CORRESPONDENCE

Turnaround times in a microbiology laboratory

Drs Rogers, Bywater, and Reeves used a "simple method" to determine turnaround time in a microbiology laboratory. Their 11 week survey yielded data on only 140 samples. The authors rightly look forward to the computerisation of pathologic services. As our own laboratory computer records when the specimen is received and results reported, it is a truly simple matter to analyse the laboratory turnaround time of all specimens, or indeed any subgroup. As an example, we assessed the turnaround time for urine specimens from the first week in March. Specimens were logged in between 09.00h and 17.30h and were reported on the computer three times on weekdays, once on Saturday, and not on Sunday.

The figure shows the results for all 736 urine specimens examined. Ninety three percent of culture negative urine samples and 28% of culture positive samples were reported in less than 24 hours, and 73% of culture positives within 48 hours. No reporting on Sunday accounted for most of the remainder. During the week 11 (1.5%) specimens took more than 96 hours to be reported. Inspection of the computer and worksheets of these "outliers" identified the following reasons for delay: (i) failure to notice the specimen remained on a 'outstanding worklist' (n = 5); (ii) excessive work on non-significant, or mixtures of, organisms (n = 4); (iii) justifiable extra technical work on dysgonic or unusually resistant organisms (n = 2).

Only four specimens should reasonably have taken more than three days. The exercise prompted us to change operational aspects of the distribution of the outstanding worklist and to reinforce our rule that the need for detailed work on mixed cultures should be assessed by a medical microbiologist.

Although we determine only a proportion of the full turnaround time, efficient use of data captured routinely permits repeated, complete analysis of any group of patients or specimens in an audit process that is flexible, suited to automation, and almost effortless.


Serum alanine transaminase (ALT) reference range in Italy

We read with interest the article by Goldie and McConnell on ALT reference ranges. According to a decree of the Italian Ministry of Health last July, only blood products negative for HBsAg, HIV antibodies, hepatitis C virus antibodies and those showing ALT activities lower than, "1.5 times the highest value of the normal range of the local population of blood donors," can be transfused. We therefore reassessed the reference range and the cut off point for blood donation of ALT activity (respectively, < 35 IU/l and 52 IU/l) for both men and women.) at the two blood banks served by our laboratory.

We measured ALT in 314 regular blood donors (209 men and 105 women) attending the Legnago blood bank using SMAC II (Technicon) and in 311 regular blood donors (206 men and 105 women) attending the Nogara blood bank using Ektachem (Kodak). ALT activities, as previously reported, were skewed to the right, and the results are summarised in the table.

Notwithstanding the differences in the instrumentation and procedure used (pyridoxal phosphate is used only in Ektachem methodology), ALT reference ranges, especially in men, were comparable.

According to the guidelines of the Italian Ministry of Health, we should raise the cut off point for blood donations to 63 IU/l in Legnago and to 64-5 IU/l in Nogara for men, and to 42 IU/l in Legnago and 36 IU/l in Nogara for women. Our clinical experience and recent reports suggest that these points are too high. We think that the more cautious 97.5th percentile cut off point is preferable; all efforts need to be directed towards preventing false negative results, mostly in areas, such as northern Italy, where there are no severe shortages in blood donations.

Reference values for ALT for Legnago and Nogara blood banks (IU/l)

<table>
<thead>
<tr>
<th>Male donors Legnago (n = 209)</th>
<th>Female donors Legnago (n = 105)</th>
<th>Male donors Nogara (n = 206)</th>
<th>Female donors Nogara (n = 105)</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.4 (9.34)</td>
<td>14.7 (5.72)</td>
<td>20.0 (9.15)</td>
<td>12.1 (5.02)</td>
</tr>
</tbody>
</table>

The geographic, gender, and analytical differences, especially in temperature, of ALT activities preclude extrapolating reference ranges and cut off points for other nations or regions, or the results obtained using alternative instrumentation and methods. All the blood banks (including those in small or medium sized hospitals) must establish, in cooperation with the local laboratories, a sex specific reference range for ALT. Otherwise, an empirically chosen and unspecified cut off point for blood donations could severely misrepresent the local population of blood donors, obliterating the usefulness of ALT measurements as a "surrogate marker" of non-A, non-B hepatitis.

Measurement techniques for melanoma: a statistical comparison

The paper by Calder, Campbell, and Plaistow is misleading when it says that the depth of invasion of the dermis is the single most important prognostic factor in determining the outcome of any melanoma. 1 This factor is of importance in stage 1 melanomas, as quoted in their first reference, but in any melanoma the most important prognostic factor is the stage of the disease. 2 It should also be emphasised that in measuring the thickness of a melanoma the examination of multiple levels from multiple blocks to find the thickest part of the tumour is more important than the accurate measurement of tumour thickness on a single section.

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2 Ackerman’s Surgical Pathology, vol 1. 7th Ed. 135.

