Evaluation of CHROMagar candida for rapid identification and Etest for antifungal susceptibility testing in a district general hospital laboratory

The incidence and clinical importance of fungal infections in immunocompromised patients is increasing, and the isolation of multiple yeast species from clinical specimens is not uncommon. *Candida albicans* remains the most frequently isolated yeast species; but others, inherently or potentially resistant to the most frequently isolated yeast species; but microdilution methods were read after 24, 48, and 72 hours incubation at 37°C. Two specimens yielded mixed populations. The identification of the isolates was confirmed using API 20C AUX (Bio Mérieux, Basingstoke, UK).

Twenty five isolates, yielding green colonies, were identified as *C albicans* (germ tube positive). Six isolates, yielding non-green colonies and germ tube negative, were identified as *C glabrata* (four), *C parapsilosis* (one), and *C norvegensis* (one; unidentified by API 20C AUX, but confirmed by Centraalbureau voor Schimmelcultures, Delft).

Amphotericin B, fluconazole, and itraconazole MICs were determined by our laboratory (laboratory 1) using RPMI 20C AUX (Bio Mérieux, Basingstoke, UK).

The rapid identification and accurate susceptibility testing of yeast would help to modify treatment and influence clinical outcome. We conclude that CHROMagar candida and Etest are worth considering in a district general hospital setting.

<table>
<thead>
<tr>
<th>Antifungals</th>
<th>Methods</th>
<th>MIC range (mg/litre)</th>
<th>MIC&lt;sub&gt;G&lt;/sub&gt; (mg/litre)</th>
<th>MIC&lt;sub&gt;90&lt;/sub&gt; (mg/litre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphotericin B</td>
<td>Etest RPMI/casitone (lab 1)</td>
<td>0.125 to 1/0.03 to 0.25</td>
<td>0.25/0.125</td>
<td>0.5/0.125</td>
</tr>
<tr>
<td></td>
<td>Etest RPMI/casitone (lab 2)</td>
<td>0.125 to 1/0.06 to 0.5</td>
<td>0.125/0.125</td>
<td>0.5/0.25</td>
</tr>
<tr>
<td></td>
<td>Broth microdilution (lab 3)</td>
<td>0.125 to 0.06 to 64</td>
<td>0.25</td>
<td>0.5</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>Etest RPMI/casitone (lab 1)</td>
<td>0.125 to 64/0.5 to 64</td>
<td>0.25/2</td>
<td>32/8</td>
</tr>
<tr>
<td></td>
<td>Etest RPMI/casitone (lab 2)</td>
<td>0.25 to ≥256/1 to ≥256</td>
<td>5/2</td>
<td>32/64</td>
</tr>
<tr>
<td></td>
<td>Broth microdilution (lab 3)</td>
<td>0.125 to 64</td>
<td>0.25</td>
<td>32</td>
</tr>
<tr>
<td>Itraconazole</td>
<td>Etest RPMI/casitone (lab 1)</td>
<td>0.03 to ≥32/0.06 to ≥32</td>
<td>0.25/0.25</td>
<td>≥32/≥32</td>
</tr>
<tr>
<td></td>
<td>Etest RPMI/casitone (lab 2)</td>
<td>0.03 to ≥32/0.06 to ≥32</td>
<td>0.25/0.125</td>
<td>≥32/≥32</td>
</tr>
<tr>
<td></td>
<td>Broth microdilution (lab 3)</td>
<td>0.008 to 2</td>
<td>0.008</td>
<td>1</td>
</tr>
</tbody>
</table>

**Figure 1** Fluconazole (FL): change of morphology at endpoint. MIC, 48 mg/litre; itraconazole (IT): sharp end point. MIC, 0.5 mg/litre.

**Table 1** MIC ranges for yeast isolates as determined by Etest and spectrophotometric broth microdilution methods

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J E AMBLER
M KERAWALA
A YANEZA
J Y DRABU

Department of Microbiology,
North Middlesex Hospital NHS Trust,
London N18 1QX, UK

We would like to thank Å Karlsson (laboratory 2) and F Odds (laboratory 3) for their valuable comments and for performing the susceptibility testing.

