LETTERS TO THE EDITOR

Screening of urines with dipstrips: does it reduce workload and consumable costs?

Urine bacteriology is an important and considerable part of the work of microbiology laboratories; in ours it accounted for 47 061 specimens in 1989 of which 20-25% yielded positive cultures. Therefore, any method that reduces the number of negative specimens which are subjected to microscopical examination and culture may reduce the technical time required to produce reports and is therefore worthy of evaluation. The use of dipstrips which test for leucocyte esterase, nitrite, protein and blood have been shown to be of value in screening urines because those which are non-reactive in these tests are unlikely to contain clinically important numbers of bacteria ($\geq 10^5$).^{1,2}

Workload evaluations using WelCan units have not been published, however, and in addition, most previous studies have taken $\geq 10^5$ cfu/ml to define "significant bacteriuria" while there is ample evidence to indicate that as few as 10^4 cfu/ml may be of importance.^{1,4}

We tested 1991 urine specimens, 1077 submitted from general practitioners and 914 from hospital using Boehringer Mannheim Nephur + leucocyte dipstrips in parallel with conventional microscopy and culture on CLED agar. A positive dipstrip was defined as one or more of the leucocyte esterase, nitrite, blood or protein tests as positive while a positive culture was defined as $\geq 10^5$ cfu/ml in pure or predominant growth with no pyuria, or $\geq 10^4$ cfu/ml in pure or predominant growth and $\geq 10^5$ cfu/ml of two species with pyuria.

Of the urine samples analysed, 344 (17.3%) were culture and strip test negative; 434 (21.8%) were culture and strip test positive;

1200 (60.3%) were strip test positive and culture negative; and 13 (0.6%) were strip test negative and culture positive. The sensitivity, specificity, and predictive value of a positive and negative result were 97.2, 57.5, 27.2, and 99.2%, respectively, which is comparable with the findings of previous studies¹ and was similar for urine samples from both general practice and hospital patients. Therefore, about an 18% reduction of microscopically examined and cultured urines could be achieved if dipstrip screening was used (table). In contrast, the aggregated WelCan values⁵ of the specimens would be increased by 14.3%, if dipstrip screening was performed and only those that were positive were cultured as the time spent screening all urine samples was not offset by the time saved by not performing microscopical examinations and cultures on some. Similarly, the high cost of strips (12.2p per strip in this study, 25.3p list price), compared with culture (25p per CLED plate) means that insufficient medium is saved to recoup the price of strips; indeed, consumable costs may be increased by about 20% (table). One potential advantage of using dipstrips, however, is that negative urine reports can be issued on the day of receipt in the laboratory, so turn-round times may be reduced. In conclusion, the use of dipstrips to screen urine samples is not cost effective in microbiology laboratories.

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- 1 Barker B, Ratcliffe JG, Turner GC. Urine screening for leucocytes and bacteria by dipstick and reflective spectrophotometry. *Med Lab Sci* 1989;97-100.
- 2 Boreland PC, Stoker M. Dipstick analysis for screening of paediatric urine. *J Clin Pathol* 1986;39:1360-2.
- 3 Doran HM, Kensit JG. Screening for bacteriuria with Clinitec 200. *J Clin Pathol* 1988;41:1127-9.
- 4 Stamm WE, Wagner KF, Amsel R, et al. Causes of the acute urethral syndrome in women. *N Engl J Med* 1980;303:409-14.
- 5 Welsh Workload Measurement System for Pathology. Department of Health: Welsh Office 1987-88, WSAC D2.

hydrolyse aesculin within two hours are reported as *Klebsiella* sp.

The conventional test for aesculin hydrolysis is an agar based medium.² Plates containing aesculin agar can be inoculated with up to 20 different isolates which must include positive and negative controls. Plates are inoculated by stabbing the agar and incubated at 37°C for two hours. *Klebsiella* spp produce a blackening of the medium around the stab site. As we isolate only small numbers of klebsiellae on a daily basis the use of a whole agar plate is wasteful. To reduce costs a paper strip method was developed.

The strips were prepared by soaking blotting paper strips in a mixture containing 2.0 g/l aesculin (Koch-Light laboratories Ltd, Colnbrook, Buckinghamshire, England), 1 g/l ferric citrate (Hopkins & Williams Ltd, Chadwell Heath, Essex, England), and 10 g/l peptone (Oxoid L37). The soaked strips were dried at 37°C for 30 minutes and stored at room temperature until required. The strips were stable for at least three months after manufacture. The strips are simple to use; a strip is placed in a Petri dish and a colony rubbed on the surface of the paper. Positive and negative controls are included on each strip which, after inoculation, is moistened with sterile distilled water and incubated at 37°C for two hours. *Klebsiella* spp produce blackening of the paper. In a three month parallel trial 31 isolates of *Klebsiella* sp were identified by the rapid method and there were no discrepancies between the agar and paper strip methods. The paper strip has several advantages over the agar method. It is easy to prepare and store and the cost is greatly reduced in terms of both material and staff time.

