

SINGLE INJECTION TREATMENT OF STREPTOCOCCAL PYODERMA WITH BENZATHINE PENICILLIN

J. C. SHROFF,* B. S. RAICHUR,† V. K. AGARWAL‡ AND R. K. CHHAYA||

Summary

Fifty-one patients of pyoderma due to Group A streptococci were treated with a single intramuscular injection of 600,000 to 1,200,000 units of benzathine penicillin. In 7 patients staphylococci were also present. A satisfactory response was obtained in 47 (92%) patients. No adverse effects were encountered. Single injection treatment of pyoderma with benzathine penicillin appears to be effective, well tolerated and convenient.

Pyodermas are one of the most common group of skin diseases. Recently the treatment of streptococcal pyoderma has attracted attention because of its possible causal role in acute glomerulonephritis.¹⁻³ Dillon⁴ and Kelly et al.⁵ have reported excellent results with a single intramuscular injection of benzathine penicillin G. This treatment appears to be convenient, economical and time saving, especially in hospital practice, and therefore a clinical trial was carried out to evaluate its effectiveness in our patient population.

Method

Male and female patients suffering from pyoderma were included in the trial, provided a smear of the infected material, freshly obtained by removing a crust or puncturing a pustule and

stained with Gram's stain, revealed the presence of streptococci, either alone or mixed with staphylococci. Before rupturing the pustule or removing the scab, the area was cleansed with 70% alcohol to prevent contamination of the test material by normal surface flora.

After inquiring about a history of penicillin allergy and performing an intradermal sensitivity test, a single injection of benzathine penicillin (Penidure LA, Wyeth) was given: 600,000 units to patients less than 6 years old, and 1,200,000 units to patients aged 6 years or more. The patients were instructed not to apply lotions or ointments locally, but cleansing of the affected area with warm water was permitted. Scabies, if present, was treated with benzyl benzoate emulsion after the pyoderma was cleared. Each patient was examined daily for 10 days.

In all patients, fresh infected material was taken for culture, and the sensitivity of the organisms to penicillin G was tested by the disc method.⁶ For this purpose, low concentration discs containing 0.03 and 0.15 units were freshly prepared before use. A clear zone of 5 mm. or more around the disc was considered as a sign of sensitivity.

* Honorary Dermatologist and Professor of Dermatology (Now Retired)

† Reader in Pathology and Bacteriology

‡ Clinical Assistant, Department of Dermatology

|| Postgraduate Student of Microbiology Grant Medical College and

J. J. Group of Hospitals, Bombay 400 008

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Response to the treatment was graded according to the percentage of lesions healed by the 10th day: excellent if 100%; good if > 75%; fair if > 50%; poor if < 50%. In those patients who showed an excellent response, the number of days required for healing was also noted.

Results

The total number of patients studied was 51, comprising 31 males and 20 females. Their ages ranged from 3 months to 40 years.

The most common sites of the lesions were hands, buttocks and legs. All varieties of lesions were seen, viz., papules, vesicles, pustules, crusts, and scabs. Scabies was present in 25 patients.

According to the criteria used by Kelly et al.⁵ the disease was *mild* in 6 patients (total lesions ≤ 6), *moderate* in 29 patients (total lesions 7-20), and *severe* in 16 patients (total lesions > 20). The maximum number of lesions observed in any patient was 80. Table I shows the classification by diagnosis.

TABLE I
Diagnostic classification

Diagnosis	No. of Patients
Pyoderma	18
Impetigo	5
Ecthyma	3
Secondary pyoderma	25
Total	51

Group A beta-haemolytic streptococci were isolated from all 51 patients; in 7 patients coagulase-positive staphylococci were also present. Of the 51 streptococci, 42 were sensitive to 0.03 units while 9 were sensitive only to 0.15 units. Among the staphylococci, 3 were sensitive to 0.03 units whereas 4 were sensitive only to 0.15 units (Table II).

