Comparison of Directigen Group A Strep Test with a Traditional Culture Technique for Detection of Group A Beta-Hemolytic Streptococci

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The Directigen Group A Strep Test (DGAST), a new rapid method of detecting group A beta-hemolytic streptococci directly from throat swabs, was compared with a traditional culture technique for the detection of group A beta-hemolytic streptococci. Five hundred oropharyngeal swabs from pediatric and adult patients were cultured and then processed by using the DGAST. Of the 144 specimens positive by culture, 131 were DGAST positive (sensitivity, 90.9%). Of the 356 specimens negative by culture, 353 were DGAST negative (specificity, 99.2%). Twelve of the 13 false-negative DGAST results were from pediatric patients. One hundred isolates of non-group A beta-hemolytic streptococci were recovered, primarily groups C, F, and G. The DGAST is easy to perform, rapid, sensitive, and very specific for detection of group A beta-hemolytic streptococci directly from swabs. Supplemented the DGAST with a culture on a 5% sheep blood agar plate would enhance detection of group A beta-hemolytic streptococci, especially in pediatric patients.

Rapid diagnostic methodologies are changing traditional approaches to clinical microbiology (3, 5). The Directigen Group A Strep Test (DGAST; Hynson, Wescott & Dunning, Baltimore, Md.), a new test using antigen extraction and latex agglutination, enables clinical laboratories to detect group A beta-hemolytic streptococci directly from throat swabs within 1 h of receipt of a specimen as compared with 24 to 48 h by routine culture techniques. With this new technique available, clinical laboratories must consider new approaches to process throat specimens to detect pharyngitis caused by group A beta-hemolytic streptococci.

To determine whether the DGAST is as sensitive and specific as traditional techniques, we processed 500 consecutive oropharyngeal swabs by a standard culture technique and then by the DGAST. The results of both pediatric and adult specimens were tabulated separately as were the incidences of group A and non-group A beta-hemolytic streptococci.

Patient sampling and specimen collection. Five hundred consecutive oropharyngeal specimens from outpatients were submitted to the laboratory for study from 21 November 1983 to 3 February 1984. The patients were identified as pediatric if they were 18 years old or younger or as adult if they were 19 years or older. The specimens were collected on a rayon swab (Culturette; Marion Scientific Corp., Rockford, Ill.) and transported to the laboratory within 4 h to be processed.

Specimen processing. Each swab was inoculated onto one plate of Trypticase soy agar (BBL Microbiology Systems, Cockeysville, Md.) containing 5% sheep blood prepared in our laboratory. Each plate was streaked by a semiquantitative method to allow estimate of relative growth expressed as 4+, 3+, 2+, and 1+. Each plate was stabbed in the area of initial inoculation and in the area of isolation. The plates were incubated aerobically for 14 to 16 h in a GasPak jar (BBL) at 35°C and then examined for the presence of beta-hemolytic streptococci. The plate was reexamined after another 24 h of incubation in 5% CO2 at 35°C for additional growth of beta-hemolytic streptococci.

Cultural identification. All beta-hemolytic streptococcal isolates were tested by the 0.04 Unit Taxo A bacitracin disk (BBL) sensitivity method. Any zone of inhibition after overnight incubation at 35°C in 5% CO2 was considered positive for group A beta-hemolytic streptococci. Each beta-hemolytic streptococcal isolate was also grouped as A, B, C, D, F, or non-group A-G by the Streptex Rapid Latex Test Kit (Wellcome Research Laboratories, Beckenham, England). The instructions of the manufacturer were followed. DGAST. After each appropriately labeled swab was inoculated onto a 5% sheep blood plate, a DGAST was performed. The swab was placed into a numbered glass test tube (12 by 75 mm) containing 0.5 ml of extraction reagent, which was vortexed for 5 s and then incubated in a 35°C heat block for 1 h. After incubation, as much extract as possible was expelled from the swab before testing. Fifty microliters of extract was mixed with anti-group A reagent (antibody-coated latex particles specific for group A beta-hemolytic streptococci) on a glass slide. After 4 min of rotation at 100 rpm, the agglutination of latex particles in the mixture was determined by using a direct light.

Of the 500 samples, 366 (73.6%) were DGAST negative and 134 (26.8%) were DGAST positive. No beta-hemolytic streptococci were recovered from 256 (51.2%) of the cultures. Beta-hemolytic streptococci were found in the remaining 244 (48.8%) cultures. Of these, 144 (59%) were group A beta-hemolytic streptococci and 100 (41%) were non-group A beta-hemolytic streptococci. Of the non-group A beta-hemolytic streptococci grown, 45 (45%) were group C, 22 (22%) were group F, 18 (18%) were group G, 9 (9%) were group B, and 6 (6%) were non-group A-G. As has been noted in previous studies, we found the predominant non-group A beta-hemolytic streptococci to be groups C, F, and G, in that order (4, 6).

Of the 144 specimens positive for group A beta-hemolytic streptococci by culture, 131 were positive by DGAST (sensi-
Approximately half were isolated three times effective was the culture. A negative DGAST result was expected for group 356 3 353 DGAST-negative specimens, for group 33 99 32 DGAST-positive cultures were 99.5% (33/33). The result of the pediatric population indicates that ca. 8% of group B beta-hemolytic streptococci would be missed by DGAST alone. A backup culture would also aid in detection of other possible agents of pharyngitis (2).

The cost of performing the DGAST is greater than that of culture alone. The benefits of DGAST warrant the additional expenditure. The rapid results allow the physician to treat promptly and appropriately, thereby preventing any sequelae due to group B beta-hemolytic streptococcal infection, and also aid in preventing the overuse of antimicrobial agents. The DGAST is easy to perform and suitable for use in clinical laboratories.

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**LITERATURE CITED**