Dry Calder, Campbell and Plaistow comment: The letter from Goulding and Gradwell is correct in pointing out that the most important factor in the prognosis of a melanoma is the stage of the disease, and also that multiple blocks must be cut to find the thickest part of the tumour. Having found the thickest part of the melanoma, however, it is then important to be able to measure it accurately: this is the problem that our paper was addressing.

Cost effectiveness of dipssticks

MacGowan and colleagues express their doubts about the cost effectiveness of dipssticks for screening urines in a routine diagnostic laboratory. 1 We have reservations about their accuracy in detecting pyuria after performing a blind comparison of 1000 urine samples by BM stix and microscopy.

BM stix (Neutrophil + Leuco; Boehringer Mannheim, Germany) were graded as follows: 0 = negative; + = 10-25 pus cells/µl; ++ = about 75 pus cells/µl; or + + + = about 500 pus cells/µl, according to the manufacturer’s instructions. Microscopy was graded as 0 = less than 20 pus cells/µl; + = 20-50 pus cells/µl; ++ = 60-200 pus cells/µl; or + + + = 500 pus cells/µl. The results are summarised in table 1.

Table 1: Comparison of microscopy and BM stix for detecting pyuria

<table>
<thead>
<tr>
<th>Leucocyte esterase stix</th>
<th>Microscopy</th>
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<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>490</td>
</tr>
<tr>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>+</td>
<td>91</td>
</tr>
<tr>
<td>++</td>
<td>52</td>
</tr>
<tr>
<td>++++</td>
<td>34</td>
</tr>
<tr>
<td>Total = 1000</td>
<td>36</td>
</tr>
</tbody>
</table>

Of the 1000 urine samples examined, 499 (49.9%) were negative for pyuria by both microscopy and BM stix; 328 (32.8%) were positive by microscopy and BM stix; 21 (2.1%) were negative on microscopy but positive by BM stix; and 152 (15.2%) were positive for pyuria on microscopy but negative on BM stix testing. This suggests that BM stix grossly underestimate the presence of pyuria. Of the 480 samples in which pyuria was found on microscopy, BM stix were negative in 152, giving a false negative rate of 31.6% and a sensitivity of 76%. Furthermore, the degree of pyuria was underestimated by BM stix in 249 (51.8%) samples.

Several workers have advocated the use of dipssticks for screening urine before culture. 2-4 Most studies take 100 organisms/ml as evidence of significant bacteruria. Various criteria for a positive dipsstick have been used: positive nitrate or positive esterase, or esterase, or nitrite, or blood positive; visual appearance and nitrate or esterase positive; blood, protein, nitrate or esterase positive. 1

Using these differing criteria, dipssticks have been found to have a sensitivity of 85-93% and a specificity of 38-65%. MacGowan et al took >10⁴ organisms/ml as being significant, found dipssticks to have a sensitivity of 97.2% and a specificity of 57.5%.

In this study the sensitivity of dipssticks was 76%, but rather than using BM stix as a screening test before culture, we were only looking for the presence of pyuria, and unlike other workers, only took the leucocyte esterase into consideration. All our urine samples are preserved in boric acid because most are received from GPs and may spend up to 72 hours in transit. Delay in transit did not have any influence on the sensitivity of BM stix but it is conceivable that the presence of boric acid has some effect.

Table 2: Comparative results of subgroup

<table>
<thead>
<tr>
<th>Culture result</th>
<th>Pyuria on microscopy</th>
<th>Sensitivity of BM stix</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;10⁴ organisms/ml</td>
<td>107</td>
<td>89</td>
</tr>
<tr>
<td>10⁴-10⁵ organisms/ml</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>&lt;10⁴ organisms/ml</td>
<td>13</td>
<td>8</td>
</tr>
</tbody>
</table>

In a subgroup of 460 consecutive samples of urine we correlated the findings on microscopy and BM stix with the culture result (table 2).

Though numbers in some of the groups are small, it is apparent that, compared with microscopy, BM stix become increasingly insensitive at detecting pyuria in lesser degrees of bacteruria. The criterion of 10³ organisms/ml has been taken as the "gold standard" for defining significant bacteruria. In a symptomatic patient with pyuria, however, the presence of as little as 10² organisms/ml is felt to be significant by many workers. 5

If BM stix are used instead of microscopy to detect pyuria many genuine urinary tract infections, especially those with lower bacterial counts may be missed.

Before 1989 all our urine samples (about 100,000 a year) were tested by BM stix and culture on CLED agar by the method of Leigh and Williams. Microscopy was not performed routinely. In 1989 we abandoned dipsstick testing in favour of microscopy. Each sample of urine is placed in a well of a microtitre tray and examined on an inverted microscope connected to a TV camera and monitor; the results are simultaneously typed into the laboratory mainframe computer. This system is both rapid and easy to use and the resultant savings from not using dipssticks (over £12,000 each year) have permitted the funding of an additional MLSO to perform the microbiological examination of the samples.

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References


