

TRIAL OF OXYTETRACYCLINE IN ACUTE GONORRHOEA

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Summary

The usual treatment for gonorrhoea in this institution is procaine penicillin 12 lakhs daily for 3 days. Generally the response with this regimen is good. However in view of the fact that some cases did not respond to this treatment, trial with Oxytetracycline was carried out on 15 patients, and is compared with the results obtained with penicillin in 15 patients. With the dosage schedules of penicillin and oxytetracycline followed by us all 30 patients improved and did not develop any recurrence, even after 3 weeks.

One of the important problems of treatment of gonorrhoea is penicillin resistance. All over the world it is being observed that more and more strains of this organism are becoming resistant. Fortunately this is only a relative phenomenon, and majority of patients at present respond to high doses of penicillin¹. In order to maintain high serum concentrations, short acting penicillins are being used. The present dosage in vogue here is procaine penicillin 12 lakhs daily for 3 days. This treatment has been found quite effective. However, in the last one year 2 cases out of 803 did not respond to the above treatment. Hence the present trial of oxytetracycline in gonorrhoea vis-a-vis penicillin was carried out.

Materials and Methods

15 patients with acute gonococcal urethritis were treated with procaine penicillin 12 lakhs daily for 3 days. Equal number of patients were treated

with oxytetracycline, I.M. injection of 250 mg followed by 1 cap. of oxytetracycline 6 hourly for 3 days.

Observations

The response observed with penicillin and oxytetracycline are given in Table 1 and 2. All patients under treatment recovered completely within 3 days. They were followed up every week for 3 weeks. None had any recurrence.

Discussion

Differing values are reported regarding penicillin sensitivity of *N. gonorrhoea*. Goodman and Gillman² mention that though formerly all strains of this organism were inhibited by 0.06 I.U. per 1 ml., some strains now grow in vitro in concentrations as high as 0.1 to 1 I.U. per 1 ml. Grollman and Grollman³ mention that gonococci which are relatively susceptible are inhibited in vitro at a concentration of 0.02 I.U. per 1 ml. Sowmini and Nair⁴ found that 93% of strains of gonococci are inhibited by concentrations less than 1 I.U. per 1 ml. The concentrations of penicillin needed and the time for its inhibitory and lethal action are given in

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TABLE 1

Patients treated with procaine penicillin 12 lakhs for 3 days.

S. No.	1st Day			2nd Day			3rd Day		
	Dis-charge	Burning micturi-tion	Smear for G.C.	Dis-charge	Burning micturi-tion	Smear for G.C.	Dis-charge	Burning micturi-tion	Smear for G.C.
1.	+	+	+	—	+	—	—	±	—
2.	+	+	±	±	+	—	±	±	—
3.	+	+	+	—	+	—	—	—	—
4.	+	+	+	+	+	+	—	±	—
5.	+	+	+	±	+	—	—	—	—
6.	+	+	+	±	+	—	—	—	—
7.	+	+	+	—	—	—	—	—	—
8.	+	+	+	—	—	—	—	—	—
9.	+	+	+	±	—	—	—	—	—
10.	+	+	+	±	—	—	—	—	—
11.	+	+	+	+	—	—	—	—	—
12.	+	+	+	+	—	—	—	—	—
13.	+	+	+	—	+	—	—	±	—
14.	+	+	+	—	+	—	—	±	—
15.	+	+	+	±	±	—	—	±	—

+ Present; — Absent; ± Diminished or slight.

TABLE 2

Patients treated with Oxytetracycline, 250 mg parentally followed by 1 cap. 6th hrly for 3 days.

S. No.	1st day			2nd day			3rd day		
	Dis-charge	Burning micturi-tion	Smear for G.C.	Dis-charge	Burning micturi-tion	Smear for G.C.	Dis-charge	Burning micturi-tion	Smear for G.C.
1.	+	+	+	—	±	—	—	—	—
2.	+	+	+	—	±	—	—	—	—
3.	+	+	+	—	±	—	—	—	—
4.	+	+	+	±	±	±	±	±	—
5.	+	+	+	—	±	—	—	—	—
6.	+	+	+	—	±	—	—	—	—
7.	+	+	+	—	±	—	—	—	—
8.	+	+	+	—	±	—	—	—	—
9.	+	+	+	±	±	—	—	±	—
10.	+	+	+	±	±	+	±	±	—
11.	+	+	+	—	±	—	—	±	—
12.	+	+	+	—	—	—	—	—	—
13.	+	+	+	±	±	—	—	±	—
14.	+	+	+	±	±	—	—	±	—
15.	+	+	+	—	—	—	—	—	—

+ Present; — Absent; ± Slight or Diminished.

