

EVALUATION OF THE GO SLIDE, A GROWTH TRANSPORT SYSTEM FOR THE LABORATORY DIAGNOSIS OF GONORRHOEA

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Summary

A growth transport system, the GO Slide (Roche Diagnostica), for the isolation of *Neisseria gonorrhoeae* from clinical specimens was evaluated. This system was compared with culture on chocolate agar (CA) and modified Thayer-Martin (MTM) agar, and Gram-stained smear for the diagnosis of gonorrhoea. Of 94 urethral specimens from symptomatic males, 77.7% were positive on MTM, 80.9% were positive on CA and Gram stain, and 81.9% were positive on GO Slide. Of the 77 isolates, 26.0% were penicillinase producers, 12.3% belonged to WI serogroup and 87.7% belonged to WII/III serogroup. The ease of transportation and the easy examination of growth on agar surfaces make the GO Slide an attractive system. It would be particularly useful for general practitioners without culture facilities to transport specimens to the laboratory for the isolation of *N. gonorrhoeae*.

Keywords: GO Slide, growth transport system, laboratory diagnosis, gonorrhoea.

INTRODUCTION

Neisseria gonorrhoeae is a commonly sexually transmitted pathogen that can cause a variety of sequelae.¹ It is therefore important for the laboratory to accurately identify this organism. Failure to do so may lead to lack of treatment of cases and contacts with no follow-up investigations. The possible medical and epidemiological consequences are serious.

The isolation of *N. gonorrhoeae* from clinical specimens was greatly improved with the development of a selective medium for pathogenic neisseriae by Thayer and Martin in 1966.² Later, New York City medium was introduced by Faur and co-workers,^{3,4,5,6} which further improved isolation rates of *N. gonorrhoeae*. Several reports in the literature have suggested that New York City medium is more sensitive than modified Thayer-Martin (MTM) or Martin-Lewis media for the recovery of *N. gonorrhoeae*.^{6,7,8,9}

The viability of *N. gonorrhoeae* may be affected during transportation of the swabs to the laboratory. To overcome this drawback, several growth transport systems have been developed and are currently in use.^{10,11} Recently, an agar carrier, the GO Slide (Roche Diagnostica, F. Hoffmann-La Roche & Co. Ltd., Basle, Switzerland), has been marketed for the isolation of *N. gonorrhoeae* from clinical specimens. The slide is covered on one side with MTM agar and on the other side with chocolate agar (CA). The insertion of a CO₂ tablet causes the release of CO₂ when

it comes in contact with the moist atmosphere in the plastic tube. The GO Slide is suitable for growing and transporting throat, urethral, cervical or rectal specimens. In this study, we compared GO Slide with the transport and growth systems used in our laboratory for the isolation of *N. gonorrhoeae* from urethral specimens of the symptomatic men. Gram-stained smears, which are used as a part of our routine procedure in the diagnosis of gonorrhoea in males, were also included in this evaluation.

MATERIALS AND METHODS

Specimen collection

The patient population consisted of 94 symptomatic males who attended the Skin Clinic of the Sultanah Aminah General Hospital. Urethral specimens from these patients were collected with a platinum loop.

Bacteriological culture

The routine procedure for evaluating the men included a Gram stain of urethral discharge. Urethral specimens collected were promptly streaked on MTM (Oxoid) and CA plates at the site of specimen collection. Upon inoculation, the plates were immediately placed in a candle extinction jar and incubated at 37°C for up to 48 h and checked after 24 and 48 h for growth. Identification of *N. gonorrhoeae* was confirmed by colony

morphology, Gram stain, oxidase reaction, and carbohydrate utilization tests (**Oxoid**).¹² To detect penicillinase-producing strains of gonococci, the Beta-Lactamase Detection Strips (Disposable Products Pty. Ltd., Australia) and a 10-unit penicillin disc test¹³ were used. Serogrouping of the isolates was performed using the Phadebact Monoclonal GC Test (Pharmacia Diagnostics, Uppsala, Sweden).

GO Slide

The GO Slides were inoculated according to the manufacturer's instructions with a slight modification. Briefly, the specimen was streaked first on the agar side containing MTM using a platinum loop which was then flamed before it was streaked on the side with CA. The inoculated slides were then placed in plastic tubes after the insertion of CO₂-generating tablets. The tubes were closed firmly and incubated at 37°C for up to 48h. Growth of the typical oxidase-positive colonies was checked after 24 and 48 h and identified as described above.

