Letter to the Editor

Quantitation of Group A Beta-Hemolytic Streptococci in Throat Cultures

In Kellogg's review (7) of throat culture procedures for the recovery of group A beta-hemolytic streptococci (GABHS), he rather summarily dispenses with quantitation of GABHS on the culture plates as providing any indication as to the presence or absence of true streptococcal infection. He cites two studies other than his own review article (8) as evidence for this statement. In the first, by Gerber et al. (4), there was no significant correlation between the degree of positivity of throat cultures and changes in antibody titers. In the second, by Kaplan et al. (6), although the correlation was not significant, there was a trend toward the association of an initial culture of 2+ or greater (10 to 50 CFU of GABHS) and serologic evidence of infection. Also, in a later study (5), Kaplan et al. found that there was a definite trend for individuals with strongly positive cultures to demonstrate an antibody rise. Similarly, in 127 streptococcal infections, Miller et al. (10) found 45% of "grade 3" cultures to be associated with at least a two-tube increase in anti-streptolysin O, as opposed to only 19 and 6%, respectively, for "grade 2" and "grade 1" plates. They interpreted this as showing a "clear-cut relationship between the number of colonies and the frequency with which a significant increase in antistreptolysin-O was observed."

Whereas the above-mentioned studies lead to differing conclusions on the basis of antibody data, those which correlate clinical findings with throat culture results are very much in accord. In a private pediatric practice, Stillerman and Bernstein (11) compared positive cultures of 98 symptomatic and 96 asymptomatic cases and found that strongly positive cultures were much more likely to occur in the former group. In culturing 1,054 children with sore throats and 462 who were asymptomatic, Bell and Smith (1) found that 71% of the 350 positive cultures in the former group showed a heavy growth of GABHS as opposed to only 10% of the 80 positive isolates in the latter one. The findings of Margileth and Mella (9) were similar when they compared children with pharyngitis and their asymptomatic siblings. Wannamaker (12) and Breese et al. (3) in review articles and a panel of experts assembled by the chief editors of the *Pediatric Infectious Disease Journal* (2) all attest to the clinical importance of the degree of positivity of throat cultures for GABHS.

The vast majority of studies which correlate patient symptomatology with throat culture quantitation support the belief that quantitation is at least of some importance in differentiating the streptococcal carrier state from true infection. To ignore these studies may be misleading, especially to those who are primarily or exclusively in the laboratory and do not have the opportunity of frequently correlating clinical and laboratory results.

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Author's Reply

I appreciate Dr. Roddey's comments concerning the question of correlation of numbers of colonies of group A streptococci recovered on throat cultures with confirmed streptococcal infection. This kind of dialogue is helpful and necessary both to clinical microbiologists, such as myself, in understanding the relevance of the tests which we perform and to clinicians, in understanding the strengths and limitations of these diagnostic assays.

A subcommittee (composed primarily of physicians with extensive backgrounds in the diagnosis of streptococcal infections) of the American Heart Association has concluded that ". . . culture does not reliably distinguish between acute streptococcal infections and streptococcal carriers with concomitant viral infections" (4). They further state that "sparse growth of group A streptococci does not necessarily reflect the carrier state and may indicate acute infection." These conclusions, shared by numerous other clinicians (1, 3, 5, 7, 8, 12–14, 16), were precisely the points of the comments, referred to by Dr. Roddey, which appeared in the review of group A streptococcal culture procedures (9). The throat culture is not designed as a quantitatively precise diagnostic test, and its results should not be arbitrarily interpreted as if it were. While many patients whose cultures contained large numbers of group A streptococcal colonies have been shown to have a significant streptococcal antibody response, such an antibody response has also been documented not infrequently in patients whose

cultures contained either small numbers of colonies of the organism (5, 8, 12–14) or no such colonies at all (7, 12–14).

There are many clinical and methodological explanations for the lack of correlation between numbers of streptococcal colonies in culture and an antibody response. These include antibiotic pretreatment of patients, duration of symptoms, variation in thoroughness of specimen collection, and the medium, atmosphere, and duration of incubation selected for culture detection of the pathogen, as previously reviewed in detail (9, 11). Dr. Roddey's pediatric group has reported that, depending on the type of culture medium and the atmosphere of incubation tested, one type of agar medium missed from 3 to 17% of culture-positive patients (15). In a study that the York Hospital laboratory undertook with a local pediatric group, the semiquantitative recoveries of group A streptococci were the same from duplicate swabs (one cultured in the pediatric office, the other in the laboratory) obtained from only 60% of the culture-positive patients (10).

It appears clinically unwise to arbitrarily interpret a culture containing only a few group A streptococcal colonies as coming from a carrier rather than an acutely infected patient. Similarly, differentiation of the carrier from the truly infected patient cannot always be reliably made on clinical grounds alone (3, 4, 8) or even, perhaps, from the absence of an antibody response in a culture-positive patient (6). The clinician should use all available clinical, bacteriological, and epidemiological information together to differentiate a patient who may be a carrier from one with an acute infection (2, 16).

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