Table 3. As seen, the lethal action is brought about by high concentrations of drug. In addition the effect is rapid being evident within 48 hours. Sowmini and Nair⁴ in their article opine that in cases of gonorrhoea, the optimum concentrations maintained for 24 hours is adequate, though high concentrations have the effect of decreasing duration of treatment. Thus the various observations given by Grollman and Grollman (Table 3) with relation to other organisms must be, by implication valid for N. Gonorrhoea also. Another important aspect in the treatment with penicillin is that higher tissue concentrations than blood concentration is achieved. Hence the dosage calculated on the basis of in vitro sensitivity is likely to be higher than what is needed in vivo. It is also to be borne in mind that pus or products of tissue destruction do not interfere with the action of penicillin³. Besides it is also known that even if serum or tissue concentrations are likely to fall below effective

bactericidal level, it would take significant time for the organisms to recover from the toxic effect of drug and multiply at a normal rate, and hence will not prejudice the ultimate outcome³.

The tissue level of penicillin effective at the focus of infection is probably the same as the inhibitory concentration in vitro². The need for the higher concentrations in serum is explained on the basis of the property of penicillins of combining with serum proteins thus making it to reach the site of infection⁷. Goodman and Gillman² mention that serum concentrations needed to cure various infections is only 2-5 times more than what is needed in vitro to kill the organisms. Grollman and Grollman³ maintain this to be 20 times.

In the case of gonorrhoea various treatment schedules are recommended. The rationale is to maintain more than 1 I.U. of penicillin per 1 ml of serum.

TABLE 3
The Susceptibility of Several Infective Organisms to Penicillin at Various Dosage Levels (After Eagle and Mussel Man) Given by Grollman & Grollman.

Infective	Concentration of Penicillin G in units per ml necessary.		Time in hrs. necessary to kill 99.9% organisms at optimal concentration of Penicillin.	
	To inhibit growth of organisms.	To kill organisms.		
		Slowly	At max. rate.	
Strep. Pyogens.	0.007	0.012 to 0.014	0.11	1.5 to 2
Pneumococcus	0.014 to 0.02	0.04	0.11	3 to 5
Staph. aureus (Susceptible strain)	0.03 to 0.04	0.04 to 0.11	0.11 to 0.425	5 to 20
Staph. aureus (Resistant strain)	0.425	1.7	27.2	11
T. Pallidum	0.03	0.054	0.7	25 to 35
Strep. faecalis (Susceptible strains)	1.7	3.4 to 6.8	6.8 to 10.2	5
Strep. faecalis (Resistant strains)	1.7	5.1 to 6.8	6.8 to 10.2	48

Strains needing more than 0.125 I.U. of penicillin per 1 ml is to be deemed relatively resistant⁸. One injection of 3 lakhs of procaine penicillin is known to give concentrations of 1.5 I.U. - 1 ml of serum within 1-3 hours, 0.2 I.U. at 24 hours; 0.1 I.U. at 36 hours and 0.05 I.U. at 48 hours. Predictably with 12 lakhs of procaine penicillin for 3 days, the serum concentrations reached must be much higher. As most of the organisms are sensitive to concentrations less than 1 I.U./1 ml of serum in these areas⁴ all 15 patients under trial with procaine penicillin improved. This feature is also seen in our general observation of treatment of gonorrhoea with penicillin.

Sowmini and Nair⁴ observed that after penicillin, tetracycline is the best drug in the treatment of gonorrhoea. The drug used by them was oxytetracycline and hence the present trial was conducted with that drug. Tetracyclines given orally, 250 mg 6th hourly is known to produce level of 1-3 μ gms/cc after second dose and these levels are maintained during treatment. With 250 mg I.M. injection, plasma concentrations are detectable within 15 minutes, peak concentration of 10 μ gms/1 ml is reached in 1 hour and maintained for 12 hours². Sowmini and Nair⁴ in vitro studies found that most gonococci respond to concentrations of tetracycline in less than 1 μ gms per 1 ml. In their clinical trial they found better response with injections than oral administration. The disparity in response was attributed by the authors to the mode of administration. In this study we tried parenteral administration to achieve peak concentration and oral administration for subsequent optimum

concentrations. The response was uniformly good.

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