Evaluation of Spot CAMP Test for Identification of Group B Streptococci

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The CAMP (Christie-Atkins-Munch-Petersen) test is commonly used for the presumptive identification of Streptococcus agalactiae (Lancefield group B). Using 350 clinical isolates of beta-hemolytic streptococci, we compared a 30-min spot CAMP test with the standard overnight CAMP test and the Lancefield precipitin test. We found 99% agreement among all three tests for all streptococci tested. The spot CAMP test is a rapid, inexpensive, and accurate method for identifying group B streptococci.

Infections in adults and neonates caused by group B streptococci are associated with high morbidity and mortality. Gram-positive cocci isolated from normally sterile specimens from such patients require prompt and accurate identification. Presumptive tests for identification of group B streptococci are often used by clinical laboratories because of their relative simplicity and cost-effectiveness compared with serological identification (e.g., the Lancefield precipitin, latex agglutination, or coagglutination tests). Of the several presumptive tests, the CAMP (Christie-Atkins-Munch-Petersen) test, originally described by Christie et al. (1), is often used because it requires minimal reagents, employs a simple methodology, is inexpensive, and rarely gives false-positive reactions with other streptococcal groups.

In an effort to make the standard CAMP test more rapid or more simple or both, several modifications have been proposed (6, 10, 11). In 1977, Kaplan et al. (R. L. Kaplan, M. B. Goldman, and J. N. Goldman, Program Abstr. 17th Intersci. Conf. Antimicrob. Agents Chemother., p. 439. 1977) described a 20-minute spot CAMP test that uses as the reagent a crude beta-lysin-containing filtrate derived from a broth culture of Staphylococcus aureus. The spot CAMP test can be performed directly on the primary isolation plate even if the colony(s) has been removed from the agar surface for other studies. Thus, an isolate can be presumptively identified as a group B streptococcus within 18 to 24 h after the specimen is obtained from the patient.

We compared the spot CAMP test with the standard overnight CAMP test and the Lancefield precipitin test on 350 clinical isolates of catalase-negative, beta-hemolytic, gram-positive cocci. The standard CAMP test was performed as described by Darling (2). The Lancefield precipitin test was performed on extracts of all isolates prepared by the autoclave method (4) with antisera for groups A, B, C, D, E, F, and G, all obtained from Difco Laboratories, Detroit, Mich. The spot CAMP reagent was prepared by growing S. aureus (ATCC 25923) in Todd-Hewitt broth (Difco) for 48 h at 35°C. The broth culture was centrifuged to sediment the cells, and the supernatant was filtered through a 0.45-μm bacteriologic filter. In addition to the spot CAMP reagent made in our laboratory, we used a commercial reagent prepared by the same procedure (Spot CAMP Test, product 2112305, lot 4303: Pasco Laboratories, West Ridge, Colo.).

A single batch of beta-lysin-containing reagent was frozen at −70°C and thawed as needed for the testing of all isolates. A drop of reagent from a Pasteur pipette was placed next to a beta-hemolytic colony(s) on a blood agar plate (Trypticase soy agar [21239] with 5% sheep blood; BBL Microbiology Systems, Cockeysville, Md.). The blood agar plate was held at room temperature for 20 to 30 min. An arc or circle of enhanced hemolysis next to the colony(s) where the reagent was dropped was considered a positive reaction for group B streptococcus. A spot CAMP test was performed on each lot of blood plates with a known group B streptococcus to ensure correct performance characteristics. All lots of blood agar plates performed satisfactorily.

Of the 350 isolates tested, 92 (26%) were from group A, 207 (59%) were from group B, 15 (5%) were from group C, 8 (2%) were from group F, 21 (6%) were from group G, and 7 (2%) could not be grouped by the Lancefield precipitin test. There were no discrepancies between the two spot CAMP reagents and the standard overnight CAMP test. There were no false-positive results by any CAMP test (i.e., no isolate from any Lancefield group except group B had a positive CAMP reaction). Two isolates that were positive by the Lancefield precipitin test were negative by both spot CAMP reagents and the overnight test.

In summary, the sensitivity of the spot CAMP test was 99%, and the specificity was 100%, with a predictive value of 100% for a positive test and 98.6% for a negative test. DiPersio et al. (3) and others (5, 6, 8, 10) have had similar results in previous studies of the various CAMP tests. The spot CAMP reagent, prepared either commercially or in house, is stable for at least 1 year at refrigerator temperature (9) and can be made in the laboratory or purchased commercially. It is inexpensive (approximately $0.15 per test for the commercial reagent), rapid, very simple to perform, and as accurate as the standard CAMP test.

The precautions that must be taken when performing the spot CAMP test are as follows. (i) The isolate must be a catalase-negative, gram-positive coccus, because other gram-positive cocci (i.e., some coagulase-negative staphylococci) and some gram-positive rods (7) can give a positive CAMP reaction. (ii) The test must be performed on agar containing sheep (or bovine) erythrocytes. The CAMP test will not work on agar containing horse, human, or rabbit erythrocytes (1).

Use of the spot CAMP test gives accurate 30-min identification of group B streptococcus from the primary culture.

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plate, thus eliminating subculturing and holding plates and requisitions for an additional 24 h. These characteristics make the spot CAMP test a valuable procedure in rapid, cost-effective laboratory testing.

LITERATURE CITED


