ALLERGIC SHOCK FOLLOWING A SCHULTZ-CHARLTON TEST

BY

R. M. CALDER, M.B., Ch.B.

Surgeon Lieutenant, R.N.V.R.

The following case was considered worth reporting in view of the severity of the reaction induced by a Schultz-Charlton test. A brief survey of the literature has not revealed a similar case.

Clinical History

The patient, a youth aged 18, was admitted to hospital on October 2, 1940, as a possible case of scarlet fever. His illness had begun during the previous night with generalized itching of the skin and mild nasal catarrh. On rising he had discovered a rash on his body and limbs. Slight sore throat was also complained of, but he did not feel really ill. There had been some epistaxis that morning. On examination he was found to be thin but healthy-looking; he was afebrile and his pulse was 80. Over the trunk and upper parts of the limbs, but most intense over the front of the chest, there was a rash consisting of a diffuse erythema with a suggestion of urticaria in places. The face and neck were unaffected. His tongue was clean and his throat appeared normal.

The diagnosis at this stage seemed to be urticaria rather than scarlet fever; and on inquiry the patient stated that he had eaten tinned salmon for supper the previous evening and that six weeks previously he had had a similar rash, which had cleared up in a few days. The appearance of the rash on the front of the chest did, however, suggest scarlet fever, and to exclude this a Schultz-Charlton test was done, 0.2 c.cm. of anti-scarlatinal serum being injected intradermally over the lower ribs on the left side at a point where the rash was most intense. Fifteen minutes later the patient was seized with sudden severe headache and vomiting, accompanied by a feeling of hotness and intense itching of the skin. Oedema of the face developed rapidly, so that soon his eyes were completely closed by swelling of the eyelids; simultaneously general massive urticaria appeared all over the trunk and limbs, affecting an area larger than and including the original rash. The skin was cold and clammy, the pulse rapid and thready, and the blood pressure 80/45. 5 minims of 1 in 1,000 adrenaline was injected slowly intravenously, and his blood pressure rose to 95/55, while the facial oedema diminished slightly. The urticaria subsided more slowly, and he felt weak and sleepy for some hours after the attack.

Inquiry was now made about his family and previous history. His mother, two brothers, and one sister all suffered from hay-fever. The patient himself had lived in America till the age of 12, and while there had had hay-fever every summer; after coming to this country he had no further attacks. When a child he had also suffered from sensitivity to poison ivy; he stated that contact with the plant was not necessary—urticaria resulted even at a distance of one foot. He had received inoculations for this when 13, with apparent benefit. At the age of 12 he had been inoculated against diphtheria in New York. So far as he knew these were the only occasions on which he had received injections.

October 3.—The giant urticaria had disappeared, leaving the rash much as it was on admission, although he still had some swelling of the eyelids. The site of the Schultz-Charlton test was surrounded by an intense ring of erythema, superimposed on the original rash. Generally he felt well and was afebrile, but his appetite was poor.

October 4.—The original rash was now fading and the facial oedema had disappeared. Scratch tests were performed on the left forearm as follows: pollen control, 0; pollen toxin, + after twenty-four hours. Saline control, 0; salmon protein,* slightly + in twenty-four hours, + in forty-eight hours.

October 6.—The rash had completely faded and he felt very well. Serum sensitivity tests were performed by intradermal injection on the right forearm: human serum (1:10) 0.2 c.cm., 0;

horse serum (1:10) 0.2 c.cm. ++++ in five seconds. The instant local reaction to horse serum was striking; within thirty seconds there was a ring of erythema about 5 cm. in diameter and a lymphangitis in the upper arm which could actually be seen moving up towards the axilla as a thin red line, advancing about 1 cm. per second. After ten minutes the local reaction was more marked and a broad band of lymphangitis extended right up to the axilla, where the glands were tender and slightly enlarged. Blood pressure 110. The patient's face was rather flushed, but his only symptom was a mild headache. After twenty minutes the face was very flushed, and quite rapidly oedema was seen to appear round the eyes and then over the face generally, exactly as it did on the previous occasion. He complained of a pricking pain behind the eyes and his nose felt blocked. The submaxillary salivary glands were noted to be enlarged and tender. On this occasion no vomiting occurred, but he had nausea and profuse sweating. There was also a brisk epistaxis. At this point the reaction was considered unduly severe, so a tourniquet was applied above the site of injection and adrenaline was injected subcutaneously into the other arm.

October 7.—There was still severe oedema round the eyes, and the site of injection was red and swollen. He complained of some pain at this point and also across the chest, but he had slept well and felt fairly fit. Later in the day he collapsed suddenly and was unconscious for a few minutes, and his skin was cold and clammy. Recovery was rapid.

