TREATMENT-RESISTANT SYphilis
SHORT REVIEW AND REPORT OF A CASE*

BY

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During four centuries of mercurial treatment of syphilis there has been little documentary evidence of the concept of treatment-resistance in syphilis. Mercury, on account of its feeble treponemical action, did not interfere to any significant extent with the natural course of infection, and the question of resistance to treatment did not arise. In the decade following the introduction of the organic arsenical compounds, Ehrlich's concept of "therapia sterilisans magna" dominated the field, but Ehrlich himself foresaw the problem of drug-fastness in chemotherapy and, recognizing inadequate dosage as its most frequent cause, emphasized the dangers of under-treatment at several international conferences. From 1920 to 1940 many reports on treatment-resistant syphilis were published by German and French workers. Beerman (1936) lists 430 references. Most of these reports discuss resistance to arsenical therapy and some to bismuth.

Silberstein (1924) classified treatment-resistance in primary and secondary syphilis as follows:

(1) Primary Resistance—resistant from the start.
(2) Primary-Secondary Resistance—after initial infection a resistant recurrence develops.
(3) Secondary Resistance—arsenical treatment heals the lesions, but after a latent period a resistant recurrence appears.

Gougerot (1923, 1931) and Nicolas, Lacassagne, and Froment (1930), cited by Beerman (1936), give a more elaborate classification based on the degree of resistance:

(1) Attenuated resistance.
(2) Treatment recurrence.
(3) True treatment-resistance:
   (a) primary,
   (b) secondary.
(4) Treatment activation or stimulation.

The increase of treatment-resistant syphilis in the pre-penicillin era was reported almost exclusively from France and Germany, the criteria of resistance being:

(a) persistence of lesions,
(b) persistently positive blood serology tests,
(c) persistence of Treponema pallidum in spite of adequate treatment, the last being the most reliable.

The most common clinical types of treatment-resistant syphilis occur in early infections and are usually cutaneous. The lesions may be typical or atypical. They are stated to have a predilection for the face, nose, neck, penis, and upper extremities, and are usually atypical at the time of their appearance.

Precocious tertiary syphilis is present in many of these cases and chancriform recurrences are frequently reported. The blood serological reaction tends to be negative more frequently in treatment-resistant early syphilis. The host seems to play the key role in treatment-resistance through inability to metabolize the drugs used, failure of defensive powers, endocrine dysfunction, hepatic insufficiency, and so on. Clinical evidence supported by in vitro laboratory studies suggests that small subcutaneous doses of a treponemical drug and inadequate treatment are more likely to cause treatment-resistance than the quality or brand of the drug used. Sometimes resistance may be overcome by changing to another drug.

The concept of drug-fast strains of Treponema pallidum is discounted by failure to transfer chemotherapy from a case of treatment-resistant syphilis to rabbits.

Before the discovery of penicillin numerous methods of circumventing treatment-resistance were advocated: raising the arseno-bismuth dosage, changing the drug, and non-specific measures such as injections of liver extract and malarial therapy. Only fever therapy gave satisfactory results. With the advent of penicillin, however, a safe and effective treatment for early syphilis resistant to arsenobismuth became available (Nelson and Duncan, 1945; Noojin and others, 1945; cited by Moore, 1947). Although thousands of cases of syphilis have been treated with penicillin during the past decade, only one patient with dark-field positive primary syphilis, reported by Tyson (1945), cited by Moore (1947), failed to improve with 2-4 mega units penicillin.

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for a period of 4 months and subsequently responded to penicillin and fever therapy.

Hahn (1947) reported a case of late gummatous syphilis of the penis which failed to heal after 4-8 mega units penicillin but which responded promptly to therapy with mapharsen and bismuth. Reynolds (1948), reporting treatment failures with penicillin in late syphilis, cautioned against the a priori supposition that penicillin alone would be as efficacious in late as in early syphilis. He classified penicillin failure in late syphilis as follows:

1. drug resistance with failure of overt manifestations to heal,
2. clinical progression despite therapy,
3. recurrence of lesions after an initially favourable response,
4. subsequent development of new lesions elsewhere in the body.

In laboratory studies of susceptible bacteria it has been demonstrated that penicillin has been found to be active in vitro against rapidly multiplying organisms in the phase of active growth, but inactive against the same organism in the resting phase. Reynolds (1948) postulates a comparable activity in vivo of penicillin against Treponema pallidum and tries to explain the failure of penicillin in late syphilis when the organisms are supposed to be few in number and not rapidly multiplying as in acute early syphilis.

