Inactivation of gonococci by procaine penicillin *in vivo*

A pilot study

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SUMMARY A pilot study was carried out of 25 male volunteers with gonococcal urethritis. After intramuscular administration of 3 megaunits procaine penicillin and 1 g oral probenecid the urethral culture results for *Neisseria gonorrhoeae* remained positive up to five hours and thereafter became negative. These results may be useful in providing guidelines for advice on the duration of sexual abstinence following treatment. It is suggested that similar studies should be carried out in women.

Introduction

Many studies have been carried out to determine the efficacy of treating patients with gonorrhoea with injections of procaine penicillin in different dosages plus oral probenecid (Morton and Harris, 1975; King and Nicol, 1975; Willcox, 1977). In most instances, the success of treatment is determined by negative results on microscopical examination and culture on the third day after treatment with no subsequent relapses for a week or two. Some studies have measured serum penicillin levels following treatment. The present pilot study was carried out to demonstrate the disappearance or inactivation of gonococci *in vivo* following treatment with 3 megaunits procaine penicillin intramuscularly and 1 g probenecid by mouth.

Materials and methods

The subjects who took part in this study were volunteers selected at random from the male patients attending the outpatient clinic of Middle Road Hospital. Urethral specimens were taken from patients who complained of urethral discharge; these were sent for microscopical examination and culture for *Neisseria gonorrhoeae*. Smears were stained by the standard Gram's method; when typical Gram-negative intracellular diplococci were demonstrated, the presumptive diagnosis was gonococcal urethritis. The patient was then invited

to participate in the study after the outline and purpose of the project had been explained to him. When consent was obtained the following procedures were carried out:

1. A pre-treatment urethral specimen was sent for culture.
2. Treatment with one intramuscular injection of 3 megaunits procaine penicillin and 1 g probenecid orally was given.
3. Thereafter urethral specimens for culture were taken at hourly intervals for six hours.
4. The patient was then allowed home and instructed to note any change of symptoms. He was asked to return on the third day when a urethral smear was made and the urine two-glass test carried out. The patient was then instructed to return on the seventh day.
5. Microscopical examination and culture were performed on the seventh day.

All swabs were inoculated directly on to modified Thayer-Martin medium and incubated at 36°C for 48 hours in candle jars (Martin *et al*, 1974). Typical colonies were identified by oxidase test and Gram-staining.

Results and comments

Of the 25 volunteers participating in the study (with the exception of Cases 5 and 6) 23 had identical results. Cultures for *N. gonorrhoeae* gave positive results during the first five hours and negative results after six hours. Gram-stained smears gave negative results on the third day and the cultures negative results on the seventh day after treatment.

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Table Urethral culture results following treatment

Case No.	Culture results at						
	1 h	2 h	3 h	4 h	5 h	6 h	7 days
5	+	—	—	+	+	—	—
6	+	—	—	—	+	—	—

+ Positive
— Negative

Cases 5 and 6 showed a different pattern of results. The cultures from these two patients gave positive results in the first hour (as did all the others) but negative results for a few hours subsequently; the results became positive again after four hours and after five hours in Cases 5 and 6 respectively. Thereafter these cultures gave similar results to the others, becoming negative after six hours and on the seventh day.

Discussion

This pilot study was carried out to study the clinical response of patients with gonococcal urethritis to 3 megaunits procaine penicillin intramuscularly plus 1g oral probenecid.

Before the study, observations which had been made of several male patients indicated that urethral cultures gave negative results five to six hours after treatment. The duration of six hours was, therefore, chosen for the present study. Furthermore, all the volunteers were treated as outpatients, since for practical and administrative reasons we could not observe them for a longer period in the clinic.

No satisfactory explanation can be offered for the different pattern of results in Cases 5 and 6. We suspect this may have resulted from faulty methods

of collecting specimens, as both patients were seen consecutively on the same day; the similar results in these two patients thus cast doubts on their validity.

The usual advice offered to patients who are treated for gonococcal infections is to abstain from sexual activities for one or two weeks. In practice, we find that many patients fail to follow this instruction. It thus appears from our findings that it may be sufficient for patients to abstain from sexual activity for not less than six hours; obviously such advice would be more acceptable to many of our patients.

Prostitutes comprise a large proportion of the women with gonorrhoea seen at our hospital. On average each prostitute has six or seven clients a day, and they usually charge \$10–20 (Singapore) each time for their services (Middle Road Hospital, unpublished data). Thus for them, abstaining from sexual activities for one day means the loss of income of about \$60–140. It is not surprising, therefore, that they rarely heed our advice on sexual abstinence for even a few days after treatment. In contrast they may well agree to abstain from sexual activity for a few hours.

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