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- 1 Henrichsen C. Rapid presumptive identification of *Escherichia coli* from urine samples; a simple direct plating method. *Med Lab Sci* 1986;43:2-8.
- 2 Cowan ST, Steel KG. *Manual for the identification of medical bacteria*. 2nd ed. Cambridge: Cambridge University Press, 1974:148.

Successful treatment of chronic immune thrombocytopenia using fresh frozen plasma

A 61 year old man presented in September 1982 with a purpuric rash. Immune thrombocytopenia was diagnosed on the basis of pronounced thrombocytopenia (platelets $15 \times 10^9/l$), other established criteria, and a brisk and sustained response to oral corticosteroids. The platelet response was $116 \times 10^9/l$ on day 13, maximum level was $185 \times 10^9/l$ in November 1984, and this was sustained at $167 \times 10^9/l$ until April 1987.

He presented again in October 1988 for an elective hip arthroplasty for osteoarthritis. As before, no history of drug ingestion was given. A routine preoperative full blood count showed a platelet count of $53 \times 10^9/l$. Relapsed immune thrombocytopenia was diagnosed. The patient's blood group was A Rhesus positive and he was treated with group A fresh frozen plasma at a dose of 200 ml daily on seven consecutive days before surgery. On day 7 his direct anti-human globulin test remained negative. No other concurrent immunosuppressive treatment was given during the period documented. The operation was successfully performed with-

Cost and technical workload comparing culture of all specimens with dipstrip screening and culture of only dipstrip positive results

	GP (n = 1077)	Hospital (n = 914)	All (n = 1991)
Number of urines dipstrip positive	855	749	1604
Potential change in urines microscopied and cultured (%)	-17.8	-18.0	-17.9
WelCan values:			
If all urines cultured	8358	6897	15255
If strip screening then culture of positive results	9590	7851	17441
Potential change in workload (%)	+14.7	+13.8	+14.3
Consumable costs (£):			
If all urines cultured	362.50	286.50	649.00
If strip screening then culture of positive results	437.39	346.51	783.90
Potential change in consumable costs (%)	+20.7	+20.9	+20.8

Rapid identification of *Klebsiella*

The rapid identification of medically important bacteria means more timely and relevant results for the clinician. Several rapid methods have been developed for the presumptive identification of common organisms such as *Escherichia coli* with β -glucuronidase.¹

We use a rapid scheme for the identification of *Klebsiella* spp isolated from urine, based on the colonial appearance on CLED agar (cystine-lactose-electrolyte deficient agar; Oxoid CM 301), results of direct antibiogram sensitivity, and rapid aesculin hydrolysis. Large, mucoid lactose-fermenting colonies that are resistant to only ampicillin and

Platelet response.

out haemorrhagic complications and the patient was well when last seen in September 1989.

The figure shows his platelet response. The platelet count rose from $53 \times 10^9/l$ to $153 \times 10^9/l$ (289%) by day 4, to a maximum of $416 \times 10^9/l$ (785%) on day 11, and when last seen was $142 \times 10^9/l$ on day 320.

Fresh frozen plasma has been used before in the treatment of adult immune thrombocytopenia.¹ On that occasion, however, it was used concurrently with other immunosuppressive agents such as vincristine, prednisolone, and azathioprine. Although a possible synergistic action between fresh frozen plasma and other agents can be postulated from that study, it is difficult to draw conclusions as to the likely role or mechanism of action of fresh frozen plasma in the treatment of immune thrombocytopenia. The use of compatible plasma ensures that the observed effect was not due to macrophage Fc receptor blockade by sensitised red cells. Studies in which technetium-labelled anti-D sensitised red cell removal by reticuloendothelial system macrophages was decreased after administration of intravenous immunoglobulin suggest that the immunoglobulin can induce widespread macrophage Fc receptor blockage.² Other evidence suggests that this effect is dose dependent.³ The comparatively small amount of immunoglobulin present in fresh frozen plasma (10 mg/ml—total dose infused 14 g), however, suggests that if indeed the observed effect is immunoglobulin dependent, then factors more related to the nature of the Ig component infused are likely to be responsible for it. Infusion of IgG in immune thrombocytopenia modulates the immune system as early as three days after infusion,⁴ and there is circumstantial evidence of a rapid fall in a platelet associated Ig after intravenous immunoglobulin. We feel that the most likely explanation is that there is a specific modulatory effect of the immune system from infused immunoglobulin, resulting in decreased anti-platelet antibody production.

