SHORT REPORTS

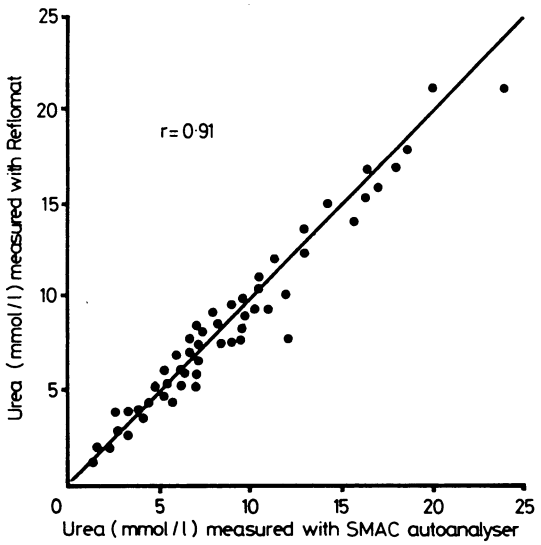
Measurement of urea as a side ward investigation

Chemical pathology originated in the side ward, but increased sophistication of investigations and a higher demand for them led to the establishment of central, purpose built laboratories. The design of some analytical equipment has since been simplified, and it is now feasible for investigations to be performed once again in the side ward. A recent criticism has been that a bedside index of renal function has not been available. We assessed the acceptability to users of a reflectance meter (Reflomat, Boehringer Mannheim, West Germany) that measures plasma urea concentration.

Materials and methods

The reflectance meter method is simple and rapid to use. Measurement of urea concentration is based on the use of solid phase reagent strips. Plasma (10μl) is placed on the reaction layer, which is impregnated with urease. Ammonia from the enzymatic breakdown of urea diffuses through a gas permeable mesh into an indicator layer, causing a blue discoloration. The intensity of the colour (proportional to the urea concentration) is measured after 10 minutes' incubation at room temperature in the reflectance meter.

The method was first evaluated in the laboratory by skilled staff, and performance was satisfactory. Plasma urea concentrations could be measured accurately and precisely in the range 3-20 mmol/l (18-121 mg/100 ml). The coefficient of variation between batches was acceptable (3·4% at 11 mmol/l (66 mg/100 ml)), and results with the meter showed good correlation with those obtained with laboratory equipment (Technicon SMAC II) ($r=0·992$, $p<0·001$).



Comparison of urea concentration measured with Reflomat (doctors) and with SMAC autoanalyser (routine laboratory).

Conversion: SI to traditional units—Urea: 1 mmol/l≈6 mg/100 ml.

Junior hospital doctors from one acute medical team were trained to use the method. They then used it over eight weeks to analyse plasma samples on the ward; duplicate samples were saved for non-urgent analysis in the main laboratory. Analysis was performed on 66 samples, and although the doctors were not as precise as the laboratory staff, the coefficient of variation between batches was satisfactory (11·6% at 11 mmol/l (66·1 mg/100ml)). Comparison of the doctors' results with those from the main laboratory gave a correlation coefficient of 0·91 (figure) and showed that under field conditions the reflectance meter could satisfactorily discriminate between normal and impaired renal function.

Comment

The role of laboratories performing emergency tests that are run by doctors is contentious. Many clinicians, especially those who make heavy demands on the chemical pathology service, see advantages in having results more quickly and frequently than a central laboratory can provide. The method described uses solid phase reagent strips and a reflectance meter. It is similar to techniques that clinicians are familiar with—namely, those for measuring blood glucose concentrations—but requires more input as it entails centrifugation, pipetting, and timed incubation. Despite this a small group of junior hospital doctors admitting patients to general medical wards found it easy to use and were able to screen satisfactorily for renal failure requiring immediate attention.

The system was cost effective. The instrument cost £250, and the cost of the reagent for each test was 28p. If allowance is made for staffing costs then the overall cost of each test of about £1·40 compares favourably with an on call cost for measurement of urea concentration by a central laboratory of £8·50.[1] Recently Boehringer Mannheim produced a new instrument that supersedes the Reflomat, in that it is self calibrating, uses whole blood, and times the incubation automatically. If its efficiency is proved in clinical use this new instrument will make the estimation of blood urea concentration on the wards almost as simple as the estimation of blood glucose concentration.

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1 Morgan DB, Gunn IR, Faye S, Clegg G, Grant AM. A comparison of alternative arrangements for an out of hours chemical pathology service. *Lancet* 1985;i:859-62.

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Vivax malaria acquired in Trinidad, a malaria free area

I describe a case of malaria caused by *Plasmodium vivax* acquired in Trinidad, which has been declared free of malaria; this is the first case to be reported from there since eradication was achieved. The patient presented in the United Kingdom with an imported fever.

Case report

A 33 year old white man presented after five weeks of intermittent fever and rigors. He had been unable, because of malaise, to complete his daily marathon training of running several miles. He farmed a densely forested area of Trinidad, where he had lived since infancy. Mosquitoes were common in the area and included vectors that transmit malaria (*Anopheles bellator* and *A aquasalis*). Travel outside the Caribbean had been limited to a visit to Florida two years previously; within the Caribbean he had visited St Martin 18 months previously and Barbados seven months previously, but he had not been to Haiti or the coast of South America. A week before presentation he had flown by standard flight from Trinidad to London with no stopovers. Before departure he had been ill for four weeks.

On admission he was drawn, febrile (temperature 39°C), and suffering from rigors. His spleen was enlarged (2 cm below the costal margin). Blood films showed large solid trophozoites and preschizonts consistent with vivax malaria. Chloroquine 1500 mg was given over two days with primaquine 15 mg daily for two weeks, resulting in a cure.

Intensive epidemiological work was performed, including interviews with contacts and examination of blood films from contacts and people who lived near the patient who were or had been febrile in recent weeks. Blood films proved negative. No malaria antibodies were detected in these subjects. The source of the infection remained puzzling.

Comment

As the result of a programme of eradication from 1957 to 1972 the World Health Organisation in 1982 declared the Caribbean, apart from Haiti and the Dominican Republic, free of malaria.[1] Malaria had been eradicated from