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Silica Gel as Transport Medium for *Corynebacterium diphtheriae* under Tropical Conditions (Indonesia)

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Silica gel was confirmed as a useful transport medium for *Corynebacterium diphtheriae* in the investigation of diphtheria cases in which there is no ready access to laboratory facilities.

Routine culturing for *Corynebacterium diphtheriae* is often difficult in developing countries because standard transport media require special handling and prompt culturing. Recently, a transport medium that does not require special handling or rapid processing was developed using silica gel to dry the specimen (1, 3). This method has been successfully used for isolating and identifying *C. diphtheriae* from skin lesions among patients living in the tropics (1, 2). However, these studies did not compare the recovery rate of *C. diphtheriae* cultured immediately with the recovery rate of specimens cultured after a delay of 72 h or more. Our investigation compared immediate and delayed culturing and evaluated the usefulness of silica gel as a transport medium for throat swabs in the tropics.

The Dr. Cipto Hospital in Jakarta, Indonesia, was selected as the institution in which to conduct this investigation because patients with diphtheria are admitted regularly and laboratory evaluation is routine for all admitted patients. This investigation compared the rates of recovery of *C. diphtheriae* from paired throat swabs (cotton swabs) of 17 patients whose illness was clinically diagnosed as diphtheria during the period 20 September to 24 October 1983. One throat swab was sent immediately to the laboratory in a sterile glass tube to be cultured, and the other throat swab was placed in a silica gel transport medium packet (available from Carter, Rice, Storrs, and Bennett, East Hartford, Conn.) and held at room temperature for 2 weeks in a water-tight plastic bag before being cultured. Resident physicians on the pediatric ward who regularly admit patients with diphtheria were trained in a standardized protocol to collect specimens. The protocol for processing throat swabs was an adaptation of the method used for the isolation and identification of *C. diphtheriae* recommended by the Centers for Disease Control, Atlanta, Ga. (4). Swabs were moistened, and a blood agar plate and a tellurite agar plate were inoculated and then incubated aerobically at 35°C for 24 and 24 to 48 h, respectively. Swabs were also placed on a Loeffler slant and allowed to remain on the slant during incubation. After 18 h of incubation, growth from the Loeffler slant was streaked onto a tellurite agar plate. Any colonies from the blood agar or tellurite agar plates resembling *C. diphtheriae* were picked to a Loeffler slant. After 18 h of incubation, smears were made from growth on the Loeffler slant and stained with Neisser and Gram stains. These smears were microscopically examined by a trained technician for cellular morphology typical of *C. diphtheriae*.

The official temperature in Jakarta as recorded in the climatological data for Jakarta Observatory ranged from 22.4 to 36.3°C (average, 27.7°C), and the relative humidity ranged from 43 to 98% (average, 74%) during the period 20 September to 8 November 1983, the dates of first swab collection and last swab culturing.

The results of culturing paired swabs are shown in Table 1. For four patients, the silica-gel-transported swab was positive, whereas the immediately transported swab was negative. For three patients, the immediately transported swab was positive, whereas the silica-gel-transported swab was negative.

If individual patients were considered truely positive if either the silica-gel-transported or the immediately transported swab was culture positive, then the sensitivity for the silica-gel-transported swab was 78.6% (11 of 14) and the sensitivity for the immediately transported swab was 71.4% (10 of 14).

If individual patients were considered truely positive if admitted with a clinical diagnosis of diphtheria, then the sensitivity for the silica-gel-transported swab was 64.7% (11 of 17) and the sensitivity for the directly transported swab was 58.8% (10 of 17).

This investigation showed that throat swabs held in silica gel transport medium for 2 weeks at room temperature are at least as sensitive as throat swabs immediately transported and processed by standard methods for hospitalized patients in confirming the presence of *C. diphtheriae*. The fact that samples from all patients admitted with clinical diphtheria were not culture positive may have been a result of antibiotic therapy begun before hospitalization or of misdiagnosis, poor swabbing technique, not using broth enrichment, or some other technical defect. In this investigation, the differ-

TABLE 1. Comparison of *C. diphtheriae* isolations

Isolation from swab held 2 wk in silica gel transport medium before processing	Isolation from immediately transported swab (no. of isolations)		
	Yes	No	Total
Yes	7	4	11
No	3	3	6
Total	10	7	

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ences in the results between the silica-gel-transported swab and the immediately cultured swab may have resulted from variations in swabbing technique.

These results suggest that the silica gel method for transporting *C. diphtheriae* may be useful in investigating diphtheria cases in which there is no ready access to laboratory facilities.

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