Most of the reported failures belong to the first two or three years of penicillin therapy, when the antibiotic was impure and dosage schedules were still in the trial stage. Since the isolation of pure crystalline penicillin G and the introduction of repository penicillin, we find fewer reports of failure or of resistance to penicillin therapy in late syphilis. Furthermore, in late syphilis resulting in destruction or degeneration of tissues, penicillin cannot be expected to achieve a miracle of quick healing or to repair the damage. While penicillin destroys the treponemata, the reparative powers of the body must produce healing. Again, the pathology of late syphilis, with its vascular occlusion and fibrosis, prevents the circulating penicillin from gaining access to the active foci of infection; hence its action is delayed, and a larger total dosage over a longer period of time may be necessary to cure or arrest the disease process. The concept of true resistance, either primary or secondary, cannot be strictly applied to the lesions of late syphilis, on account of its inherent pathology and immunology. Reynolds was right in suggesting that adjuvant measures, such as the concurrent use of fever therapy, may be necessary to achieve rapid healing and avoid relapse. The iodides, which promote the absorption of granulomatous and fibrous tissues, have recently gone out of use, but they may still have some value in late syphilis.

**Table**

<table>
<thead>
<tr>
<th>Episode</th>
<th>Period of Observation</th>
<th>Clinical Findings</th>
<th>Laboratory Findings</th>
<th>Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1943 Aug. 19-30</td>
<td>Florid secondary syphilis with indurated penile lesions</td>
<td>Dark-field positive for T. pallidum Kahn and W.R. strong positive</td>
<td>No. of Injections Drug</td>
<td>Lesions healing</td>
</tr>
</tbody>
</table>

**Case Report**

The authors are not aware of a case similar to the following having been described in the literature. This patient has been under observation for 11 years, from August, 1943, to May, 1954, and has been given various courses of treatment with every available form of therapy punctuated by periods of default. In April, 1949, he appeared to be clinically cured, but as he was still strongly sero-positive further malarial therapy was suggested; however, he could not be persuaded to undergo the ordeal of fever, which he had already tried in 1946, and was discharged.

After 5 years of well-being with no clinical recurrence, he again presented himself on May 15, 1954, with a fresh ulceration of the orbit of one month's duration. At the time of writing he is still under treatment with PAM and mapharsen and the ulceration is healing.

