

## Theme 1: Recent advances in the microbiology and immunology of gonorrhoea

### Sensitivity of *Neisseria gonorrhoeae* to penicillin in West Germany

D. PETZOLDT, K. GRÜNDER, AND U. NEUBERT

From the University Medical School, Lübeck; and the Department of Dermatology, University of Munich, West Germany

**SUMMARY** The sensitivity of gonococci to penicillin in Germany has largely decreased in the last 22 years. No significant decrease has occurred, however, in the last three years, but the results show that a slight tendency to decrease may be persisting.

#### Introduction

Information on the sensitivity of *Neisseria gonorrhoeae* to penicillin in Germany is meagre, but sensitivity seems to be decreasing.

In Hamburg in 1955 Meyer-Rohn (1970) stated that the minimum inhibitory concentrations (MICs) did not exceed 0.001 IU/ml. In 1961 the range of MICs was 0.05-0.18 IU/ml. In 1969 no further decrease was established.

In Munich the sensitivity of *N. gonorrhoeae* to penicillin was determined in 1962 and in 1974. In 1962 more than 90% of 250 strains were of normal sensitivity ( $IC_{50}$  of 0.063 IU/ml or lower) (Röckl, 1972), whereas in 1974 only 56% of 104 strains were sensitive (Petzoldt and Reyn, 1976). In addition, the peak of the distribution curve within the sensitive range had moved to the right (Fig. 1).

In Lübeck the penicillin sensitivity of gonococci was determined in 1976. Seventy-seven per cent of the strains tested were found to be sensitive (Gründer and Petzoldt, 1977) (Fig. 2).

The aim of the present study is to investigate the strains collected in 1977 and to compare them with the results quoted above.

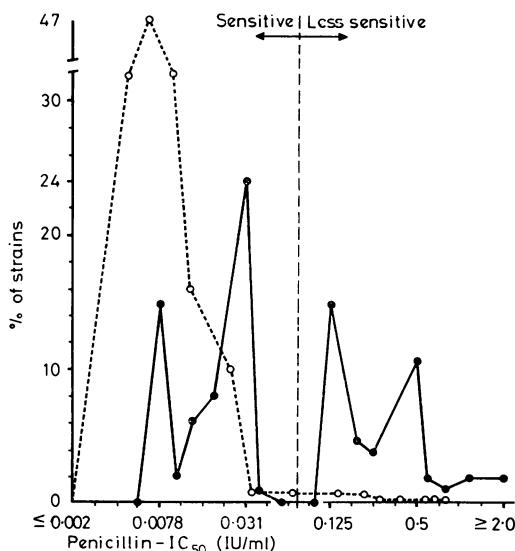


Fig. 1 Penicillin sensitivity of *Neisseria gonorrhoeae* in Munich (1962 and 1974)

o--o 1962; ●—● 1974

#### Present study

One hundred and fifty-four strains of gonococci (77 from Munich and 77 from Lübeck) were stored in liquid nitrogen. The sensitivity testing was performed

Address for reprints: D. Petzoldt, Abteilung für Dermatologie, Klinikum der Medizinische Hochschule Lübeck, Ratzeburger Alle 60, D-2400 Lübeck, West Germany

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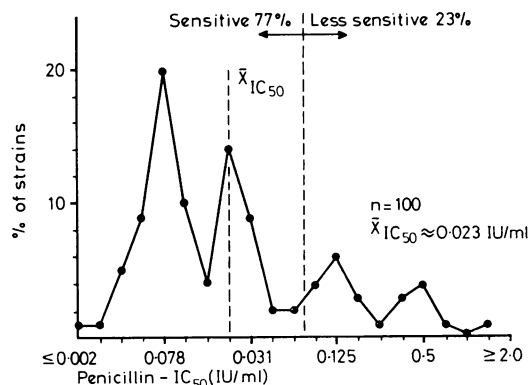


Fig. 2 Penicillin sensitivity of *Neisseria gonorrhoeae* in Lübeck (1976)

by the plate dilution method of the World Health Organisation Gonococcus Reference Centre, Copenhagen (Reyn *et al.*, 1963).