RESULTS

Table 1 shows the results obtained with culture and Gram stain for 94 urethral discharge specimens from symptomatic men. Among these specimens, 73 (77.7%) were positive on MTM and 76 (80.9%) were positive on CA and Gram stain. Of these, 77 (81.9%) were also positive on GO Slide, growth being observed on both sides of the system in all cases. One specimen was positive on all the three culture systems but negative on the Gram-stained smear. Growth of *N. gonorrhoeae* was not observed on MTM and CA from 4 and 1 specimens, respectively; but these were all

Gram-stained smear-positive specimens.

Of the 77 isolates of *N. gonorrhoeae*, 20 (26.0%) were found to be penicillinase producers. The overall serogroup distribution was 12.3% **WI** AND 87.7% **WII/III**. Of the isolates belonging to the **WI** serogroup, 55.6% were **beta-lactamase** producing; of those belonging to **WII/III**, only 23.4% were beta-lactamase producing (Table 2).

DISCUSSION

In this study, isolation rates of 81.8%, 80.9% and 77.7% for *N. gonorrhoeae* were obtained on GO Slide, CA and MTM, respectively, from 94 urethral discharge specimens. A recent evaluation of the GO Slide conducted by Anand and Gubash¹⁴ reported a sensitivity of 88% for males when the sensitivity of the MTM was assumed to be 100%. The GO Slide we evaluated performed much better as all the specimens that were positive on CA and MTM also yielded growth on this system. Of the 77 specimens from which *N. gonorrhoeae* was isolated on the GO Slide, 1 specimen was not recovered on CA, and 4 specimens were not recovered on MTM.

It has been observed that approximately 2–10% of *N. gonorrhoeae* strains may be inhibited by the concentration of vancomycin present in isolation media.^{1,5,15,16} The concentration of vancomycin in our MTM medium was 3.0 mg per litre which may have been too high for the 4 strains of *N. gonorrhoeae* which failed to grow on it. However, the detailed composition of the media used on the GO Slide was not available. Generally, 3 to 7% CO₂ is recommended for the isolation of *N. gonorrhoeae*.¹³ The candle

TABLE 1
CULTURE AND GRAM STAIN RESULTS
FOR 94 URETHRAL DISCHARGE
SPECIMENS

Medium/Stain	No. of patients with positive test (%)
CA	76 (80.9)
MTM	73 (77.7)
GO Slide*	77 (81.9)
Gram stain	76 (80.0)

*Growth was observed on both sides of GO Slide.

TABLE 2
N. GONORRHOEAE CHARACTERIZED
BY SEROGROUPING AND
PENICILLINASE PRODUCTION

Serogroup (No. of isolates)	No. of penicillinase-producing isolates (%)
WI (9)	5 (55.6)
WII/III (64)	15 (23.4)
Not typed (4)	0

jar is reported to produce a CO₂ concentration of 2.3 to 3.5%.^{17, 18, 19} The concentration of CO₂ generated in the GO Slide system, which was not known to us, may have also enhanced the isolation rate of *N. gonorrhoeae* as isolation on CA and MTM media was achieved by the use of the candle extinction jar.

Penicillin-resistant *N. gonorrhoeae* infections are being seen with increasing frequency worldwide.^{0, 21, 22} Our study revealed that 26.0% of the isolates were penicillinase producers. Serogrouping performed on our isolates showed that 12.3% of them were **WI** whereas 87.7% were **WII/III**. We also found 55.6% of all isolates belonging to the **WI** serogroup were penicillinase-producing *N. gonorrhoeae*. However, only 23.4% of all **WII/III** isolates tested were penicillinase-producing. These data are similar to those of Carlson *et al.*²³ but in conflict with those of Sandstrom *et al.*²⁴

The diagnosis of the urethral gonococcal infection in symptomatic males is generally determined by Gram-stained smear and culture of the urethral exudate. In sexually transmitted disease clinics, antimicrobial therapy for these patients is frequently based on the results of the Gram-stained smear alone. Studies have shown this technique to be more than 98% specific for the diagnosis of gonorrhoea when **gran-negative** diplococci are observed within polymorphonuclear leucocytes.^{3, 25} Our evaluation of the Gram Stain confirmed this finding as we achieved a sensitivity and specificity of 98.7% and 100%, respectively, with this procedure.

We found the CO Slide capable of promoting the growth of large and easily recognizable colonies of *N. gonorrhoeae*, and they were generally visible after 24 h of incubation. Also, the system remained stable on storage in the refrigerator. It has an attractive design both for ease of transportation and for the examination of growth on agar surfaces. The cost of the GO Slide may limit its application in most laboratories. Currently, the list price of one CO Slide is MR 4.08. It would, however, be particularly useful for the general practitioners who do not have laboratory facilities to prepare isolation media for the culture of *N. gonorrhoeae* to determine its antimicrobial susceptibility. Due to its small size as compared to the larger and more cumbersome candle extinction jar, the CO Slide is easy to handle during transportation to the laboratory where culture facilities are available.

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