professionals to provide true representative sample. A brief instructions slip provided to the patient along with urine container for sample collection may improve the outcome. Maximum number of samples (76%) were obtained from females patients with comparatively more positive results than males. This could be due to test requests for antenatal protocol. Pyuria (29.9%) was higher in females compared to 16.5%⁷ in Ruhila's study. The other abnormal features were more in males while they were similar in above study.⁷

It is thought that mass urine screening is of benefit in number of Asian countries,^{11,12} although it is not clear whether it is cost effective or not. In United States mass screening of asymptomatic individuals has not been shown to be cost effective.¹ Better strategies should be adopted to minimize unnecessary tests cost, for example, by use of multi-test dipsticks for initial screening by a competent nurse at bedside or outdoor department. The research is also needed to obtain clinician's point of view and justifications for frequent demand of routine and other special tests from patients. Key factors responsible for fruitful outcome of laboratory investigations include due consideration to various factors at the time of sampling and testing, physiological states, environmental conditions, oral intake, and judicious interpretation of results. The question, whether the laboratory tests are being used more as an expensive screening tool for accidental diagnosis or as an aid to confirm provisional clinical diagnosis, still needs conscientious answer by clinician.

CONCLUSIONS

The detection of abnormal findings in this study was 39.8% Urine RE tests indicated fairly high diagnostic yield. Pyuria was the commonest abnormality, especially in females. The research and better strategies are needed to improve diagnostic yield in children. The guidance of patients and health care professionals to improve current practices of sample collection and examination can yield more positive results. Finally the clinicians should order laboratory investigations after conscientious justifications.

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