

REPORT ON REACTIONS TO ANTI-PLAGUE SERUM.

BY MAJOR J. MACKAY-DICK,

*Royal Army Medical Corps,**Medical Specialist.*

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SEVEN British officers and four British other ranks, all close contacts of plague, all received 3 c.c. of plague vaccine and 5 c.c. of anti-plague serum with the exception of one British officer who only received serum as he had already been protected against plague. In addition, four Indian officers, some V.C.O.s and numerous I.O.R.s received the same vaccine and serum and from the same small amount which had been supplied.

The severity of the delayed reactions amongst the British, essentially in the form of serum sickness, commencing almost to the minute at the beginning of the sixth day following the injections, are considered worthy of record.

Serum used.—From Serum Department, Lister Institute. Date of preparation: 1941. To be used prior to July, 1943. Actually used January, 1944, and considered safe to use. Vaccine used: Haffkine's.

The Reactions are Divided into:—

IMMEDIATE, i.e. onset within twenty-four hours.

Local (Vaccine): Usual signs of a local reaction with associated adenitis of neighbouring lymph glands.

Serum Reaction: (a) Mild.—Urticaria of trunk and extremities. (b) Severe.—Same as (a) plus severe swelling of face, lips, eyelids, tongue and hoarse voice.

DELAYED, i.e. commencing at the beginning of the 6th day. (i) *Mild:* Febrile reaction, malaise, local reaction. Associated painful, tender, discrete adenitis of neighbouring lymph glands. (ii) *Moderate:* Severe nausea, headache; fainted twice. (iii) *Moderately Severe:* Discrete, painful, tender adenitis (cervical, axillary and inguinal) with local reaction and evanescent generalized urticaria with final severe angio-neurotic oedema. Febrile. (iv) *Severe:* Multiple reactions, i.e. fever, headache, malaise, evanescent urticaria with angio-neurotic oedema. Difficulty in micturition in one case due to swelling of the penis. Discrete, painful, tender adenitis (cervical, axillary and inguinal); severe muscle pains; severe joint pains with crippling. Joints affected; Temporomandibular, shoulders, elbows, wrists, hands, hips, knees, ankles and feet. Large effusions into both knees in one case. Subsequent marked weakness, loss of weight and relatively slow convalescence.

Two cases had both immediate reactions (serum) and delayed reactions.

Two had immediate local (vaccine) reaction and delayed reaction.

BRITISH CASES.

No reactions	1	9.09 per cent
<i>Immediate.</i>			
Local (vaccine)	3	27.2 per cent
Serum reaction (a) mild	2	18.1 per cent
(b) severe	1	9.09 per cent
<i>(Severe Case Delirious, Collapsed and Admitted Hospital.)</i>			
<i>Delayed.</i>			
Mild	1	9.09 per cent
Moderate	1	9.09 per cent
Moderately severe	1	9.09 per cent
Severe	5	45.45 per cent

All severe cases had to be admitted to hospital. All were incapacitated and were lying cases.

Cases exhibiting SEVERE signs and symptoms occurring at
 the beginning of the 6th day almost to the minute. 63-63 per cent
 Cases exhibiting serum sickness 73 per cent

Of the eleven members of the British Service, one was a Palestinian (moderate reaction delayed) and one was an Egyptian (mild reaction delayed). The remaining cases were born and bred in the United Kingdom and all bear names peculiar to the Celtic races of the British Isles and Eire. Amongst the severe delayed reactions were three fair-haired, blue-eyed Scots, one Welshman and one Englishman with an Irish name.

Out of 4 Indian officers who had both injections one had a severe delayed reaction (serum sickness) just as the severe British cases, and he had to be admitted to hospital. The three other officers had vague aches and general malaise.

There were no reactions complained of, or especially noted, amongst the V.C.O.s or amongst the numerous I.O.R.s who received both vaccine and serum.

Routine Treatment consisted of: Judicious exhibition of adrenalin hydrochloride (1-1,000) hypodermically as indicated; Ephedrine hydrochloride gr. $\frac{1}{2}$ t.d.s. p.c. *per oram*. Large doses of calcium; massive ascorbic acid therapy; fluids *ad lib.* and fruit drinks; lotio borocalamine locally as necessary; luminal if required; alkaline drinks; painful joints immobilized in optimum position; heat; early movements of joints which quickly returned to normal.

From my experience, except for a very small number of cases, the reactions following anti-plague vaccine are local and occur within twenty-four hours of injection. Some of the reactions are delayed though mild.

Severe reactions usually appear within twenty-four hours and are accompanied by fever, generalized painful tender and discrete enlargement of lymph glands with occasional tender enlargements of the spleen, as well as a marked local reaction. Such patients feel very ill and prostrated and have a high fever and severe headache for twenty-four to forty-eight hours. These remarks are confined to reactions following vaccine.

CONCLUSIONS.

There is no question of a bad batch of serum being responsible for the high incidence of reactions occurring amongst individuals from the United Kingdom because the same small supply of serum was used for both British and Indians on the same days.

The difference in the reactions in the dark-skinned and fair-skinned races is of interest. The high incidence of reactions amongst the British of Celtic stock seems worthy of mention.

The delayed reactions, i.e. those occurring from the sixth day onwards following serum and vaccine administration, are considered to be manifestations of serum sickness.

The incidence of serum sickness amongst the British was very high.

In close contacts of plague who are doing important work replacements for one-third at least should be available from the sixth day following the administration of 5 c.c. of anti-plague serum if the above experience is to be taken as a guide.

It may be that the delayed reactions were intensified because of the joint administration of anti-plague vaccine and of anti-plague serum but it must be pointed out that one case, already protected against plague, received only the anti-plague serum and the delayed reactions in this case were extremely severe.

If any of the cases with severe reactions had been in occupations involving severe physical strain they would have all been off duty for at least fourteen days for, on return to their duties, they were all *very feeble physically* and had visibly lost weight.

On the whole, the younger the individuals receiving serum, the greater the reactions and *vice versa*.

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