We thank Dr Robert Mair for advice on resistant forms of infection.

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**Correspondence**
The use of the Reflection computer program for facilitating report formulation in the medical microbiology laboratory

There are several different computer systems in use in UK medical microbiology laboratories. Rule bases can be built into the system for the automatic release of comments or antibiotic sensitivities on laboratory reports in predetermined situations to aid manual amendment. The time consuming nature of data entry has already been highlighted. We describe a method to facilitate data entry and report amendment. Within our hospital, all result entry and reporting is performed through the pathology management system APEX (ACT Medisys Ltd, Newbury, Berkshire, UK). Most of the data input on to this system is via dumb terminals that attach to the server through the hospital network. In addition, there are presently two PCs within the department also attached to the hospital network running either Windows 95 or NT. By utilising the terminal emulation software Reflection (WRQ/Wickhill, Guildford, Surrey, UK), these PCs are able to replicate all the functionality achieved from a terminal on a windows based PC platform. However, because Reflection is a software component, it can incorporate features unavailable to a terminal.

A toolbar programme within the Reflection programme can be used to facilitate report amendment. This enables a toolbar to be created with icons on which a frequently used string of keystrokes can be recorded then played back by clicking on the icon. The computer can therefore be used like a tape recorder by recording keystrokes instead of sound. Figure 1 demonstrates the creation of an icon.

The method can be used to assist various functions, such as comment entry or amending antibiotic sensitivities. For example, to enter a comment:

- Icon 1 = to arrive at the comment entry point = five keystrokes.
- Icon 2 = comment “contaminated urine sample, please send a repeat” = 44 keystrokes.
- Icon 3 = to return to the main menu = five key strokes.

In this example 54 keystrokes have been reduced to three.

Different toolbars can be created for each group of samples—for example, sputum, urine, etc.

Figure 1 shows three toolbars open simultaneously, thus allowing toolbars to be used together. Customised toolbars can be saved onto disc, allowing them to be used on different machines, or for different users to have their own customised disc.

An important feature of a UK microbiology laboratory is the input of the medical microbiologist in laboratory supervision and report authorisation. Report amendment can be time consuming but can make a report more user friendly for the clinician and facilitate clinical care. The toolbar programme can assist this process.

The program can also be used by technical staff. A further advantage of this program is that it can be used as an adjunct to most computer systems. A hospital in which there is an integrated network can therefore incorporate the use of Reflection without having to change its current computer system.

This program may assist in more effective time management for hospital microbiologists, an increasingly important factor if their time is to be deployed in the most effective way.

The Reflection package is produced by WRQ (UK distributors: Wickhill Ltd, Bradstone Brook, Christmas Hill, Shelford, Guildford, Surrey GU4 8HR. Tel: +44 01483 466 500).

Figure 1 The Reflection toolbar program has the facility to record both text and function keystrokes and allow these to be played back. The “string to transmit” box shows the letters and function keys being recorded.

Biopsy Interpretation of Bone and Bone Marrow is a second, completely revised edition of a similar book published in 1985 by the same authors, but the book also resembles the Atlas of Bone Marrow Pathology published in 1990 by these authors.

In 31 chapters, the authors give a comprehensive overview of the diagnostic features of most disorders of the bone and bone marrow. After four introductory chapters, nine chapters are entirely dedicated to bone diseases. In chapter 14, metastatic bone disease is described, and in the following chapters most bone marrow disorders including the lymphoproliferative disorders are described. Sometimes, an introductory chapter precedes more specific chapters.

The book contains highly valuable information on issues that are not easily found in other text books, especially on bone diseases. It reflects the enormous experience of both authors in this field of diagnostic pathology.

In general, each chapter is clearly written and contains comprehensive tables either listing general features of a specific disorder, clinical characteristics, histological characteristics, or checklists.

The layout is excellent and the illustrations (most representing Giemsa stained slides of plastic embedded biopsies) with the schematic drawings are really superb.

However, there is also some criticism possible: in general, the background information (especially on pathophysiology) for each disorder is limited and the text is often relatively superficial. Just to give one example, in chapter 18, brief information on the different types of haemolytic disorders should be given, at least to alert the pathologist to the possibility of detecting a non-Hodgkin's lymphoma in the biopsy in association with cold agglutinin disease.

