Is routine urine testing in outpatient clinics useful?

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In many hospitals the urine of outpatients is routinely tested, but whether this is a useful way of discovering asymptomatic disease is uncertain. I therefore carried out a prospective study of the rewards of routine analysis of urine.

Patients, methods, and results

For 25 weeks records were kept of all routine urine tests on new patients seen in adult clinics (other than antenatal) at this hospital. The tests were performed by nurses with dipsticks (BM-Test-5L; Boehringer, Mannheim); the urine sample had been collected by the patient at home or provided on arrival. The graded results for protein, blood, and glucose were recorded in the hospital notes before the patient was seen by a doctor. Hospital notes for patients with abnormal results were reviewed at least six months after the initial attendance and a judgment made as to whether the abnormality might have been expected from information already available at the first visit. For unexpected results evidence of an attempt to discover the cause was sought and the eventual diagnosis noted.

Information on 2184 male and 3702 female patients aged 1-95 was recorded. They attended medical (1891 patients), gynaecological (1808), surgical (1240), urological (726), and geriatric (221) clinics. In 287 patients (4.9%) protein, glucose, or blood was detected to some degree (+, ++, or ++++). Patients who had abnormal results were older than those who had normal results (mean age 60.8 (SD 15.4) years *v* 49.5 (18.6) for male patients (*t* test, $p < 0.001$) and 53.2 (18.8) *v* 43.6 (18.8) for female patients ($p < 0.001$)). Overall, abnormal results were more common in male (7.8%; 171/2184) than female (3.1%; 116/3702) patients ($\chi^2 = 64.3$, $p < 0.001$), but no such difference was found in patients attending medical and surgical clinics, where the age distribution in the sexes was similar ($\chi^2 = 3.7$, $p > 0.5$). The prevalence of abnormal

results differed strikingly between clinics ($\chi^2 = 297$, $p < 0.001$) largely because it was very low in gynaecological patients (0.6%; 11/1808).

In 166 of the 287 patients with positive findings the result could have been expected from information already available when the patient was first seen. Among the 121 others further investigations had been carried out in only 60. In 30 patients (0.5% of all those tested) new diagnoses had been made (table).

Comment

In what seems to be the only other report of urine screening in hospital outpatients Fraser *et al* tested 2600 people of all ages not only for protein, glucose, and blood but also for pH, ketones, bilirubin, urobilinogen, and nitrite and found that 7% had abnormal results.¹ Webster reported protein and blood in 2% of 763 well patients referred specifically for screening.² The current survey showed that dipstick urine testing used in a manner similar to that used in many British hospitals showed protein, glucose, or blood, alone or in combination, in about 5% of unselected outpatients. In just under half of these patients the abnormalities might not have come to light if routine screening had not been used.

That asymptomatic abnormalities in the urine can indicate serious and potentially treatable disease may not be sufficiently widely appreciated. Failure of doctors either to notice or to act on abnormal results was common as has been noted previously.^{2,3} If all abnormalities had been investigated the total number of new diagnoses found during the survey period might have increased from 30 to 48. As with any routine procedure, urine analysis can be justified only if action is taken on the basis of the results it brings to light.

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1 Fraser CG, Smith BC, Peake MJ. Effectiveness of an outpatient urine screening program. *Clin Chem* 1977;23:2216-8.

2 Webster IW. A preliminary report on the operation of a multiple screening centre in Sydney. *Med J Aust* 1972;2:488-92.

3 Ritchie CD, Bevan EA, Collier SJ. Importance of occult haematuria found at screening. *Br Med J* 1986;292:681-3.

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New diagnoses made after investigation of unexpected abnormal results of urine testing

Diagnosis	No
<i>Systemic</i>	
Diabetes mellitus	8
Myelomatosis	1
Bacterial endocarditis	1
Hypertensive nephrosclerosis	1
Polycystic renal disease	1
Exercise haematuria	1
<i>Urological</i>	
Prostatism and obstruction	6
Urinary infection	3
Calculi	2
Carcinoma of bladder	1
<i>Gynaecological</i>	
Menstruation	3
Pelvic carcinoma	1
Vaginal polyp	1
Total	30

BCG immunisation of infants by percutaneous multiple puncture

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Immunisation of infants with BCG provides effective protection against tuberculosis in childhood,^{1,2} but the standard intradermal method is difficult in young babies. We assessed the safety, efficacy, and ease of administration of a percutaneous multiple puncture method.

Patients, methods, and results

We allocated 214 consecutive babies less than 8 weeks old referred to the chest clinic for immunisation with BCG alternately, with parental consent, to the percutaneous or intradermal method. None of the infants was known to have been in contact with a patient with active tuberculosis. Immunisation was done by one of three doctors.

Modified Heaf guns with 20 needles set to penetrate

to a depth of 1 mm (East Health Care, Oxford) were used to administer percutaneous vaccine (Evans Medical) through the skin overlying the left deltoid muscle. Gun heads were sterilised between immunisations by flaming for one minute. Injections of 0.05 ml intradermal vaccine were given into the dermis overlying the left deltoid muscle with a syringe fitted with a 24 gauge short bevelled needle. Doctors recorded the ease of administration of the vaccine and any bleeding that occurred.

The infants were Heaf tested four months after immunisation. A doctor who was unaware of the method of immunisation read the test three to seven days later, inspected the site of the injection, and asked about complications and other immunisations.

Fourteen babies were lost to follow up, leaving 200 in the study (107 boys, 93 girls). All of the babies had been born in the United Kingdom; their ethnic origin was Asian (from the Indian subcontinent), 157; white European, 17; South East Asian, nine; Arabian, five; African, four; and others, eight. Mean (SD) age was 47 (10) days at immunisation and 172 (12) days when the Heaf test was read. Positive Heaf reactions were found in 141 babies (130 grade 1 and 11 grade 2).

One hundred babies were immunised by each