The progress of this patient for over 10 years is set out in the Table. This prolonged resistance to treatment of syphilitic infection is unique in that it cannot be classified by any of the criteria outlined by various European investigators. The initial inadequate therapy of early syphilis is the basis of the subsequent evolution of the disease. After mapharsen, bismuth, and fever had failed, the resistance to therapy was broken in 1947 by the introduction of penicillin, but two fresh successive penile gummatas appeared in 1948, the first of which responded promptly to mapharsen and bismuth and the second to penicillin. Then, after 5 years' freedom from symptoms, the disease broke out again. When he was examined on February 14, 1955, the ulceration at the orbital margin had healed and there was no evidence of fresh lesions. He was still VDRL positive but showed decline from 128 to 32.
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<tr>
<td>II</td>
<td>1943 Dec. 23 to 1944 Feb. 14</td>
<td>Penile lesions healed Cutaneous papular eruptions completely disappeared Multiple discrete destructive crusted ulcers on face, trunk, and limbs. Loss of weight</td>
<td>Dark-field positive Kahn and W.R. strong positive</td>
<td>FIRST DEFAULT</td>
<td>6 mapharsen 6 bismuth Malignant precocious teratiam</td>
</tr>
<tr>
<td>III</td>
<td>1944 Mar. 3 to Aug. 30</td>
<td>Ulcers not healed. Lesions on left knee showing evidence of extension</td>
<td>—</td>
<td>SECOND DEFAULT</td>
<td>18 mapharsen 18 bismuth Lesions on trunk and face slowly healing, but on left knee refractory and spreading</td>
</tr>
<tr>
<td>IV</td>
<td>1944 Dec. 4 to 1945 Mar. 28</td>
<td>Nodulo-cutaneous ulcerations on left knee and leg unhealed (Fig. 1)</td>
<td>Kahn and W.R. strong positive</td>
<td>THIRD DEFAULT</td>
<td>13 mapharsen 13 bismuth No evidence of healing</td>
</tr>
<tr>
<td>V</td>
<td>1945 April 28 to July 23</td>
<td>Lesions on left knee and leg unhealed and slowly spreading Ulcers on trunk and face completely healed</td>
<td>—</td>
<td>FOURTH DEFAULT</td>
<td>10 mapharsen 10 bismuth No evidence of healing</td>
</tr>
<tr>
<td>VI</td>
<td>1947 Nov. 7 to 28</td>
<td>Multiple crusted sinus ulcers on dorsum of right hand (Fig. 3) Extensive necrotic ulceration with polycyclic border on lateral aspect of right upper arm (Fig. 3) Nodulo-cutaneous ulceration on left side of nape of neck. Ulceration of right nostril</td>
<td>Kahn and W.R. strong positive</td>
<td>FIFTH DEFAULT</td>
<td>3-8 mega units aqueous penicillin. Pot. iodide by mouth. Course of liver extract injections</td>
</tr>
<tr>
<td>VII</td>
<td>1948 Feb. 27 to July 17</td>
<td>Gummatous ulcer on dorsal aspect of prepuce</td>
<td>Dark-field negative Kahn and W.R. strong positive</td>
<td>DISCHARGED</td>
<td>10 mapharsen 10 bismuth Ulcer healed</td>
</tr>
<tr>
<td>VIII</td>
<td>1948 Dec. 22</td>
<td>Gummatous destructive ulceration on penoscrotal junction extending to under surface of penis (Fig. 5)</td>
<td>Dark-field negative Kahn and W.R. strong positive</td>
<td>DISCHARGED</td>
<td>6 mega units aqueous penicillin</td>
</tr>
<tr>
<td></td>
<td>1948 Dec. 26 to 1949 Jan. 11</td>
<td>No fresh recurrence and clinically free</td>
<td>Kahn and W.R. strong positive</td>
<td>—</td>
<td>Ulceration rapidly healed</td>
</tr>
<tr>
<td></td>
<td>1949 April 27</td>
<td>—</td>
<td>Further fever therapy refused</td>
<td>—</td>
<td>Cerebrospinal fluid negative Cardiovascular system normal</td>
</tr>
<tr>
<td>IX</td>
<td>1954 May 15</td>
<td>Nodulo-cutaneous crusted ulceration on lateral aspects of left orbital margin (Fig. 6). Scars of past ulceration</td>
<td>VDRL positive Titre 128 dilutions</td>
<td>FIVE YEARS SYMPTOM-FREE</td>
<td>PAM 2 ml. daily for 25 days. Bismuth 1 ml. weekly Ulcer healing Patient still under observation</td>
</tr>
<tr>
<td>X</td>
<td>1955 Feb. 14</td>
<td>No ulceration or fresh lesions</td>
<td>VDRL positive Titre 32 dilutions</td>
<td>—</td>
<td>Cerebrospinal fluid no abnormality</td>
</tr>
</tbody>
</table>
FIG. 1.—Scar of resistant nodulo-cutaneous ulceration on left knee and leg (1944-46). See Table, part IV.

FIG. 2.—Scar of healed gummatous ulceration of dorsum of hand and right upper arm (1945-47). Note shortening of middle finger. See Table, part V.

FIG. 3.—Gummatous ulcerations of dorsum of right hand and upper arm (1947). See Table, part VI.

FIG. 4.—Radiograph showing destruction and shortening of metacarpal bone of right middle finger (1947). See Table, part VI.

FIG. 5.—Hypopigmented scar of gummatous ulceration on under surface of penis (1948). See Table, part VIII.

FIG. 6.—Nodulo-cutaneous ulceration of left orbital margin (1954). See Table, part IX.
TREATMENT-RESISTANT SYPHILIS

Comment
The prolonged resistance of the infection to mapharsen, bismuth, and fever over a period of 3 years, after penicillin therapy, the subsequent response to penicillin, the three further recurrences, and the satisfactory healing of these later lesions with mapharsen, bismuth, and penicillin seem to suggest that not the drugs but the tissues of the host are responsible for treatment-resistance and recurrence. The role of the parasite in treatment-resistance is difficult to evaluate unless the chemo-resistance can be transferred to experimental animals.

Summary
A case of unusually prolonged, treatment-resistant syphilis with recurrences is reported. Inadequate treatment of the original infection seems to have induced an inveterate allergic sensitivity in the tissues of the host. After 3 years of resistance to prolonged concurrent therapy with mapharsen and bismuth, the lesions responded dramatically to the first course of penicillin, but new manifestations appeared at varying intervals from 4 months to 5 years after the first course of penicillin. These new lesions have healed both with the arseno-bismuth combination and with penicillin. It is not possible to foresee whether the patient will be free from further trouble. The treatment-resistant lesions were cutaneous and skeletal.

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