

EXAMPLES OF THE IMMEDIATE AND OF THE ACCELERATED REACTION FOLLOWING TWO INJECTIONS OF ANTIDIPHThERIAL SERUM.

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SINCE the close of the period which furnished the data for the preceding paper regarding the effects of repeated injections of horse serum, two cases have been observed in the practice of Belvidere Fever Hospital which have special bearing on the subject of abnormal rashes after suitably repeated doses of antidiphtherial serum.

The first of the two cases, *David W.*, age 1 year and 4 months (Ref. XII. 115), was admitted to hospital 5. x. 1906, suffering from diphtheria. On his admission he received 54 c.c. of antidiphtherial serum by subcutaneous abdominal injection. After an interval of 15 days he showed a general and somewhat profuse morbilliform rash of two days' duration. His highest recorded temperature during the rash was 102° Fahr.

When 21 days had elapsed from the first injection of serum a recrudescence of diphtheria occurred, and the patient received a second injection of antidiphtherial serum, again into the subcutaneous tissues of the abdomen, estimated on this occasion at 18 c.c. Within half an hour of the second injection of serum an urticarial rash was visible on the skin of the abdomen. In six hours the rash had become vivid and general, extending over the whole surface of the body. Six hours later its brightness had begun to fade, and 21 hours after the second injection a faint suffusion in the area of puncture alone was seen. Twenty-four hours after the injection no trace of the rash remained.

Before the administration of the second injection of serum the temperature of the patient was 98.4° Fahr. Fourteen hours after injection it reached its maximum at 103°. Thirty hours after injection

99·8° was recorded, and thirty-four hours after injection the temperature had receded below the normal line to 97·6°.

In this case the second rash was perceptible within half an hour of the second injection: so brief a period forms a contrast with the fifteen days which intervened between the first injection of serum and the first rash. The second rash further differs from the first rash in having a duration of one day instead of two days.

The case now under consideration, in which the interval between injections of serum was twenty-one days, corresponds with the cases in von Pirquet and Schick's tabular statement (1905, pp. 89—90)<sup>1</sup> in which the interval recorded between injections was twelve to fifty days. In its rapid onset, appreciable severity and brief duration the second rash of this case is typical of the *immediate serum reaction*.

The second of the two cases *Janet G.* (Ref. xv. 18) was twice admitted to Belvidere Hospital suffering from diphtheria. A period of five years separated the two attacks. On both occasions she received antidiphtherial serum.

On her first admission to hospital (9. xi. 1901) in the sixth year of her age, she underwent tracheotomy, and 48 c.c. of antidiphtherial serum were administered subcutaneously. In seven days from this first injection of serum a rash appeared, urticarial at its onset, later morbilliform, lasting three days. The rash was general and very profuse. It was not attended by a higher temperature than 98·8° Fahr.

On admission to hospital five years later (31. x. 1906), and in the eleventh year of her age, the child was again suffering from diphtheria. Membrane was situated on the fauces: the attack was of moderate severity. At this time 27 c.c. of antidiphtherial serum were injected into the subcutaneous tissues of the abdomen: an interval of 1817 days divided this, the second injection, from the first. On the 5th day from the second injection of serum an urticaria appeared on the chest. On the 6th day the limbs showed a circinate erythema: the face and the hands were swelled and marked by thick-set morbilliform macules: discomfort and restlessness were extreme. On the 7th day the signs had faded in some measure: but on the 8th day urticaria was general. On the 9th day a general circinate erythema and a general urticaria were both recorded. On the 10th day the skin was no longer

<sup>1</sup> von Pirquet and Schick (1905) *Die Serumkrankheit*. Franz Deuticke, Leipzig und Wien, pp. 89—90.

abnormally coloured, but the swelling of the face persisted until the 11th day. On the 12th day the condition of the child was normal. The highest temperature ascertained during the continuance of the rash was  $100\cdot2^{\circ}$ . The duration of the rash was seven days.

The rash which followed the second injection of serum in this case may be looked on as typical of the *accelerated reaction*. The rash after the second injection was earlier in its onset by three days than the rash after the first injection. The severity of the second rash is contrasted with the comparative mildness of the rash which followed the first injection. The second rash had a longer visible course than the three days of the first rash: but its seven days' duration is less than that of a case recorded by von Pirquet and Schick (1905, p. 90 *loc. cit.*) in their table, in which the accelerated reaction lasted for eight days. As regards the interval of time between the two injections of serum, the case is within the limit of cases tabulated by von Pirquet and Schick (p. 90) which furnished an accelerated reaction, and in which the interval between injections was seven months to seven and a half years.

The case of Janet G. may almost be said to have the value of a controlled experiment in view of the fact that her sister, *Maud G.* age 5 (Ref. xv. 20), and her brother *Thomas G.* age 8 (Ref. xi. 92) were received into hospital each with a first attack of diphtheria on the same day and at the same hour as Janet G. was admitted with her second attack of diphtheria. In all three cases the faucial appearances were approximately similar: the sisters were equally affected; the membrane in the boy's throat was somewhat more extensive. In all three cases antidiphtherial serum was administered at the same time: each of the sisters received 27 c.c. whilst 36 c.c. were given to the boy.

In the case of Janet G., as stated above, there began on the 5th day a rash of much severity and of seven days' duration: in the case of *Maud G.* no reaction was apparent until the 9th day after injection, when a trivial urticaria of eight hours' duration appeared on the abdominal skin. In the case of *Thomas G.* the 12th day was reached without evidence of rash, but in the course of the 12th day the abdomen showed slight urticaria. This urticaria was intermittent, lasting for two days in all.

The rashes of the G. family thus differ from one another in accordance with the view that a previous injection of antidiphtherial serum favours an abnormally active response to a succeeding injection.

The details of the cases described are appended in tabular form.

TABLE.

Name and details:—	<i>David W.</i> , age 1½ yrs. Two injections at interval of 21 days		<i>Janet G.</i> , age 10 at time of second injection. Two injections at interval of 1817 days		<i>Maud G.</i> age 5. One injection	<i>Thomas G.</i> age 8. One injection
	First injection	Second injection	First injection	Second injection	Single injection	Single injection
Injections						
Quantity of serum in- jected	54 c.c.	18 c.c.	48 c.c.	27 c.c.	27 c.c.	36 c.c.
Time be- tween in- jection and succeeding rash	15 days	½ hour	7 days	4 days	8 days	11 days
Duration of rash	2 days	1 day	3 days	7 days	8 hours	2 days
Highest tem- perature during rash	102°	103°	98·8°	100·2°	98°	99°
Quality of rash	Morbilliform	Urticarial	Urticarial and morbilliform	Urticarial with circinate erythema	Urticarial	Urticarial
Distribution and degree of rash	General: somewhat profuse	General: profuse	General: very profuse	General: extreme severity	Local: trivial	Local: trivial, intermittent