Further Progress.—During the next few days the swelling of the arm gradually subsided and was followed by the appearance of bruising at the site of injection. He had no further general symptoms, and was discharged from hospital quite fit nineteen days after admission. A notation was made on his medical history sheet of his extreme sensitivity to horse serum, in view of the probable danger of a therapeutic dose of serum.

Discussion

This patient provided an interesting example of the "allergic diathesis." He had a family history of hay-fever and was himself sensitive to the following substances: (1) Poison ivy. (2) Pollen—confirmed by skin test. (3) Salmon protein. This was probably the cause of his original rash. The onset, with itchiness of the skin, a few hours after eating a brand of salmon to which he gave a positive skin test is very suggestive. (4) Horse serum. The dramatic result which followed the intradermal injection of 0.2 c.cm. of anti-scarlatinal serum was proved to be a true sensitivity to horse serum by the exactly similar response to normal horse serum—of which 0.2 c.cm. of a 1 in 10 dilution or 0.02 c.cm. of pure horse serum induced a severe reaction. Such a high degree of sensitivity is uncommon; indeed, a similar dose of serum has been recommended as a test of sensitivity before the intravenous injection of much larger quantities.

In the human being delayed reactions to serum (e.g., serum sickness) are much commoner than immediate reactions, to which the term "allergic shock" has been applied. This term is perhaps preferable to "acute anaphylaxis," since the latter implies that the sensitivity has been induced by a previous dose of serum (Lamson, 1929). In the present case it is possible that the diphtheria prophylactic at the age of 12 was the sensitizing dose. Various estimates of the frequency of serum sensitivity after diphtheria prophylactics have been made (Hooker, 1924; Gordon and Creswell, 1929). Tuft (1932) noted that sensitivity was more common in people with a family history of allergic disease, which was certainly positive in the present case.

Cases of allergic shock after the subcutaneous or intravenous administration of serum have often been reported; but only two references have been found to general reactions to serum given intradermally. Freedman (1935) recorded the case of a boy of 6 who died after the intradermal injection of 0.05 c.cm. of horse serum given nine

* An extract prepared from the brand of salmon consumed by the patient.

days after a dose of diphtheria toxin-antitoxin. Vaughan and Pipes (1936) described a case very similar to the present one in which a severe reaction was caused by 0.1 c.cm. of anti-tetanic serum given intradermally.

An interesting feature of our case was the rapidly spreading inflammation of lymphatic vessels and glands draining the site of injection. It is obvious that such a reaction must be due to the presence of some substance flowing along the lymphatic which causes dilatation of the surrounding capillaries as it travels. Whether this substance is the actual serum injected or some tissue product is unknown, but it is interesting to realize that 0.02 c.cm. of serum intradermally can produce such an intense and prolonged lymphangitis as was observed.

Summary

A case of allergic shock after the intradermal injection of horse serum is described in a youth aged 18, who was also sensitive to poison ivy, pollen, and salmon protein.

A severe systemic reaction was induced by as little as 0.02 c.cm. of serum given intradermally.

The case emphasizes the importance of skin-testing before the therapeutic use of serum, particularly in patients with a family or personal history of allergic disease.

I have to thank Surgeon Vice-Admiral S. F. Dudley for permission to publish this case.

REFERENCES

- Freedman, H. J. (1935). *New Engl. J. Med.*, **212**, 10.
Gordon, J. E., and Creswell, S. M. (1929). *J. prev. Med.*, **3**, 21.
Hooker, S. B. (1924). *J. Immunol.*, **9**, 7.
Lamson, R. W. (1929). *J. Amer. med. Ass.*, **93**, 1775.
Tuft, L. (1932). *J. Allergy*, **3**, 235.
Vaughan, W. T., and Pipes, D. M. (1936). *Amer. J. dig. Dis. Nutrit.*, **3**, 558.

Medical Memoranda

Treatment of Bacillary Dysentery (Flexner) with Sulphapyridine

In view of the increased incidence of bacillary dysentery (Flexner and Sonne) in this country during the past few months, the following note appears to be worthy of record. The results achieved are so striking that it is hoped that others who are faced with a similar epidemic may be induced to give this form of treatment a trial.

It was decided to employ sulphapyridine when bacillary dysentery showed itself at this hospital, owing to the results obtained by Drs. Reitler and Marberg published in the *British Medical Journal* of February 22 last. The opportunity occurred on April 26, when an epidemic of Flexner dysentery began. Sixteen male patients were treated, their ages varying from 22 to 67 years. They included patients suffering from various forms of chronic psychosis, and their general state of health was by no means uniformly good. Three of them had suffered from bacillary dysentery on a previous occasion.