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- 1 Bharucha C, Magennis H. Fresh frozen plasma in the treatment of chronic auto-immune thrombocytopenic purpura in adults: evidence for potentiating effect of Vincristine. *Clin Lab Haematol* 1985;7:119-24.
- 2 Bussell JB. Treatment with intravenous immunoglobulin: use in chronic idiopathic thrombocytopenic purpura to avoid splenectomy. *Intravenous immunoglobulins*. In: Waters AM, Webster ADB, eds. London: The Royal Society of Medicine, 1985:83-9.
- 3 Fehr J, Hoffman V, Kappeler U. Transient reversal of idiopathic thrombocytopenia by high dose intravenous gamma globulin. *N Engl J Med* 1982;306:1254-8.
- 4 Macey MG, Newland AC. Modulation of T and B cell subpopulations during the high dose intravenous immunoglobulin therapy. *Plasma Therapy and Transfusion Technology* 1988; 9:139-47.

Leukaemic phase of mantle zone lymphoma

Mantle zone lymphoma, also called intermediate lymphocytic lymphoma, is a histologically distinctive form of non-

Hodgkin's lymphoma with morphological features ranging from those of small lymphocytic lymphoma to small cleaved cell lymphoma.¹ Leukaemic manifestation of this lymphoma seems fairly uncommon and its detailed morphological and phenotypic characteristics have only recently been described.²

A 60 year old man was admitted into hospital in May 1987 because of a two month history of asthenia, weight loss, and fever. Physical examination showed enlargement of cervical, axillary, and inguinal lymph nodes. Both the liver and the spleen were also enlarged. Laboratory data were as follows: leucocyte count was $9.7 \times 10^9/l$; the differential was 0.29 segmented neutrophils, 0.67 lymphocytes, 0.02 monocytes, and 0.01 eosinophils. Lymphoid cells were heterogeneous, with respect to size and morphology. The lymphocytes were medium to large in size, with scanty to moderate cytoplasm, and a nucleus with an irregular outline some of which bore pronounced indentations. The chromatin was moderately coarse with nucleoli in some cells. Haemoglobin concentration was 115 g/l; platelet count was $156 \times 10^9/l$. The erythrocyte sedimentation rate was 16 mm in the first hour. Gamma globulin was 5.48 g/l, and lactic dehydrogenase was 634 U/l. Liver function tests were normal. A chest x ray film was reported as normal.

A left axillary lymph node biopsy was carried out. Histological examination showed diffuse infiltration by well differentiated lymphocytic cells, together with atypical lymphocytes resembling small cleaved cells. Germinal centres were not observed. Intermediate lymphoma was diagnosed. A bone marrow biopsy specimen disclosed nodular and interstitial infiltration by medium sized lymphocytes. An ultrasound scan showed multiple, enlarged, abnormal lymph nodes. Cyclophosphamide was started with poor results. Radiotherapy (20 Gy) to the spleen was carried out, resulting in pronounced improvement of abdominal symptoms. In the last follow up carried out in January 1990 enlarged lymph nodes were present and the spleen was palpable 10 cm below the costal margin. Laboratory data were as follows: leucocyte count $28 \times 10^9/l$; the white cell differential was 0.08, segmented neutrophils, 0.05 monocytes, 0.01 eosinophils, 0.86 atypical lymphocytes, haemoglobin concn-

Immunological markers of circulating and lymph node cells

Monoclonal antibody	CD	Peripheral blood	Lymph node
T3	3	17%	20%
T4	4	10%	12%
Cris 1	5	85%	90%
T8	8	5%	7%
J5	10	<5%	<5%
anti-βLFA 1	11a	59%	ND
LeuM5	11c	<5%	ND
Leu15	11b	<5%	ND
anti-βLFA 1B	18	53%	ND
B4	19	75%	65%
B1	20	75%	67%
Leu14	22	11%	ND
IOB8	23	8%	ND
IL-2	25	55%	ND
Leu17	38	73%	ND
Leu8	—	27%	ND
FMC7	—	70%	70%
Surface immunoglobulins			
μ		72%*	60%*
δ		negative	negative
τ		negative	negative
α		negative	negative
Kappa		70%*	60%*
Lambda		negative	negative
Mouse rosettes		5%	7%

*Strong intensity.