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LOCAL ALLERGIC REACTION OF PREVIOUSLY VACCINATED SKIN DURING ASIAN INFLUENZA

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IN NOVEMBER, 1957, a 32-year-old white man was inoculated intradermally with Asian influenza vaccine. Inoculation was attempted in the skin of the flexor aspect of the right forearm, but mishap led to inadequacy of the dose. A full dose, presumably 0.1 c.c., was therefore injected into the left forearm. There were no reactions.

In March, 1958, during the epidemic appearance of Asian influenza, the patient became ill with high fever and acute bronchitis. He recovered in five days. A roentgenogram of the chest revealed no abnormality. The blood leukocyte count was not elevated. However, there was some left shift in the differential count at the height of the illness, but this returned to normal with recovery. The illness resembled the other cases of influenza being seen in the hospital at that time.

On the initial day of illness, there appeared two erythematous areas at the sites of inoculation of vaccine four months earlier (Fig. 1). These became slightly indurated and tender. The area involved was larger in the left forearm, which had received the full dose of vaccine. The erythemas subsided with recovery from the illness.

It was concluded (though unproved) that the patient had contracted Asian influenza, despite intradermal inoculation of prophylactic vaccine four months earlier, and that the illness had caused specific reactivity of the locally inoculated skin.

COMMENT

That a local immunity may exist in the absence of a general immunity has been recognized since early studies with experimental erysipelas in rabbits.

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The tissues become allergic during the immunizing infection, as indicated by prompt and vigorous reactivity to the specific antigenic stimulus. Later observations extended the phenomenon to other bacterial infections.¹

A similar local immunity has been observed in viral infections. Four days after intradermal injection of vaccinia virus in rabbits, tissue extracts from the inoculated area contained two to ten times as much antibody as blood or other tissue extracts.² Intranasal vaccination of mice with influenza virus gave a ratio of antibody in the respiratory tract to that in serum of 1:20, compared with a ratio of 1:250 following parenteral vaccination.³ The local production of antiviral antibodies in inoculated tissue was shown for poliomyelitis by Morgan,⁴ and for equine encephalomyelitis by Schlesinger.⁵

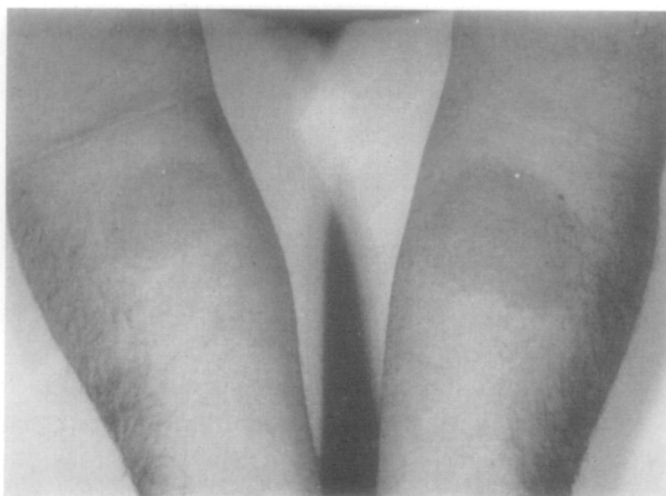


Fig. 1.—Local allergic reaction during Asian influenza, occurring at sites of intradermal inoculation of Asian influenza vaccine four months previously.

Increased reactivity of the skin to injection with live or inactivated virus is demonstrable in persons or animals that have recovered from a variety of viral diseases, including smallpox, vaccinia, psittacosis, lymphogranuloma, trachoma, influenza, herpes, mumps, swine fever, and contagious ecthyma of sheep.^{6, 7} Beveridge⁷ suggests that persisting allergy to viruses need not be associated with the continued presence of neutralizing antibody, since repeated reinoculations may produce a full "primary" type of reaction.

When the above reported patient became ill with influenza, a local allergic response occurred in skin areas inoculated four months previously. Since monovalent Asian influenza vaccine (a variant A strain) had been used, and since Asian influenza was epidemic in the community at the time, it is assumed that a specific allergic response was elicited by the disease in the locally immunized skin. I have found no reference to this phenomenon, in which the local reaction was produced by the disease after earlier inoculation. It is reminiscent of the Schwartzman phenomenon.⁸ In that experiment, intravenous injection of homologous culture filtrate, eight to thirty-two hours after

inoculation of bacteria or culture filtrates into the skin of rabbits, resulted in gross hemorrhage and necrosis in the inoculated skin. The Schwartzman phenomenon is sharply limited in its time of occurrence, however, apparently depending on the stage of the initial inflammatory reaction. The presently reported observation suggests, rather, a "skin test" in reverse (that is, produced by the disease in previously inoculated skin) and is probably similar in its mechanism to the skin reactions obtained on specific inoculation of sensitized persons. It may bear analogy with the "fixed eruptions" produced in some persons by ingestion of specific drugs.⁹

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