The Use of PAS in the Treatment of Draining Tuberculous Empyemata*

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Reports of excellent results in the treatment of tuberculous empyema with PAS led to this trial of its efficacy. We were unable to repeat the method previously reported (instillation of a suspension into closed empyema space) because we had available only patients on whom thoracotomy had been performed. In this work we, therefore, investigated the effect of oral PAS therapy and the effect of local PAS packs.

The patients studied all had proved tuberculous empyemas with secondary infections. All had thoracotomies. Many had previous surgery: In the 22 patients studied, 12 had thoracoplasties; two pneumonectomies; four unroofing procedures; one lobectomy; one decortication; and one cavernostomy. Practically all patients had at least one previous course of streptomycin, and most were resistant to 100 micrograms per cc.

The 22 patients were divided into 11 treated and 11 placebo cases. Each group contained a range of cases from mild to severe, as evenly matched as possible under the circumstances. Table I shows the color, sex, age, duration of disease, duration of empyema, fever and weight before and after treatment.

The 11 treated cases received sodium salt of PAS, 3 grams q.i.d., orally, in a liquid preparation (20 per cent solution, peppermint flavored), for 120 days. The 11 placebo cases received a prepara-

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*From the Clinical and Research Departments of the City of Chicago Municipal Tuberculosis Sanitarium.
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PAS was generously furnished for this study by the Massengill Co., for which we are duly grateful.
†Chief of Medical Service.
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### TABLE I: Data Concerning Patients on Oral Therapy, Placebo Therapy, and Local Packs

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*Expired*
tion whose appearance and taste closely resembled the above, for the same length of time. After 60 days of the above management, four patients in each group were treated twice daily with NaPAS 5 per cent packs in the wounds for the last 60 days of the experiment. Saline packs were used in several other patients in each group for the same period. No packs could be used on some because of large broncho-pleural fistulas.

Observations: The clinical effects were determined by bi-weekly interviews with each patient, beginning before therapy. General condition, cough, quantity of sputum, fever, and weight were recorded. Complete blood counts were done every month; urinalyses every two weeks; sedimentation rates every month; smear, culture, and cytology of pus every two months. Levels of PAS in blood were determined every month. One level on the pus from each patient was done while on oral therapy alone.

The appearance of the wound was recorded at intervals. The size of the empyema space was determined at the beginning, middle, and end of the period of treatment by measuring the amount of saline required to fill it. (This could not be done on those with large broncho-pleural fistulas).

X-rays of the chest were taken every month; sinograms were made before and after treatment.

Results

Clinical Effects: Cough improved markedly in five treated and two placebo cases. Expectoration was markedly diminished in five treated and one placebo patient. Fever improved markedly in three treated and no placebo cases. Marked weight gains occurred in six of each group. More than half the patients in each group stated that they "felt better."

Mortality: One patient in the placebo group died after six weeks of the period, as a result of cor pulmonale. Another in the same group died at the end of the period because of toxemia and cachexia.

Laboratory Findings: The sedimentation rate dropped more than 10 mms. in six treated and seven placebo patients. (Cutler method, 30 min.). Hemoglobin determinations showed no significant differences between the two groups.

Pus: All but two treated and three placebo patients had tubercle bacilli in the pus on smears at the beginning of treatment. At the end all the positives remained so except three in the treated group; two of these had very few bacilli at the beginning and were negative on culture at the end.

Cytological examination of the pus smears showed mainly polymorphonuclears with some lymphocytes and an occasional eosino-
phile throughout treatment. No significant differences were noted between the oral treatment, local treatment, and placebo patients.

Blood levels (one hour after A.M. dose) averaged 7.02 mg. per 100 cc. (low 3.4, high 10.4) in the patients on oral PAS. Pus revealed evidence of PAS in five patients, averaging 1 mg. per 100 cc. (low 0.1 and high 1.6); in five other patients on oral PAS no drug could be found in the pus.

Physical examination of the wound at intervals revealed a cleaner appearance in those treated with local PAS packs, and a thinning and diminution in the pus was noted in the same group.

The size of the cavity diminished in both the treated and untreated groups. No definite differences are noted.

| TABLE II |
| Capacity of Emphyema Cavity Before and After Therapy |
|-----------------|-----------------|-----------------|-----------------|
|                 | VOLUME OF CAVITY (cc.) | Before | 2 Mos. | 4 Mos. |
| ORAL PAS        |                 |        |        |        |
| Pt. A           | 115             | 75     | 62     |
| Pt. B (PAS packs) | 40             | 40     | 30     |
| Pt. C           | 4               | 3.5    | 1.5    |
| Pt. D           | 4               | 3      | 1.5    |
| Pt. E (Saline packs) | 10          | 10     | 4      |
| Pt. F (PAS packs) | 105            | 85     | 70     |
| Pt. G (Saline packs) | 1400         | 1500   | 1150   |
| PLACEBO ORALLY  |                 |        |        |        |
| Pt. H (Saline packs) | 60            |        | 40     |
| Pt. I (PAS packs) | 65             | 50     | 35     |
| Pt. J (Saline packs) | 70            | 47     | 45     |
| Pt. K (PAS packs) | 240            | 300    | 215    |
| Pt. L (PAS packs) | 750            | 600    | 450    |

Sinograms corroborated the above finding.

X-ray films of the chest revealed improvement in the contralateral lung in two of the treated cases.

Toxic effects were negligible. Mild nausea and diarrhea with occasional emesis disturbed a few patients. Local sodium salt of PAS was non-irritating.

Discussion

It appears evident from the above that oral therapy with the sodium salt of PAS, when it produces a good blood level, allows but little of the medicament to seep through into the empyema pus in about one-half the cases. A course of 120 days of oral treatment produced no very definite improvement as compared with the usual slow rate of healing noted in some of the untreated patients.

Local therapy in the open cases is difficult to apply satisfac-
Conclusiónes

1) Se presenta un estudio de 22 enfermos con empiema tuberculoso, drenados con toracotomías. La mitad de estos enfermos fueron tratados con PAS por boca por espacio de 120 días—la otra mitad fue tratada con placebo. Ocho enfermos fueron tratados con una solución al 5 por ciento de PAS localmente por espacio de 60 días; suero fue usado en otros.

2) El tratamiento con PAS, no ha producido una mejora notable, cuando se comparan con los casos, que no han sido tratados.

3) El tratamiento local con PAS, produjo licefacción y disminución de la cantidad del pus drenado; y el aspecto de la herida mejoró.

4) El estado general mejoró ligeramente.

Referencias