**Abstract:**

Objective: To evaluate the efficiency of Group B Streptococcus detection using the combination of the Hardy Diagnostics StrepB Carrot Broth™ Kit (CB) and the CHROMagar Colorex Strep B Agar (COLOREX – Inverness Medical Canada). The yield and turn-around times were compared to the conventional method of OXOID Columbia CNA/Group B Strep Agar with 5% Sheep Blood (CNA) and PML Microbiologicals Group B Strep Broth (GBSB). The cost differential between the different protocols was also examined.

Method: Dual vaginalrectal swabs were collected for Group B Streptococcus screening. One swab was cultured on CNA/GBSB. The other swab was inoculated into the CB broth. All cultures were incubated at 35°C for 18 hours. The GBSB was subcultured to another CNA and incubated at 35°C for 18 hours. Prolex Streptococcus grouping (STREPGP) were performed on any suspicious growth on the CNA. Direct STREPGP were performed on all positive (orange colour) CB broths. All CB broths (orange and colourless) were subcultured to CNA and COLOREX and incubated at 35°C for 18 hours. STREPGP was performed on any suspicious growth on the subcultured CNA and the pink and blue colonies isolated from the COLOREX.

Results: Of the total 391 specimens examined, there were 92 GBS isolated by at least one culture protocol. The CNA/GBSB protocol detected 67 (72.8%) of the positives. There were 76 (82.6%) GBS isolated from the Carrot Broth (orange coloured CB), with three false positive tubes. The CB/CNA protocol detected 89 (96.7%) of GBS while the CB/COLOREX protocol yielded 90 (97.8%) of the GBS isolates.

**Table 1. Result Summary**

<table>
<thead>
<tr>
<th>No. of Specimens</th>
<th>CNA/GBSB (Broth)</th>
<th>CNA/GBSB (Colorex)</th>
<th>CNA/GBSB (Broth Only)</th>
<th>Carrot Broth (Broth Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNA/GBSB Protocol</td>
<td>$2.92</td>
<td>$2.77</td>
<td>$6.59</td>
<td>$6.46</td>
</tr>
<tr>
<td>Carrot Broth/Colorex Protocol</td>
<td>$6.01</td>
<td>$3.56</td>
<td>$9.57</td>
<td>$9.57</td>
</tr>
</tbody>
</table>

The turnaround times for all protocols were similar (reporting within 48 hours).

The average cost applicable for the different protocols are as follows:

**Figure 2. Cost Calculations of Three Group B Streptococcus Screening Workflow Diagram**

**Introduction:**

Many women carry Group B Streptococcus (Streptococcus agalactiae) in their vagina or large bowel. This organism may be transmitted to the neonate as it passes through the birth canal, resulting in potentially devastating systemic disease in the newborn. The Centre for Disease Control (CDC) recommends screening pregnant women for Group B Streptococcus (GBS) carriage at 35-37 weeks gestation by culture of a vaginorectal swab received for GBS screening. Both swabs were placed in one Amies transport medium prior to delivery to the laboratory. Figure 1 shows the work up algorithm of this study.

**Discussion:**

The conventional method of CNA/GBSB missed 27% of the isolates. Carrot Broth with either the CNA or Colorex Group B Agar produced a much higher yield (sensitivity of 96.7% and 97.8% respectively). Turnaround time for both of these methods was similar.

**Table 2. Average Group B Streptococcus Screen Cost Calculations for total positivity rate of 23.5%**

<table>
<thead>
<tr>
<th>Supplies Cost each</th>
<th>Labour Cost each</th>
<th>Total Average Cost each</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>$6.46</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>$9.57</td>
</tr>
</tbody>
</table>

**Methods:**

Dual vaginorectal swabs were collected through the obstetrics clinic from pregnant patients between 35 to 37 weeks of gestation for GBS screening. Both swabs were then cultured in separate Amies transport medium prior to delivery to the laboratory. Figure 1 shows the work-up algorithm of this study.

For each specimen, one swab was cultured initially onto CNA and GBSB (for the CNA/GBSB protocol). All cultures were incubated at 35°C for 18 hours. BE test and STREPGP were performed on any suspicious growth on the subcultured CNA. CNA/GBSB protocol:

Following incubation any suspicious colonies from the CNA were tested for Group B Streptococcus by bile esculin test (BE) and Prolex Streptococcus grouping (STREPGP). The GBSB was subincubated to another CNA and incubated at 35°C for 18 hours. BE test and STREPGP were performed on any suspicious growth on the subcultured CNA.

**Figure 1. Group B Streptococcus Detection by Carrot Broth and Colorex GBS Agar vs. Conventional Colistin/Nalidixic Acid Agar with Group B Strept Broth Method – Work up algorithm**

The cost of all the media and the subsequent work up materials used were recorded for the calculation of the average cost per test by each method.