In this hospital, unfortunately, dysentery epidemics have occurred in the past, usually in the spring and autumn, and in consequence the experience of both the medical and nursing staff in the treatment of this unpleasant illness, at least so far as it affects mental patients, is considerable. Treatment previously has been determined by symptoms and according to the current belief of the medical officer concerned. It is all the more striking therefore when experienced nurses declare spontaneously that the course of the disease has been shortened with sulphapyridine by at least seven days.

Clinically the cases were of moderate severity, with temperatures as high as 104° F. and loose stools with the usual blood and mucus. Bacteriological examination in each case uncovered Flexner XYZ. With sulphapyridine the temperature fell to normal in most cases in twenty-four hours, and in all within forty-eight. The character of the stools improved more gradually, showing diminished blood and mucus and being formed

about the fifth day. In every case but one the stools were reduced to a maximum of two a day from the third day. The tongue, from being furred and dry at the outset, was clean and moist by the third or fourth day. The general condition improved in the same striking manner, the toxic appearance, characteristic of dysentery, rapidly disappearing. The drug was administered by the mouth as early as possible; that is, immediately upon the case being clinically diagnosed. A routine dose was adopted, namely:

1.0 gramme (two tablets)	4-hourly for the 1st day
0.5 " (one tablet)	4 " " 2nd "
0.5 " " "	6 " " 3rd "
0.5 " " "	thrice during the 4th "
0.5 " " "	twice " " 5th "

Bicarbonate of soda was added wherever there was any tendency to nausea.

Diet	1st and 2nd days	Milk and water only
	3rd and 4th days	add arrowroot
	4th and 5th days	" " and mashed potatoes
	5th or 6th day	" " and "pounded" fish.

Bacteriologically all patients were Flexner-free (as determined by rectal swabs and plating) by the fifth day. Four consecutive negative swabs were considered to establish freedom from Flexner, and these were obtained in all the cases.

A most striking feature is the excellent general condition of the patients when they are allowed up, usually about seven days from the onset. In previous epidemics the patients have lost much weight and required several weeks of convalescence before they could be regarded as approaching normal health.

I am much indebted to Dr. Morris Robb for his careful treatment in this series of cases.

Brentwood, Essex.

W. GORDON MASEFIELD,
Medical Superintendent, Brentwood
Mental Hospital.

Amidopyrine and Pernicious Anaemia

We are accustomed to associate amidopyrine with the development of agranulocytosis, but Rhoads and Miller (1937) have shown that amidopyrine will depress the production of red cells in animals on a defective diet. Their work suggests that we should be very careful about the prescription of amidopyrine, and of drugs such as the sulphonamides and the organic arsenicals, to patients with pernicious anaemia, but the following is the first case in which I have seen amidopyrine depress erythropoiesis in man.

CASE RECORD

A married woman doctor came under treatment in 1934. She was 32 years old and had suffered from symptoms of pernicious anaemia for two years. The diagnosis was confirmed by the presence of achlorhydria, increase in serum bilirubin, and a characteristic Price-Jones curve. She was in a nursing home for three months, responded well to liver injections, and became fit enough to have a baby. A week after the baby was born she began to get corneal ulcers, and eventually in 1940 she stopped the injections of liver because it seemed possible that the corneal ulcers were a symptom of sensitization to liver. In January, 1941, she lost heavily at her period and in February she resumed the liver injections. On March 20, after weekly injections, her haemoglobin was 70%, but on March 26 it had fallen to 58%. Injections of liver were given on alternate days till April 1, and then daily, but although there was a moderate reticulocytosis the haemoglobin fell to 46% on March 31 and to a minimum of 44% on April 4. The white cells were normal. Naturally some serious complication was feared, but no evidence of any could be found. Inquiry then revealed that she was taking the hypnotic drug allonal, which contains amidopyrine. On omitting this, and without making any other change in the treatment, she showed a reticulocytosis of 31% and a rapid improvement. By the end of June her haemoglobin had risen to 92% and the colour index and red cell volume had returned to normal. The tendency to corneal ulceration has unfortunately persisted.

L. J. WITTS, M.D., F.R.C.P.,

Nuffield Professor of Clinical Research.

Radcliffe Infirmary, Oxford.

REFERENCE

Rhoads, C. P., and Miller, D. K. 1937). *Proc. Soc. exp. Biol.*, N.Y., **33**, 654