In some chapters, the data are incorrect. For instance, in the lymphoma chapters 25 and 27, data on the localisation of specific subtypes of non-Hodgkin's lymphomas are given. According to these data mantle cell lymphoma has a preferential paratrabecular localisation. This is incorrect, the infiltrates in mantle cell lymphoma being patchy and entirely random. It is likely that the described paratrabecular infiltrates represent localisation of follicle centre cell lymphomas with very few centroblasts often mixed up with centrocytic lymphoma in the past, but now very easy to distinguish with immunohistochemistry.

An amusing error is shown in tables 25.6 and 25.7 because the REAL and ILSG classifications are essentially the same, the author probably referring to the novel WHO classification in table 25.7. An insufficient updating in this area is also illustrated by the absence of more recently described entities such as hepatosplenic γδ T cell lymphoma with a diagnostic intrasinusoidal pattern of neoplastic T cells, best visible in bone marrow biopsies. In these chapters on lymphomas many other (small) errors, also concerning the cytogenetic data, can be found.

One disturbing general feature of the book is the lack of specific references in the text, whereas the references are listed alphabetically after each chapter. This makes it almost impossible to go back to the original literature data. A related weakness is the lack of quotation of sources in cases where detailed numerical data are given. For instance, in chapter 14 metastatic bone disease is described and data on the incidence of metastasis in breast cancer, prostate cancer, etc., are given. These data seem to be derived from the authors' large collections, but it is unclear how these series were selected (for instance, an incidence of 42% positive bone marrow biopsies in a random series of patients with breast cancer is very high and suggests that this represented a selected series of patients with advanced disease).

In summary, this book is an excellent atlas of bone and bone marrow pathology and as such it is an important adjunct for each (haematopathologist). However, it is of limited value to obtain adequate (background) information.

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Calendar of events

Full details of events to be included should be sent to Maggie Butler, Technical Editor JCP, The Cedars, 36 Queen Street, Castle Hedingham, Essex CO9 3HA, UK; email: maggiebutler@piloree.prestel.co.uk

BSCC Northern Spring Tutorial: Gynaecological Cytology
8 March 2001, Manchester, UK
Further details: BSCC Office, PO Box 352, Uxbridge UB10 9TX, UK. (Tel +44 01895 274 020; fax +44 01895 274 080; email lesley.couch@psilink.co.uk)

International Consultation on the Diagnosis of Noninvasive Urothelial Neoplasms
11–12 May 2001, University of Ancona School of Medicine, Torrette, Ancona, Italy
Further details: R Montironi, Ancona Italy (email r.montironi@opcsiani.unian.it), D G Bostwick, Richmond, VA, USA (email bostwick@bostwicklaboratories.com), P-F Bassi, Padua, Italy (email bassipf@ux1.unipd.it), M Droller, New York, USA (email michael_droller@smpтик.mssm.edu), or D Waters, Seattle, WA, USA (email waters@vet.vet.purdue.edu)

Further details: The Academic Secretary, Department of Haematology, St Mary's Hospital Campus of ICSM, Norfolk Place, London W2 1PG, UK. (Fax +44 020 7262 5418)

Haematological Morphology and Leukaemia Classification for Cytogeneticists
29 March 2001, St Mary's Hospital, London, UK
Further details: The Academic Secretary, Department of Haematology, St Mary's Hospital Campus of ICSM, Norfolk Place, London W2 1PG, UK. (Fax +44 020 7262 5418)

6th European Forum on Quality Improvement in Health Care
29–31 March 2001, Bologna, Italy
Further details: BMA/BMJ Conference Unit, BMA House, Tavistock Square, London WC1H 9JR, UK. (Tel +44 020 7383 6409; fax +44 020 7383 6869; email Quality@bma.org.uk; website www.quality.bmj.org)

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J E Ambler, M Kerawala, A Yaneza and Y J Drabu

*J Clin Pathol* 2001 54: 158-159
doi: 10.1136/jcp.54.2.158

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