### Results and discussion

In Munich 52% of the strains showed normal sensitivity. The average  $IC_{50}$  was 0.068 IU/ml (Fig. 3). The results in 1974 were very similar.

In Lübeck 69% of the strains showed normal sensitivity; in comparison with the results of 1976 (77%) this means a definite decrease in sensitivity. The mean  $IC_{50}$  was 0.032 IU/ml in 1977 and 0.023 IU/ml in 1976 (Fig. 4). There is evidently no significant difference between the two results.

A comparison of the sensitivity of the strains isolated in Munich with those isolated in Lübeck is of interest. The strains from Munich had a mean

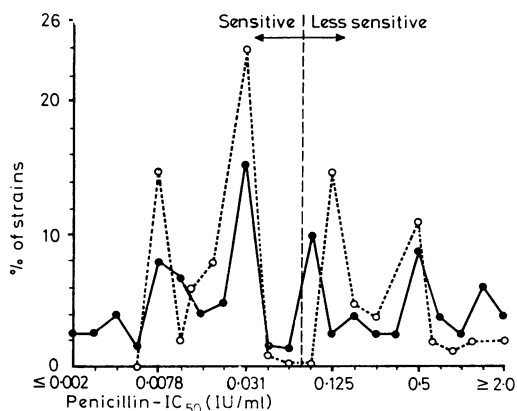


Fig. 3 Penicillin sensitivity of *Neisseria gonorrhoeae* in Munich (1974 and 1977)

o---o 1974; ●—● 1977

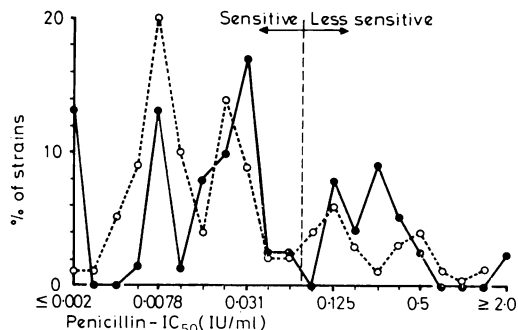


Fig. 4 Penicillin sensitivity of *Neisseria gonorrhoeae* in Lübeck (1976 and 1977)

o---o 1976; ●—● 1977

$IC_{50}$  of 0.068 IU/ml and were significantly less sensitive than the strains from Lübeck with an average  $IC_{50}$  of 0.032 IU/ml ( $t=2429$ ,  $P<0.02$ ).

The cause of this difference can only be a matter of speculation. Undoubtedly, the extent of clandestine prostitution is greater and the supervision of the prostitutes by the medical services is more difficult in a big capital city like Munich than in Lübeck, a city of only 240 000 inhabitants. The more pronounced decrease in sensitivity to penicillin of strains in Munich may, therefore, reflect a greater illicit administration of this antibiotic.

In February 1978 a penicillinase-producing strain was isolated in Munich (Neubert and Ruckdeschel, 1979). A 33-year-old German patient, who had had sexual intercourse with a prostitute in Cebu (Philippines), complained of a purulent discharge. *N. gonorrhoeae* was isolated, but treatment with penicillin was unsuccessful. A single injection of 1.5 g cefuroxime and 1 g probenecid orally eradicated the symptoms within a few hours. Control investigations gave negative results. The production of  $\beta$ -lactamase was demonstrated with a chromogenic cephalosporin (Glaxo 87/132). The pattern of susceptibility to various antibiotics is shown in the Table (Neubert and Ruckdeschel, 1979).

Table Minimum inhibitory concentrations ( $\mu$ g/ml) of the isolated  $\beta$ -lactamase-producing strain (Munich 966/78)

Antibiotic	Inoculum size (organisms/ml)			Result
	$10^5$	$10^6$	$10^7$	
Benzylpenicillin	16	64	256	Resistant
Cefuroxime	0.25	0.25	0.25	Sensitive
Spectinomycin	16	16	16	Sensitive
Tetracycline	2	4	4	Moderately sensitive

The strain also had diminished susceptibility to tetracycline; this corresponds to the characteristics of other strains of Far East origin (Percival *et al.*, 1976).

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