TABLE II
Organisms isolated and their sensitivity to penicillin G

Organism	No. sensitive to		Total
	0.03 units	0.15 units	
Streptococci (Group A, beta-haemolytic)	42	9	51
Staphylococci (Coagulase +ve)	3	4	7

The therapeutic response was excellent in 43 patients, good in 4 patients, fair in 1 patient, and poor in 3 patients (Table III). In those patients whose response was excellent, the modal time for clearance of the lesions was 7 days.

TABLE III
Therapeutic response

Grade	No. of Patients
Excellent	43 } 47 (92%)
Good	
Fair	1 } 4 (8%)
Poor	
Total	51 (100%)

* For explanation see text.

The correlation between *in vitro* sensitivity and clinical response was not always good. Several patients had an excellent response even though their organisms were sensitive to 0.15 but not to 0.03 units. On the contrary, the organisms of all 3 patients who had a poor response were sensitive to 0.03 units. Table IV shows that there was no significant association ($P=0.34$) between the clearance or non-clearance of lesions and the level of sensitivity of the organisms.

None of the patients had allergic adverse reactions or side-effects. In all of them the history of penicillin sensitivity was unknown, but none had a positive reaction to the intradermal sensitivity test.

TABLE IV

Association between clearance of lesions and level of sensitivity* of the organisms

Response	No. of organisms sensitive to		Total
	0.03 units	0.15 units	
Cleared	32	11	43
Not cleared	6	2	8
Total	38	13	51

P = 0.34 (Fisher's test)

* When a patient had both streptococci and staphylococci, the less sensitive of the two was taken for this analysis.

Discussion

Very few cases of streptococcal or staphylococcal or staphylococcal pyoderma heal spontaneously, the untreated condition usually persisting for several weeks. In the controlled trial by Dillon,⁴ only 20% of the patients were cured on placebo, and local application of Bacitracin ointment produced a 39% cure rate. Kelly et al.⁵ compared 600,000 units of benzathine penicillin intramuscularly with a similar dose of procaine penicillin. The cure rate on benzathine penicillin was 100%, whereas that with procaine penicillin was only 38%, by the end of 2 weeks. The excellent results with benzathine penicillin were obtained in spite of the fact that 85% of the patients had staphylococci and 45% of these were resistant to 10 units of penicillin.

In the present trial an excellent result was obtained in 84% of patients (43 of 51), whereas 8% (4 of 51) had a good response. It is possible that if these 4 patients had been followed for 2 weeks as Kelly et al.⁵ did, their response would have been excellent. On this assumption, it may be said that 92% of the patients (47 out of 51) showed a satisfactory therapeutic response. The fact that good correlation was not always seen between clinical response and *in vitro* sensitivity of the organisms does not mean that *in vitro* sensitivity

tests are not useful, but rather that, besides the antibiotic, host factors also play an important role in the overall response. Such a hypothesis would also account for the good results by Kelly et al.⁵ in patients who had resistant staphylococci.

Discs containing 2, 5 or 10 units of penicillin are generally used for bacterial sensitivity tests. However, in the present study specially prepared low-concentration discs were used so that, as suggested by Busch and Lane,⁷ the concentrations in the discs would correspond to the expected serum levels. The reason for selecting 0.03 and 0.15 units was that these are the average maintenance and peak serum levels expected with the doses of benzathine penicillin employed in this study.^{8,9}

Benzathine penicillin is reported to have the lowest incidence of adverse reactions, viz., 0.03%, among the injectable preparations of penicillin G.¹⁰ In the present study no adverse reaction was encountered in any of the 51 patients. In view of this the drug appears to be not only highly effective but also well tolerated.

Acknowledgments

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True

Thickening of the basement membrane of skin vessels is seen in conditions like porphyria cutanea tarda, Erythropoietic protoporphyria, Scleroderma, Dermatomyositis and Lupus Erythematosus. In searching for a defect which could be a skin marker of the pre-diabetic or potential diabetic, none of the difference like micropools, microaneurysms, immature plexus formation, nodular apical dilatations etc., is specific.

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