

SCREENING NEISSERIA GONORRHOEAE FOR PENICILLINASE PRODUCTION

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Summary

One hundred and seventeen strains of *Neisseria gonorrhoeae* were isolated from patients attending LNJP hospital in New Delhi during the period June, 1977 to February, 1978. All these strains were tested for the production of penicillinase by two methods namely rapid iodometric and chromogenic cephalosporin tests. None of the strains was found to produce penicillinase.

Although penicillin still remains the drug of choice in the treatment of acute uncomplicated gonorrhoea, therapeutic failure with this drug is becoming more common¹. The widespread use of suboptimal dosages of penicillin in the treatment of gonococcal infections has led to the gradual selection of mutants of *N. gonorrhoeae* in several areas of the world with a stepwise increase in resistance². In India resistance to penicillin has been reported from several sources^{3,4,5}. The recent discovery of plasmid-mediated β -lactamase production by *N. gonorrhoeae* has far graver implications in

the therapy and control of gonorrhoea since these strains may be totally resistant to penicillin^{6,7,8}. Since no reports were available of the incidence of such strains in India we considered it worthwhile to screen the locally isolated strains of *N. gonorrhoeae* for beta lactamase production.

Material and Methods

Strains: One hundred and seventeen strains of *N. gonorrhoeae* were isolated from 112 clinically suspected cases of gonorrhoea. All the strains were identified on the basis of Gram reaction, oxidase test and biochemical reactions⁹.

Testing for Beta lactamase production

Beta lactamase production was tested by the rapid iodometric method¹⁰ and the chromogenic cephalosporin method¹¹.

The following strains were used as controls :

1. Beta-lactamase producing *N. gonorrhoeae* strain Oslo 2 20098/77.
2. A local strain of *Staph aureus* producing penicillinase.

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3. Standard Oxford strain of *Staph aureus* NCTC 6571.
4. Local sensitive strain of *N. gonorrhoeae*.
4. Ambady BM, Sugathan P, Pappali C, Penicillin resistant *Gonorrhoea* in Trivandrum, *Ind J Derm Ven*, 1966; 32 : 25.

Results and discussion

None of the tested strains was found to produce beta lactamase by the two methods employed. Penicillinase producing gonococci have been implicated in 30.40% of infection in Phillippines and 9% of infection in Liverpool¹².

Antibiotic sensitivity tests alone may not give a correct picture since it has been observed that high levels of in vitro resistance to penicillin has been seen with some strains which do not show evidence of penicillinase production^{13,14}. There is a real danger of introduction of penicillinase producing strains in India and a constant screening of strains should be a regular feature of laboratories isolating the strains to identify and localise such cases and contacts. There are several methods for testing the production of penicillinase by *N. gonorrhoeae*. We have used two methods which are easy to perform and give rapid results that can be made available on the day of the test itself. Further, iodometric method has the added advantage that reagents are readily available and inexpensive.

References

1. Singh R : Penicillin resistance in *Gonorrhoeae*, *Indian J Dermatol Venereol*, 1963; 29 : 106.
2. Report (1978) WHO Tech Report series No. 616, *Neisseria gonorrhoeae* and gonococcal infections.
3. Rama Ayangar MC: Antibiotic sensitivity and treatment failure in gonorrhoea: *Indian J Dermatol Venereol*, 1967; 33 : 4.
5. Bhujwala RA, Sood P, Pasricha JS : Susceptibility of *Neisseria gonorrhoeae* in vitro to antibiotics (Penicillin, Oxytetracycline, chloramphenicol and rifampicin), *Indian J Med Res*, 1973; 61 : 1563.
6. Ashford WA, Golash RG and Hemming VG : Penicillinase producing *Neisseria gonorrhoeae*, *Lancet*, 1976; 2 : 657.
7. Phillips I : Beta-lactamase producing penicillin resistant gonococcus, *Lancet*, 1976; 2 : 656.
8. Turner GC : Ratcliffe JG, Anderson D : Penicillinase producing *Neisseria gonorrhoeae*, *Lancet*, 1976; 2 : 793.
9. Cruickshank R, Duguid JP, Marmion BP: *Medical Microbiology*, Churchill Livingstone, Edinburgh, 1973.
10. Reyn A : *Neisseria gonorrhoeae* producing penicillinase WHO weekly epidemiological report, 1976; 38: 1.
11. Callaghan O'CH, Morris A, Kirby SM : Novel method for detection of B - lactamase by using a chromogenic Cephalosporin substrate, *Antimicrob Agents and Chemother*, 1972; 1 : 283.
12. Percival A, Rowlands J, Corkill JE : Penicillinase producing gonococci in Liverpool, *Lancet*, 1976; 2 : 1379.
13. Shtibel R : Non - beta lactamase producing *Neisseria gonorrhoeae* highly resistant to penicillin, *Lancet*, 1980; 2 : 39.
14. Osoba AO, Montefiore DG, Scogbctum KO : Sensitivity pattern of *Neisseria gonorrhoeae* to penicillin and screening for B - lactamase production in Ibadan, Nigeria, *Brit J Vener Dis*, 1977; 53 : 304.