REATIONS TO INTRADERMAL T.A.B.T. AND T.A.B. VACCINES

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In 1959 Barr, Sayers and Stamm published their results following the administration to Service personnel by the intradermal route of a combined tetanus and enteric vaccine. These authors stated that prior to that time enteric prophylactic (T.A.B.) administered by the subcutaneous route was responsible for an incidence of general reactions "lying between 5 and 10 per cent" and of local reactions "approaching 75 per cent," whereas in a series of 3,800 intradermal inoculations of T.A.B. no general reactions were observed.

Combined tetanus and enteric prophylactic (T.A.B.T.) administered intradermally for primary immunization of the Army in Home Commands, and enteric prophylactic (T.A.B. intradermal) for booster dosage, have now been in general use for four years. During this period, approximately 4 million doses of T.A.B.T. and approximately 3.5 million doses of T.A.B. intradermal, have been manufactured and issued by the David Bruce Laboratories, for use in Army personnel; only 42 reactions of sufficient severity to warrant the suggestion that the vaccine may have been unduly toxic were reported to the David Bruce Laboratories for investigation of the suspect vaccine. In most cases the unused remainder of the suspect bottle was returned for testing and in all cases a "file" copy from the same batch was tested for toxicity.

Incidence of Reactions

Not all issued doses will have been used, many being discarded, time-expired or still available for future use. If between 20 and 60 per cent have actually been administered intradermally, 42 severe reactions from 7.5 million issued doses show an incidence of severe reactions of between 0.003 and 0.0009 per cent as compared with the figure of 5 to 10 per cent quoted above for a similar vaccine administered subcutaneously.

Nature of Reactions

Of the 42 reactions reported, 11 patients experienced general symptoms of moderate pyrexia of 99–100°F, malaise and headache. None of these patients required hospitalization or bed rest for longer than 48 hours.

Local lesions at the site of inoculation, consisting of induration 3 inches in diameter or greater surrounded by an erythematous zone, occurred in the 11 patients with constitutional symptoms and in 28 others who did not complain of any systemic upset.

Two patients, receiving T.A.B. for the first time, had typical urticarial rashes of shoulders and trunk, four and six days after inoculation, which responded rapidly to
oral anti-histamine therapy. Both these patients were shown by skin testing to be exceptionally sensitive to T.A.B. vaccine.

Another patient developed a weeping contact eczematous dermatitis of the upper arm, three days after receiving T.A.B. Extensive skin sensitivity tests, including skin cleansing agents, and various monovalent fractions of T.A.B.T. vaccine, showed undue sensitivity to the bacillary component of the vaccine.

One local reaction, not included in the series, occurred in a patient who received intradermal T.A.B.T. into the skin of the ventral surface of the forearm contrary to the instructions for administration of the vaccine set out in the Memorandum on Immunological Procedures (1961).

Table I shows the distribution of reactions between T.A.B.T. and T.A.B. intradermal vaccine.

### TABLE I

**Reactions following the intradermal administration of T.A.B.T. and T.A.B. vaccine**

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>General + local</th>
<th>Severe local</th>
<th>Generalized Urticaria</th>
<th>Local eczema</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.A.B.</td>
<td>2</td>
<td>13</td>
<td>2</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>T.A.B.T.</td>
<td>9</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>28</td>
<td>2</td>
<td>1</td>
<td>42</td>
</tr>
</tbody>
</table>

**Tests on Suspect Vaccine**

Returned bottles of vaccine suspected of being unduly toxic, together with "file" copies from the same batch, have been tested; for bacteriological sterility, both aerobically and anaerobically; for toxicity to laboratory animals, both subcutaneously and intradermally; in human volunteers and for evidence of concentration due to failure to "shake the bottle." In no instance was the vaccine found to be infected or toxic.

**Discussion**

*Intradermal* T.A.B.T. and T.A.B. have been used extensively in the Army for four years. All reactions occurring in the past four years and of sufficient severity to justify notification to the manufacturing unit have been reviewed. The incidence of both general and local reactions due to these preparations is minute compared to those produced by T.A.B. vaccine administered by the *subcutaneous* route. Such general reactions as have occurred, although adjudged as severe compared to the usual trivial local effect of intradermal inoculation, were, in themselves, hardly worse than the effects of an uncomplicated common cold. The few severe local reactions were considered, in the main, to be due to exceptional sensitivity to T.A.B. vaccine, although some of them may have been due to subcutaneous leakage, following a faulty deep intradermal inoculation.
Reactions to Intradermal T.A.B.T. and T.A.B. Vaccines

Barr, Sayers and Stamm (1959) state that "the technical difficulty of inoculation by the intradermal route may be a factor in deciding the efficacy of the inoculation." This statement is interpreted as meaning that either a significant number of patients would receive subcutaneous rather than intradermal vaccine with consequent reactions or that they would be inadequately protected by failure of the operator to place the prescribed dose intradermally. In the light of experience those objections appear to be invalidated by the extremely small number of reactions reported, and by the fact that no difficulty in performing the intradermal technique has been experienced by medical officers. Protection afforded by the intradermal vaccine appears to have been excellent.

A further cause for concern was the possibility that local tissue hypersensitivity might develop after repeated intradermal inoculations comparable to the Arthus (1921) phenomenon, in which successive injections of foreign proteins produced increasingly severe local reactions ending in necrosis and ulceration. This was due to increasing local tissue sensitization. No such reactions have been reported following the use of intradermal vaccine, nor have they occurred in laboratory technicians, at special risk, who have received regular annual intradermal injections of T.A.B.

McKelvey (1955) described a case of transverse myelitis as a complication of T.A.B. administered by the subcutaneous route, and reviewed the neurological complications of T.A.B. inoculation. During the four years under consideration no case of neurological complication attributable to intradermal T.A.B.T. or T.A.B. has been reported.

Conclusions

Experience has confirmed that T.A.B.T. and T.A.B. vaccines, administered by intradermal injection, carry only a minute risk of reaction, and reactions when they do occur are relatively mild compared to those experienced with a similar vaccine injected subcutaneously in former years. Many of the reservations held at the time of the adoption of the intradermal technique have, in the light of this experience, been found to be groundless.

REFERENCES


