OXYTETRACYCLINE IN PYODERMA

A. K. SHARMA, R. GUPTA, UMA SAXENA, AND R. K. JAIN

Summary

One hundred patients with moderate to severe pyoderma were treated with oral oxytetracycline. The most common organisms isolated were coagulase positive *Staph pyogenes and Str betahemolyticus*. Of 100 patients, 87 showed a successful therapeutic response. The predictive value of *in vitro* test for bacterial susceptibility to oxytetracycline (30 mcg disc) was 88% for "sensitive" reports but 17% for "resistant" reports. Judged by clinical response, the incidence of false sensitive reports was 12% (9/87) but that of false resistant reports was 83% (22/26).

KEY WORDS: Pyoderma, Oxytetracycline, Antibiotic sensitivity tests.

Introduction

The clinical efficacy of antibiotics can change with time and place. It is therefore necessary to periodically assess the efficacy of antibiotics that have been in use for many years. One such antibiotic is oxytetracycline, and we undertook this study with two objectives: (1) to observe the present clinical efficacy of oxytetracycline in pyoderma and (2) to assess the value of *in vitro* antibiotic sensitivity test for predicting the clinical response to oxytetracycline.

Departments of Dermatology and Microbiology
Safdarjang Hospital
New Delhi 110016

Reprint request to:
Dr. A. K. Sharma,
D II/138, Kidwai Nagar West,
New Delhi 110023.

Paper presented at XI Annual Conference of Indian Association of Dermatologists, Venereologists and Leprologists, Mangalore, January 20-23, 1983.

Received for publication on 22—4—1983

Methods

Male and female patients, aged 8 years and above, were serially admitted to the study at the skin outpatient department, Safdarjang Hospital, New Delhi, if they fulfilled the following selection criteria: Moderate to severe pyoderma as judged by extent of the lesions, accompanying cellulitis, tenderness and enlargement of regional lymph nodes, or fever; presence of polymorphonuclear leucocytes in Gram-stained smear of pus from the lesions; and negative history of antibiotic treatment during the previous 2 days.

On each patient the following investigations were carried out: total WBC count; culture of pus from the lesions; and sensitivity of the bacterial isolates to oxytetracycline by the single disc method. If the culture turned out to be negative, the patient was omitted from the study. For sensitivity testing, 30 mcg oxytetracycline discs specially prepared by Pasteur Laboratories were used.

After collecting blood and pus specimens, the patients were given oxytetracycline (Terramycin) capsules containing 250 mg. The dose was 3 capsules per day for patients aged 8–12 years, and 4 capsules per day for older patients. The day of starting treatment was called day 1 and the patients were re-examined for their progress on days 4, 7, 11 and 14. If the lesions showed marked improvement on day 4, oxytetracycline treatment was continued irrespective of whether the bacterial isolate was reported to be sensitive or resistant. The maximum duration of treatment was 14 days. However, if there was little or no response on day 4, oxytetracycline was discontinued and the patient was given another antibiotic which his bacterial isolate was reported to be sensitive. His subsequent progress was outside the scope of this study.

The clinical response to oxytetracycline was interpreted as "success" if there was *rapid* and *complete* or almost complete resolution of the lesions and as "failure" if the resolution was *slow* and *incomplete* even by day 14. The study was concluded when 100 patients got evaluated.

To assess the predictive value of *in vitro* sensitivity test, each patient's response was compared with the test report on his bacterial isolate. If there were more than one isolates, the predominant organism was considered for this comparison. The "sensitive" test reports were classified as true or false according to whether the clinical response was success or failure, respectively. Likewise, the "resistant" test reports were classified as true or false according to whether the clinical response was failure or success, respectively. The predictive value of "sensitive" and "resistant" reports was calculated separately as the percentage of true results in each category.

Results

Of the 100 patients, 69 were males and 31 were females. The age range was 8 – 63 years with a mean of 22 years. All had moderate to severe pyoderma for which a systemic antibiotic could be justifiably given. The various clinical types of pyoderma are shown in Table 1. 34 patients had more than one type.

TABLE 1
Distribution of diagnoses in 100 cases of pyoderma

Diagnosis	No. of patients*
Impetigo	43
Furunculosis	40
Ecthyma	22
Acute folliculitis	14
Chronic folliculitis	4
Cellulitis	11

* Of 100 patients, 34 had more than one clinical type of pyoderma.

Leucocytosis was present in 35 patients, the total WBC count varying from 10,200 to 16,000 per mm^3. Only a single organism was isolated from 87 patients, whereas in 13 patients two organisms were isolated (Table 2). As

TABLE 2
Distribution of patients by bacterial isolates*

	Organism(s)	No. of patients
(a)	Staph pyogenes, coagulase + ve	69
(b)	Str beta-hemolyticus	14
	(a) + (b)	9
(c)	Staph pyogenes, coagulase — ve	3
(d)	Klebsiella spp	1
	(b) + (d)	1
	(c) + (d)	1
	(a) + Pseudomonas aeruginosa	1
	(d) + Proteus spp	1
	Total	100

* The total number of isolates was 113 since 13 patients yielded 2 organisms

shown in Table 3, staphylococci and streptococci were the commonest isolates (107/133 or 95%); Gram-negative organisms were only 6 among the 113 isolates (5%).

