Evaluation of Three Commercial Latex Agglutination Kits for Serogrouping β-Hemolytic Streptococci

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Introduction
Group A Streptococcus (GAS) is one of the most common pathogens responsible for infections in patients suffering from pharyngitis. Unlike some of the other Beta Hemolytic Streptococci (BHS), GAS possesses a number of virulence factors that allow it to cause a wide variety of sequelae including endocarditis, meningoencephalitis, respiratory, skin and soft tissue infections. When left untreated, sequelae such as rheumatic fever, glomerulonephritis and scarlet fever may occur. Early diagnosis and differentiation from other BHS is important in preventing the severe complications that may be caused by prolonging untreated GAS infection.

Materials and Methods
A total of 279 isolates of BHS were tested. All of these originated from fresh clinical throat swabs initially plated on 5% Sheep Blood Columbia Agar (BA) and incubated 16-18 hours under anaerobic conditions to enhance hemolysis. Subcultures were prepared for each isolate to ensure purity. Any suspicious, minute colony types belonging to the Streptococcus mitis group were ruled out using the Vogues Proskauer (VP) test. The Oxoid Enzyme Extraction kit, considered our reference standard, was used to resolve any discrepant results. Once the Lancefield group was determined, each of the isolates was tested with each latex group using:

1. Phadebact Direct Colony method
2. PathoDx Direct Colony method
3. Prolex Blue Acid Extraction method

All kits were used according to instructions defined by the manufacturer. Each isolate was tested with each latex group to check for cross-reactivity. (Group D was not considered.) Times for agglutination to occur varied from immediate to 30 seconds and, for the Direct Colony methods, was very dependent on technique.

Results

<table>
<thead>
<tr>
<th>Group</th>
<th>Phadebact</th>
<th>PathoDx</th>
<th>Prolex</th>
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<td>G</td>
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</tbody>
</table>

Table 1: Number of strains correctly identified

Agglutination time (interval between beginning of mixing and agglutination detection) varied from immediate to 30 seconds and, for the Direct Colony methods, was very dependent on technique. Time was also dependent on amount of organism, but independent of group of testing kit.

Discussion

All test kits performed well with respect to accuracy. Only one false negative occurred with Phadebact Group C. Cross reactions were negligible for all kits. The few cross reactions that did occur were detected very close to the one minute time restriction, long after the actual group had reacted. Phadebact had 4 cross reactions (1.4%) whereas Prolex had 2 (0.7%) and Prolex had 1 (0.3%).

Agglutination time was least for Prolex but all kits gave results within 30 seconds, well within the one minute deadline. No significant differences were found in rapidity when performing all 5 latex reactions per isolate. However, there were considerable time differences when testing only one latex group per isolate. Because of the extra manipulation time involved in acid extraction techniques, Prolex required on average twice as long as the direct methods of PathoDx and Phadebact. The latter two rely on proper technique and although product inserts mention that colonies are to be rubbed thoroughly and smoothly onto the test cards, both fail to mention that this step is paramount to obtaining reliable results.

Materials and Methods

Conclusion

Rapid direct colony testing methods for grouping hemolytic streptococci, when performed properly, are as accurate as acid extraction methods. High volume laboratories should consider rapid direct colony agglutination kits for faster TAT when performing single latex grouping.

Direct colony methods require proper preparation technique. PathoDx kits were easier to use in terms of dropper bottle safety and size, reaction cards were larger and offered more tests per isolation.

All test kit results were easy to read.

Acknowledgements

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References