Coagglutination as a test for *Neisseria gonorrhoeae*

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After growth on Thayer–Martin medium, 196 strains of freshly isolated *Neisseria gonorrhoeae* were subjected to a coagglutination reaction. The sensitivity of the test was 94% and did not vary much in the hands of four consecutive technicians. In a group of 99 strains tested by one of the technicians non-interpretable results were obtained with 17% of the strains when the test was performed with cells taken from the first or primary plate, against 9% when cells from the secondary (subcultured) plate were used. The lowest number of non-interpretable results was found with a modified Thayer–Martin medium, which also showed the lowest number of false negatives (2%).

No non-interpretable results were obtained when the bacterial suspension was first heated to 100°C for 3 min. In a group of 14 recently isolated strains of non-gonococcal species there was only one, preventable, false-positive strain and there were none in a group of 12 meningococci (all of them laboratory strains).

In comparison with the fermentation test with Lingelsheim's sugars, the coagglutination test with cells taken from the primary plate with Thayer–Martin medium yielded a conclusive result more often. The test is simple and rapid and does not require special technical equipment. It seems to deserve a place as a confirmative test in the search for gonococci in samples from the urogenital-anal area.

**INTRODUCTION**

In general, rapid laboratory tests are very useful in the diagnosis of infectious diseases. Their result may not only affect the choice of therapy to be instituted but may also be decisive for subsequent epidemiological investigations. This is also true for gonococcal infections. Since it is contended that a coagglutination test can contribute to rapid diagnosis, and because it has become commercially available, we decided to evaluate this test.

The test is based on the binding of immunoglobulin by protein A which is present on staphylococci of Cowans serogroup I. Forsgren and Sjöquist (1966) proved that the binding took place by means of the Fc-part of the immunoglob-
bulin molecule. By making an anti-serum against an antigen and letting the antibodies therein fix themselves onto the formalin-stabilized staphylococci the nature-coated particle could be used to visualize the reaction of the antigen with its antibody.

The application of this principle to the identification of gonococci has been described by Danielsson and Kronvall (1974). One year before, it had been used to serogroup streptococci (Christensen et al., 1973) and to serotype pneumococci (Kronvall, 1973) and mycobacteria (Juhlin and Winblad, 1973).

MATERIALS AND METHODS

From November 1978 to November 1979 the coagglutination test was used in parallel with the routine tests for gonococci. Patients were all from the Rotterdam region. Samples were almost all of genital or anal origin.

Routine tests were carried out with cells grown on Thayer – Martin medium (Thayer and Martin, 1966) and on Thayer – Martin medium from which the antibiotics vancomycin, colimycin and nystatin (VCN) had been omitted. The Gonococcus (GC) agar base for both media was obtained from Difco. In addition, a modified Thayer – Martin medium was used as described by Stacey and Warner (1973) in a study on a carbohydrate disc identification technique.

Subcultures (secondary plates) were grown on the media described above or on GC agar plus either 30 mg haemin or 250 mg ferri pyrophosphate per liter.

All plates were incubated in an atmosphere containing 10% CO₂. A Gram stain was made of suspected colonies and an oxidase test performed. If both tests were positive, carbohydrate fermentation was investigated by inoculation into so called ‘Lingelsheim’s sugars’ medium which contains 20% (v/v) ascites fluid.

The test procedures and the reading of the results were carried out according to the instructions of the manufacturer (Pharmacia, Uppsala, Sweden). A suspension of the same staphylococci carrying immunoglobulins from unimmunized rabbits was used as a control. Positive tests were considered those in which the result using the reagent surpassed that of the control by two plusses. We defined sensitivity as the percentage of positives in a series of isolates of proven Neisseria gonorrhoeae. Specificity was defined as the percentage of negatives in a series of cultures consisting solely of non-gonococcal species.

RESULTS

As shown in Table 1 the sensitivity in a series of 196 strains of Neisseria gonorrhoeae was 94%. The differences in sensitivity as found by the four consecutive technicians were slight (less than 10%) and the sensitivity was con-