

Virus content of smallpox scabs*

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Abstract

Log titres of smallpoxvirus (pock-forming units per 0.1 g of scab) were estimated in scabs from 5 patients from the 13th to the 24th days of illness. They were found to vary from 3.72 to 6.54 with no diminution as convalescence progressed, and they were not related to the primary vaccination status of the patient or the clinical severity of the disease.

The spread of smallpoxvirus is mainly through droplets and scabs. Recently, the presence of virus in the urine, the conjunctival secretions, and in throat swabs from patients with smallpox was demonstrated and the titres of virus in them estimated daily (3). The present work, which does not seem to have been carried out previously, describes the quantitative estimation of virus in smallpox scabs on different days of the illness.

Materials and methods

Scabs from patients with smallpox in the Infectious Disease Hospital, Calcutta, were taken with the aid of forceps, daily or on alternate days, and placed in sterile screw-capped containers, which were properly labelled. The clinical type and the vaccination status of the patients were noted. The presence of a vaccination scar was taken as evidence of primary vaccination. No attempt was made to obtain the date of primary vaccination or a history of revaccination, since it was thought that the information would be unreliable. The day of illness was reckoned from the day of onset of fever. The scabs were preserved in the laboratory at -20°C till the time of virus estimation. Virus titres were deter-

mined by the pock count method in chick chorioallantoic membranes as reported previously (2). Before each inoculation in eggs, 3 scabs were accurately weighed in a balance and a suspension of 0.1 g per ml was made with McIlvaine's buffer solution.

Results

Altogether 5 patients, 3 with confluent and 2 with discrete smallpox, could be collected for this study. Some details on them and the log titres of virus per 0.1 g of scab on different days of the illness are shown in Table 1. The separation of scabs from the patients was completed on different days so that the last day of collection of scabs varied. The log titre of virus per 0.1 g of scab was in the range 3.72-6.54.

Discussion

As the spread of infection through scabs is well recognized, and as the viability of variolavirus is known to be prolonged when in the dried state (1) as in the scabs, it is important to know the quantum of virus that is present in different scabs. From our results, it is apparent that the virus titre did not depend on the clinical severity of the disease, because the titres of virus in the scabs of discrete and confluent cases were similar.

Previous vaccination of the patients also did not seem to influence the virus concentration in the scabs. It may be recalled that although there was a difference in the quantum of virus in the urine and in the throat and conjunctival swabs taken from patients with haemorrhagic, confluent, and discrete smallpox, the vaccination status of these patients made no difference to the virus levels (3).

In general, specific microorganisms in any disease diminish in number as convalescence progresses. Thus, virus titres in the urine, and in the throat and conjunctival secretions of patients with smallpox diminished with time (3). In the scabs, however, the quantum of virus was found to have been unaffected by the passage of time. This is not unexpected,

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Table 1. Virus titres ^a in smallpox scabs from 5 patients on different days of the illness.

Age (years)/ sex	Clinical type	Primary vaccina- tion	Day of illness												
			13	14	15	16	17	18	19	20	21	22	23	24	
26/M	confluent	+	5.53	6.45	6.40	5.78	no scab available								
10/M	confluent	+			6.54		6.45	5.08			4.48	no scab available			
18/M	discrete	-				5.60	5.20	5.51		5.50		5.52	5.26	5.48	
25/M	discrete	-	5.30	5.30			5.70	6.20		5.90	no scab available				
11/M	confluent	-		3.74		5.58			4.60	4.74		3.72	no scab available		

^a Expressed as the log titre of pock-forming units of virus per 0.1 g of scab.

because scabs are but dried-up pustules or trans-
formed vesicles, which contain virus particles.

Although the time of separation of scabs varied
between patients, there was no consistent diminution
in the number of virus particles with time, because,
as was mentioned above, the variolavirus is fairly
stable when in the dried state. In other words, the
infectivity of smallpox scabs does not appear to
depend on the time when they separate from the
lesions.

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