

VACCINIA NECROSUM

REPORT ON A FATAL CASE¹

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Vaccinia necrosum, a rare complication of smallpox vaccination, appeared in a young adult male, developed rapidly, and proved fatal in less than six weeks.

Vaccinia necrosum, known also as progressive vaccinia, is a rare complication of smallpox vaccination. It appears generally in children and without proper treatment may be fatal.

The World Health Organization and the Pan American Health Organization cooperate with Governments in vaccination campaigns against smallpox. As the number of vaccinations increases, the number of complications may also be expected to increase—among them vaccinia necrosum. Although it is extremely rare, the possibility exists that, when a case does occur, it may not be correctly diagnosed and the proper treatment may not be given; the patient may then die.

Complications from a vaccination may affect the success of a campaign, especially one against smallpox. It is well known that there are people who do not object to other vaccinations, who may even request them, but nevertheless are opposed to smallpox vaccination; they have actually formed organized groups to oppose it. Specifically, if a case of vaccinia necrosum occurs and physicians are not informed in time, the vaccine used may be held responsible when in fact the complication only appears in persons with particular immunological deficiencies whose existence is revealed by the vaccination.

Kempe (1) stated in 1960 that up to that time only nine cases of vaccinia necrosum in the entire world had been published; in his paper he reported 23 more, which raised the number of known cases to 32. The subsequent literature consulted mentions four additional cases (2-5).

Description of Case

A 26-year-old farm laborer in El Salvador was vaccinated for the first time against smallpox in the deltoid region of the left arm, at the end of July 1966. At first the case developed as a primary vaccination, but, contrary to the normal process of regression, the lesion progressed to the point that the patient had to be hospitalized.

At the time of his admission, three weeks after the vaccination, the lesion covered the entire left deltoid region (Figure 1) and consisted of an irregular, dark-brown central necrotic zone surrounded by large pustules, most of them confluent; these were moist, dull yellow, and quite raised. The lesion was surrounded by a fairly extensive area of inflammatory edema, hard, reddish, and shiny, which covered the entire shoulder and the upper half of the arm. Altogether, it seemed to be a massive, exaggerated reaction to a primary smallpox vaccination.

On admission the patient had a temperature of 38°C and complained of pain in the area of the lesion; his general condition was fairly good; he had a slight neutrophilia and there was no lymphopenia.

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FIGURE 1—Appearance of Lesion Three Weeks after Vaccination.



The lesion continued to progress. Four weeks after the vaccination the necrotic zone had reached a diameter of about 10 cm and covered the outside of the upper left arm, still surrounded by the pustulous area and edema (Figure 2). The pustulous area had extended to the armpit and the edema to the elbow, invading the left hemithorax. Small, pearly blisters appeared in the armpit, and others halfway between the main lesion and the elbow.

During the succeeding days the necrotic and pustulous zones increased in size; the edema reached the hand and the lower left side of the face, and advanced further in the hemithorax. The blisters in the armpit and those near the elbow became pustules and conglomerated.

The main lesion continued to spread outward, and independent necrotic zones appeared near the elbow, in the armpit, and in

the anterior and posterior walls of the left hemithorax. As the size of the lesions increased, more and more tissues were invaded; as a result, the patient deteriorated rapidly.

Thirty-nine days after the vaccination, the patient awoke slightly jaundiced, sweating, and agitated; he died before noon.

During his stay in the hospital, the patient received antibiotics—streptokinase and streptodornase—and local treatment. He was given large doses of analgesics for pain. The process was moderately febrile, with the temperature seldom going above 38°C.

Discussion

A month after the vaccination, a blood sample was taken from the patient and tested for vaccinia neutralizing antibodies and globulin. These tests were made in two dif-

FIGURE 2—Appearance of Lesion Four Weeks after Vaccination (necrotic area measures 10 cm in diameter).



ferent laboratories, and the results were similar. As additional laboratory data, it may be mentioned that there was no reaction in the VDRL test for syphilis, which is worth mentioning in view of the frequency of such a reaction in persons recently vaccinated against smallpox (in whom there is a visible reaction).

The gamma globulin level proved to be low, but within normal limits. One of the laboratories found a low titer of vaccinia neutralizing antibodies; the titer found by the other must be interpreted as practically negative.

The occurrence of vaccinia necrosum has been associated with various factors. Among them is hypogammaglobulinemia; it is found in a certain number of cases, but in others the values are normal. Either may have been the case with this patient. On the other hand, an absence or low levels of vaccinia neutralizing antibodies in the serum have been noted in patients with vaccinia necrosum, but, although this is very frequent, some patients do have specific antibodies in the blood. In the case studied here, there were practically none.

These two are the factors that have received the most study. It should also be mentioned that in some cases of vaccinia necrosum there is a defect in the tissue immunity mechanism.

The treatment most often and most successfully used is human vaccinia immunoglobulin. Coming as it does from the blood of persons recently vaccinated against smallpox, this substance differs from ordinary human immunoglobulin, and it makes up for the deficiency of antivaccinia antibodies in the patient.

Recently, methylsatin (N-methylsatin-Beta-thiosemicarbazone) has also been used successfully to treat vaccinia necrosum. Another treatment has been the injection, at the edges of the lesions, of leukocytes from persons recently vaccinated against

smallpox; transplants of lymph nodes from similar donors have also been used.

In general, cases of vaccinia necrosum that do not receive specific treatment develop slowly and result in death four to six months after the onset of illness. The present case developed rapidly; death occurred in less than six weeks after vaccination.

The patient was visited a few days after he entered the hospital. The diagnosis was established, and an attempt was made to obtain vaccinia immunoglobulin and also methylsatin. But the illness developed so rapidly that by the time the immunoglobulin arrived the patient had died.

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Summary

The author reports on a fatal case of vaccinia necrosum in a 26-year-old man in El Salvador who was vaccinated against smallpox on the outer surface of the left arm. At first the case developed as a primary vaccination, but instead of showing the normal regressive process the vaccinal lesion followed an invasive and destructive course. A necrotic zone was formed, surrounded by pustules and edema; the lesion occupied the left arm, the armpit, and there were necrotic foci on the chest. The patient deteriorated in a short time and died with a clinical picture of toxemia.

This complication of smallpox vaccination is rare. Of the few such cases published, most occur in children and result in death if specific therapy is not instituted. In those that do not receive such therapy, death usually occurs in four or six months. The present case occurred in an adult who did not receive the specific treatment and died in less than six weeks.

The author discusses the factors that have been found associated with vaccinia necrosum cases: hypogammaglobulinemia, inability to form vaccinia neutralizing antibodies, and deficiencies in the tissue immunity mechanism.

The recommended treatment for vaccinia

necrosum is described: vaccinia immunoglobulin (human), methylisatin, injection at the edges of the lesions of leukocytes from donors who have been recently vaccinated against smallpox, and transplants of lymph nodes from similar donors. □

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