TABLE 3
Reports of bacterial sensitivity to 30 mcg oxytetracycline disc *in vitro* and their classification by clinical response*

Organism	No sensitive		No resistant		Total
	True	False	True	False	
Staph pyogenes, coag. +ve	54	7	3	15	79
Staph pyogenes, coag. — ve	1	1	1	1	4
Str beta-hemolyticus	22	1	0	1	24
Klebsiella spp	1	0	0	3	4
Proteus spp	0	0	0	1	1
Ps aeruginosa	0	0	0	1	1
Total	78	9	4	22	113

* see text for explanation

By *in vitro* test, 87 of 133 isolates (77%) were reported to be sensitive to oxytetracycline, and 26 (23%) were reported resistant (Table 3). The incidence of false sensitive reports was 12% (9/78) but the incidence of false resistant was 85% (22/26).

Patientwise correlation between the clinical response and the reported *in vitro* sensitivity of bacterial isolate to oxytetracycine (Table 4) showed that the predictive value of a sensitive report was 88% but that of a resistant report was only 17%. In all, 87 patients responded to oxytetracycline. The average duration of treatment was 7 days and the range was 5-14 days.

None of the patients experienced any untoward side effect.

Discussion

The most common organisms causing pyoderma are reported to be *Staph pyogenes* and *Str hemolyticus*[1,2]. In the present study this observation was confirmed.

TABLE 4
Correlation between clinical response to oxytetracycline and *in vitro* sensitivity report. Figures are numbers of patients.

Report	Clinical response		Total
	Success	Failure	
Sensitive*	68	9	77
Resistant**	19	4	23
Total	17	13	100

* Predictive value = 68/77 or 88%
** Predictive value = 4/23 or 17%

Systemic antibiotic treatment is recommended in pyoderma if the lesions are extensive, if there is lymphadenitis, or if signs of systemic toxicity are present[1,2]. Although cloxacillin and penicillin are generally recommended[1], Bremner and Karn[3] suggested that a tetracycline is a good initial choice for pyogenic skin infections encountered in outpatients. A success rate of 87% with oxytetracycline in the present study supports this suggestion, especially in view of the low cost and safety of tetracyclines. The efficacy of tetracyclines in acne vulgaris[1] is another point in favour of these drugs.

The *in vitro* test of bacterial sensitivity to oxytetracycline had a good predictive value (88%) if the report was "sensitive" but a poor predictive value (17%) if the report was "resistant". In other words, the incidence of false sensitive reports was low (12%) but that of false resistant reports was high (83%). A similar observation has been reported by Phadke et al[4] who found that the incidence of false resistance to oxytetracycline was 85% in urinary infections and 82% in lower respiratory infections.

What could be the possible causes of this high incidence of false resistant

reports ? First, tetracyclines are concentrated in the sebaceous gland of the skin[1] and in the urine[5] so that the disc test, which is standardized to assess the sensitivity of bacteria to average serum concentrations[6], may not be suited to reveal clinically significant resistance among cutaneous and urinary pathogens. Secondly, it is known that tetracyclines are more active in acidic pH[6] and that urine and tissue fluid often are acidic, or low in pH, when infection is present. On the contrary, culture media on which *in vitro* sensitivity is tested are usually neutral or slightly alkaline in reaction. So it is possible that the activity of tetracyclines on culture plates is less than that in body fluids at the site of infection. Lastly, a test has a low predictive value when the condition it is supposed to detect has a low prevalence in the population[7,8]. Perhaps the low predictive value of a resistant report reflects a low prevalence of oxytetracycline resistance among cutaneous and urinary pathogens of man.

In conclusion, it appears that oxytetracycline continues to enjoy acceptable efficacy in cases of pyoderma and that the reports of *in vitro* resistance to oxytetracyclines are more likely to be false than true so far as clinical response is concerned.

References

1. Marks MI : Common bacterial infections in infancy and childhood, 4. skin and wound infections, Drugs 1978; 16 : 202-209.
2. Bremner DA : Antibiotics and skin infections ; when to use local or systemic measures, Drugs 1977; 13 : 52-56.
3. Bremner DA, Karn HM : Antibiotic sensitivity of pathogens from infected skin lesions, NZ Med J 1975; 82 : 83-85.
4. Phadke AS, Jain NB, Phadke SA et al : Increase in drug resistance among shigella dysenteriae, Sh flexneri and Sh boydii, Br Med J 1982; 284 : 1336.
5. Kucers A, Bennett NM : The Use of Antibiotics,ed 3, London, William Heinemann, 1979; p 608.
6. Kunin CM : Detection, Prevention and Management of Urinary Tract Infections, ed 3, Philadelphia, Lea and Febiger, 1979; p 289.
7. Rose G, Barker DJP : Epidemiology for the Uninitiated, London; British Medical Association, 1979; p 36-37.
8. Riegelman RK : Studying a Study and Testing a Test, Boston: Little, Brown and Co, 1981; pp 127-130.