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Comparison of Commercial Amies Transport Systems with In-House Amies Medium for Recovery of Neisseria gonorrhoeae

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Microbiologists are still encumbered by the variable performance of Amies charcoal transport medium in recovery of Neisseria gonorrhoeae. The objective of this study was to evaluate and select a good quality commercial system to replace our in-house preparation. We adsorbed 0.1 ml of a suspension from 30 gonococcal isolates onto each swab type and replaced the swab into the transport medium. We plated the swabs to New York City medium at 0, 24, 48, 72, and 96 h. We compared the survival of each isolate in the commercial Amies transport systems with that in our in-house Amies transport medium. The best recovery was observed with Copan transport systems. Some systems are inadequate and unacceptable for culture of gonococci.

The incidence of gonorrhea in Canada was 5,500 cases in 1995. Despite the declining rates since 1981, infections with gonorrhoea (GC) still cost the Canadian health care system in excess of $43 million a year (4). GC are still technically difficult to preserve and recover from clinical specimens. An internet search (2a) for publications regarding GC transport and specimen handling from 1966 to 1998 revealed 6 publications from 1966 to 1974, 10 for 1975 to 1979, none in the period 1980 to 1984, 2 for 1985 to 1989, none from 1990 to 1994, and 3 for 1995 to 1998. Previous work was done principally from 1966 to 1979. Despite that work, we continue to struggle with the quality of transport media.

In 1967, C. R. Amies, medical microbiologist for the Ontario Public Health Laboratories (PHL) published his modification of Stuart’s transport medium (1) for improved recovery of GC from clinical specimens. We (the PHL) have been evaluating commercial systems for 5 years to replace the in-house preparation. This study reports recent evaluations of commercial Amies-like transport swab systems.

(Previous work was reported at the 65th Conjoint Meeting on Infectious Diseases of the Canadian Association for Clinical Microbiology and Infectious Diseases, St. John’s, Newfoundland, 26 to 29 October 1997 [5].)

We used fresh GC isolates, rather than stock cultures, which are poor predictors of medium performance characteristics. Thirty isolates recovered from clinical specimens on New York City (NYC) medium with antibiotics (colistin, lincomycin, amphotericin B, and trimethoprim) (2) were used for each system. An internet search (2a) for publications regarding GC transport and specimen handling from 1966 to 1998 revealed 6 publications from 1966 to 1974, 10 for 1975 to 1979, none in the period 1980 to 1984, 2 for 1985 to 1989, none from 1990 to 1994, and 3 for 1995 to 1998. Previous work was done principally from 1966 to 1979. Despite that work, we continue to struggle with the quality of transport media.

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TABLE 1. Survival of 30 GC isolates in Amies transport systems

<table>
<thead>
<tr>
<th>Swab system</th>
<th>No. of isolates surviving at plating interval of:</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>0 h 24 h 48 h 72 h 96 h</td>
</tr>
<tr>
<td>Transystem 7073a</td>
<td>30 30 29 27 15</td>
</tr>
<tr>
<td>CultureSwab 100660TA</td>
<td>30 30 29 22 Not tested</td>
</tr>
<tr>
<td>Transwab 7029b</td>
<td>30 29 14 0 0</td>
</tr>
<tr>
<td>Transsystem 7323c</td>
<td>30 30 29 28 26</td>
</tr>
<tr>
<td>Transwab 97G28d</td>
<td>30 30 28 16 4</td>
</tr>
<tr>
<td>Culturette N7KA020f</td>
<td>29 29 3 0 0</td>
</tr>
<tr>
<td>NCS 7F26A</td>
<td>30 28 14 0 0</td>
</tr>
<tr>
<td>PHL 1390/2058/5028g</td>
<td>30 30 28 20 13</td>
</tr>
</tbody>
</table>

a Transystem (Copan Italia, Bovezzo, Italy); standard medical peel pouch with bottom layer of paper and top plastic film.
b CultureSwab (manufactured by Copan for Difco Laboratories, Detroit, Mich.); standard medical peel pouch with bottom layer of paper and top plastic film.
c Starswab (Starplex Scientific, Etobicoke, Ontario, Canada).
d Transystem (Copan Italia); completely plastic peel pouch.
e Transystem (Copan Italia); without charcoal packaged with completely plastic peel pouch.
f Transwab (Medical Wire and Equipment Co., Ltd., Corsham, England).
g Culturette (Becton Dickinson and Co., Cockeysville, Md.); only 29 cultures tested.
h NCS (Starplex Scientific).

In-house lots. (In-house lots yielded about 500 transport vials, which required us to use three different lots over the period of evaluation.)

system 7323 were next best, both with 15 of 30 isolates still viable at 96 h. PHL followed next in order of performance, with 13 of 30 isolates recovered.

Copan Transystem lots 7073 and 7029 had been tested in a previous study (12 May 1997 to 15 September 1997) along with other lots and were found to give the best performance. Copan lots 7029 and 7073 showed no decline in performance in this study compared with the study done in 1997. In the 1997 study, we recovered 18 of 20 GC isolates from lot 7029 and 16 of 20 from lot 7073 at 72 h. In this study, we recovered 27 of 30 isolates from 7073 and 28 of 30 from lot 7029 at 72 h.

Until 1996, we had been unable to find a commercial transport system as good as our own in-house preparation, but saw promise in early trials with Difco CultureSwab, manufactured by Copan for Difco Laboratories. Copan indicated they were collaborating with Difco and using new innovations to improve the performance of their transport medium. Copan modified their product by using oxygen-neutralizing and scavenging agents to counteract superoxide radicals. Copan lots 7029 and 7323 had a modified plastic barrier packaging that allowed for nitrogen gassing at the time of production. This modification was intended to retard oxygen penetration into the medium for improved shelf life. The best performance overall was with the Copan product (lots 7029, 7073, and 7323). Copan lot 7323 contained no charcoal and was formulated for customers preferring to prepare smears from transport media. These lots were superior to our in-house preparation. Lot 7029 preserved 26 of 30 cultures for 96 h compared with lots 7073 and 7323, which both sustained 15 of 30 cultures. The Starplex, NCS, and Culturette transport swabs performed poorly, with a major decline in viability of isolates between 24 and 48 h. Our results support the data by Perry (3) who compared the Copan Transystem without charcoal to the Culturette system. He was unable to recover GC at 24 or 48 h in the Culturette system from 0.1 ml of a 10^6-CFU/ml inoculum compared with 23% of the inoculum at 24 h and 6% at 48 h recovered with the Copan system.

An important feature of culture medium performance is the age of the medium. Shelf life depends largely on the age of the medium. Copan Diagnostics and Starplex decoded each product, giving us manufacturing dates. We tested Copan lot 7073 manufactured in March 1997 and lot 7029 manufactured in November 1996 twice and found no deterioration in performance within 14- and 18-month periods of manufacture, respectively. The difference in performance of the three Copan lots at 96 h may be related to better packaging in lot 7029 (plastic barrier) and the absence of charcoal in lot 7323.

On 1 October 1998, the PHL adopted the use of Copan Transystem with charcoal and plastic barrier film packaging. Our decision was based on our evaluation of performance in this study.

The variability in performance seen in this study reinforces the need to do quality assurance before using Amies transport medium for transport of specimens for recovery of fastidious organisms like Neisseria gonorrhoeae.

We thank the Toronto Clinical Bacteriology Laboratory for supplying most of the GC isolates, the Microbiological Support Services of the Toronto Public Health Laboratory for supplying the NYC medium and PHL Amies medium, and Neal den Hollander for critical review of the manuscript.

REFERENCES