Cost identification analysis of culture methods for trichomoniasis

OBJECTIVE

Presently, trichomoniasis is one of the most common curable sexually transmitted diseases worldwide. Culture is the standard diagnostic method for confirmation of trichomoniasis. However, there are several commonly used media, such as cysteine/peptone/liver-infusion maltose (CPLM), modified CPLM and BBL company. METHOD An evaluation was made of the costs of these tests in medical practice. Cost identification analysis was performed. RESULTS According to this study, it can be shown that the cost per accurate diagnosis for modified CPLM is the least expensive choice. CONCLUSIONS Modified CPLM is the best method for culture diagnosis of trichomoniasis, based on the principles of medical laboratory economics.

MATERIAL AND METHOD

Alternatives for culture of T. vaginalis

There are three common culture methods for confirmation of the diagnosis of trichomoniasis, namely cysteine/peptone/liver-infusion maltose (CPLM), modified CPLM and the BBL company commercial product.

Diagnostic property analysis

The three media were studied for their diagnostic property on 21 cases of trichomonas vaginitis diagnosed by microscopic examination of vaginal samples from patients with leukorrhea.

Cost analysis

The cost in US dollars for performing each test was reviewed. The cost used was set as the price of each test at the reference laboratory in Thailand (Division of Parasitology, King Chulalongsorn Memorial Hospital, Bangkok, Thailand).

Cost identification analysis

The cost for each alternative mode of diagnosis of trichomo-
Trichomoniasis was calculated. Based on a recent validation study, it was assumed that the efficacy of the three studied tests is similar. The cost identification analysis was then performed. The cost of each medium was calculated by summing up the cost of the ingredients. The costs of processing, workload and batch control of ingredients and medium were not included, since they are not part of the direct cost of the media and also they are similar for all the media.

RESULTS

Regarding their diagnostic property, all three media provided positive results for all positive cases (sensitivity = 100%). The costs of each alternative method of diagnosis of trichomoniasis are presented in table 1. The cost of CPLM is the highest and that of modified CPLM is the lowest.

DISCUSSION

Trichomoniasis is perhaps the most common curable STD worldwide. It is associated with potentially serious complications such as preterm birth and the acquisition and transmission of HIV. The immunology of a related organism, T. foetus, which causes disease in cattle, has been investigated to some extent, but more work is needed for the human strain, T. vaginalis. In addition, although trichomoniasis is easily treated with oral metronidazole, there is concern that the number of strains resistant to this antibiotic are increasing.

For diagnosis, microscopy of a wet mount from a vaginal specimen is a routine screening test, while there are many confirmation tests. According to a recent study, the sensitivity of the various alternative methods were: polymerase chain reaction technique (PCR) 95%, enzyme-linked immunosorbent assay 82%, direct fluorescence antibody 85%, and culture 95%. It can be shown that the sensitivity of the culture is similar to that of PCR, and therefore, it is accepted as a standard confirmation test for trichomoniasis.

In this study an economic analysis of the three common culture tests widely used for the diagnosis of trichomoniasis was performed, from which it can be shown that modified CPLM is the least expensive choice. Therefore, this alternative is the best method for culture diagnosis of trichomoniasis, based on the principles of medical laboratory economics.

Table 1. Cost and utility of each alternative method of diagnosis of trichomoniasis.

<table>
<thead>
<tr>
<th>Composition</th>
<th>Cost (US dollar)</th>
<th>Composition</th>
<th>Cost (US dollar)</th>
<th>Composition</th>
<th>Cost (US dollar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacto peptone</td>
<td>3.75</td>
<td>Bacto peptone</td>
<td>3.75</td>
<td>BBL</td>
<td>18.59</td>
</tr>
<tr>
<td>Bacto agar</td>
<td>0.34</td>
<td>Bacto agar</td>
<td>0.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cystein HCl</td>
<td>1.69</td>
<td>Cystein HCl</td>
<td>1.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maltose</td>
<td>1.09</td>
<td>Maltose</td>
<td>1.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liver infusion</td>
<td>5.00</td>
<td>Liver infusion</td>
<td>5.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NaCl</td>
<td>0.03</td>
<td>NaCl</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CaCl₂</td>
<td>0.03</td>
<td>CaCl₂</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NaHCO₃</td>
<td>0.03</td>
<td>NaHCO₃</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horse serum</td>
<td>37.50</td>
<td>Amino acid (BME)</td>
<td>0.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amphotericin B</td>
<td>0.69</td>
<td>Human serum</td>
<td>0**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penicillin G</td>
<td>0.38</td>
<td>Amphotericin B</td>
<td>0.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Streptomycin</td>
<td>0.16</td>
<td>Penicillin G</td>
<td>0.38</td>
<td>Streptomycin</td>
<td>0.16</td>
</tr>
<tr>
<td>Total</td>
<td>50.69</td>
<td>Total</td>
<td>9.57</td>
<td>Total</td>
<td>18.59</td>
</tr>
</tbody>
</table>

*Commercially available

** This can be obtained by collection of left fresh refrigerated serum from routine analysis at any medical laboratory. This can be done without any additional cost since the separation of serum is the basic procedure in laboratory analysis in every routine medical laboratory. There is also no ethical problem since the used serum is the serum left from analysis.
ΠΕΡΙΛΗΨΗ

Ανάλυση κόστους της καλλιέργειας ως μέθοδου διάγνωσης της τριχομονάδωσης

W. SAKSIRISAMPANT,1 J. PROWNEBON,1 V. WIWANITKIT2
1Department of Parasitology, 2Department of Laboratory Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Αρχεία Ελληνικής Ιατρικής 2009, 26(4):517–519

ΣΚΟΠΟΣ Σήμερα, η τριχομονάδωση αποτελεί ένα από τα συχνότερα ιάσιμα σεξουαλικώς μεταδιδόμενα νοσήματα παγκοσμίως. Η καλλιέργεια είναι συνήθης μέθοδος διάγνωσης. Εντούτοις, υπάρχουν αρκετά συχνά χρησιμοποιούμενα υλικά, όπως cysteine/peptone/liver-infusion maltose (CPLM), τροποποιημένη CPLM και BBL. ΥΛΙΚΟ-ΜΕΘΟΔΟΣ γίνεται αξιολόγηση του κόστους των χρησιμοποιούμενων εξετάσεων στη συνήθη ιατρική πράκτική. ΑΠΟΤΕΛΕΣΜΑΤΑ Το χαμηλότερο κόστος για την ακριβή διάγνωση της τριχομονάδωσης αφορά στη χρησιμοποίηση της τροποποιημένης CPLM μέθοδου. ΣΥΜΠΕΡΑΣΜΑΤΑ Η συγκεκριμένη μέθοδος αποτελεί την καλύτερη μέθοδο καλλιέργειας για τη διάγνωση της τριχομονάδωσης με βάση τα οικονομικά δεδομένα του ιατρικού εργαστηρίου.

Λέξεις ευρετηρίου: Διάγνωση, Καλλιέργεια, Κόστος, Τριχομονάδωση

References


Corresponding author:
W. Saksirisampant, Department of Parasitology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand 10330 e-mail: wilaisaksiri@hotmail.com