Evaluation of liquid biphasic Granada medium and instant liquid biphasic Granada medium for group B streptococcus detection

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Introduction

Group B streptococci (GBS) are transmitted from the mother to the newborn. Prevention of neonatal infection is achieved by intrapartum prophylaxis given to mothers colonized with GBS at 35 to 37 weeks of pregnancy.

Materials and methods. Liquid biphasic Granada medium (LB) and instant liquid biphasic Granada medium (ILB) were evaluated for GBS detection. Vaginal swabs obtained from 300 women were inoculated onto LB or ILB, or onto Todd-Hewitt broth and analyzed with the ATB system (comparison method).

Results. Prevalence of GBS was 20% (61/300). LB and Todd-Hewitt with ATB detected GBS in 20% of women, and ILB in 19% of women. No growth was observed at four hours in any of the media studied. At 10 h and 14 h, identification of GBS was possible in 43/300 (14%) and 53/300 (18%) of ILB cultures, respectively, and in 32/300 (11%) and 46/300 (15%) of LB cultures.

Conclusion. All the media used are suitable for GBS detection. The majority of GBS were identified in ILB and LB cultures at 10 h and 14 h.

Granada agar is a selective and differential medium for rapid detection of beta-hemolytic GBS and has been recommended by several authors for GBS detection. Other Granada media have been recently commercialized, such as liquid biphasic Granada (LB) and instant liquid biphasic Granada (ILB), which seem to have some advantages, such as shorter time requirements (4 h, 10 h) for identifying GBS (both LB and ILB), easy reading, and a longer shelf life (ILB).

The objectives of the present study were to evaluate liquid biphasic Granada medium and instant liquid biphasic Granada medium as compared to the reference method (Todd-Hewitt broth and subculture into blood agar) for the detection of GBS.

**Materials and methods**

From January to April 2006, triplicate swabs were used to collect vaginal specimens from 300 women consulting at Fernando da Fonseca Hospital, Amadora, and Oeiras Primary Health Center, Oeiras (Portugal). Swabs were transported to our laboratory at the Instituto de Higiene Medicina Tropical in Stuart transport medium and reported values. Granada LB presented the highest sensitivity (100%) and Granada ILB a sensitivity of 92% (56/61).

The ILB medium proved to be less sensitive than the detection rate described by De la Rosa et al. The fact that some of the ILB tubes were less concentrated (less amount of powder for the same 3 mL of distilled H2O) and/or errors in the lyophilization process could explain the lower detection rate found. Improved quality control is likely to resolve these problems.

The shortest incubation period needed for identification of GBS was 10 h. At that time, ILB presented the highest sensitivity, while at 14 h, 87% of GBS had grown on this medium and 75% on LB. It is also worth noting that no growth was observed after 18 h in either of the Granada media evaluated in the present study and after 24 h in the blood agar plates. A shorter incubation period, as is obtained with ILB, is important since fast results are useful, particularly in women starting premature labor.

In conclusion, it seems that all the media used in our study are suitable for GBS growth. Nonetheless, ILB and LB offer some advantages, since the majority of GBS grown in these media can be identified at 10 h and 14 h.

**Results**

Group B streptococci were identified in 61 of 300 women (20%) on Granada LB medium, in 60 women (20%) on Todd-Hewitt broth with the ATB system, and in 56 (19%) women on ILB medium.

There was no GBS growth in Todd-Hewitt with antibiotics after 24 h incubation or in any of the other media after 18 h. No GBS growth was observed at 4 h in any media. However, at 10 h and 14 h, the presence of the orange pigment was observed (fig. 1) in 43/300 (14%) and 53/300 (18%) of the ILB tubes and in 32/300 (11%) and 46/300 (15%) of the LB tubes, respectively (table 1).

**Conclusions**

As previously stated, the screening approach strategy recommend by the CDC is based on GBS detection in the vagina and rectum of women at 35 to 37 weeks of pregnancy. Therefore, optimum prevention of neonatal GBS infection will only be achieved if all colonized women are detected during pregnancy and treated intrapartum. Therefore, sensitive and rapid laboratory techniques are necessary to identify GBS-carrying women to facilitate implementation of intrapartum antibiotic prophylaxis.

In this study, we assessed different culture media for GBS growth, comparing sensitivities and time of incubation needed for identification of the microorganism. The sensitivity of the Todd-Hewitt broth technique found in our study was high, 98% (60/61), which is in keeping with reported values. Granada LB presented the highest sensitivity (100%) and Granada ILB a sensitivity of 92% (56/61).

**TABLE 1. Group B streptococci culture results in different media**

<table>
<thead>
<tr>
<th>Medium</th>
<th>4 hours</th>
<th>10 hours</th>
<th>14 hours</th>
<th>18 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Todd-Hewitt with ATB</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>60/300 (20)</td>
</tr>
<tr>
<td>Granada LB</td>
<td>0</td>
<td>32/300 (11)</td>
<td>46/300 (15)</td>
<td>61/300 (20)</td>
</tr>
<tr>
<td>Granada ILB</td>
<td>0</td>
<td>43/300 (14)</td>
<td>53/300 (18)</td>
<td>56/300 (19)</td>
</tr>
</tbody>
</table>

*No GBS growth was observed.
Since ILB presented results similar to those obtained with LB and it can be kept at room temperature for up to 2 years, it may be a good option when refrigeration is not available or when long storage periods are needed. Further studies should be performed to determine whether the incubation period needs to be increased to more than 18 hours, since no growth of GBS was observed after this time.

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References