Comparison of the Sensitivity of Complement Fixation (CF) Test and Immunoelectroosmophoresis (IEOP) for Detection of Hepatitis B

Principal Investigators: Rapin Snitbhan, M.D.
Dumrong Chiewsilp, M.D.
Franklin H. Top, Jr., M.D.

BACKGROUND: Of the many tests described to detect HB Ag in human serum, three — agar gel diffusion (AGD), CE and IEOP — have been used in this laboratory. This report compares the sensitivity of the 3 tests in detecting HB Ag in the serum of Thai blood donors and recipients.

METHODS: Sera tested were obtained from blood donors and recipients in a study earlier described in this report or from patients with hepatitis. Details of methods of AGD, CF, and IEOP tests were described in last year's Annual Report.

PROGRESS: Table 1 compares the results of CF and IEOP tests for detection of HB Ag in human serum. Of the 3445 sera tested, IEOP detected HB Ag in 369 (10.7%). By CF, 216 sera (6.2%) were positive for HB Ag (positive equals complete fixation at $\geq$1:2 serum dilution) or 306 sera (8.9%) if partial fixation reactions are deemed to reflect antigen. Relatively good agreement between CF and IEOP results were evident in sera with complete fixation, except for sera with low CF titer (2—4). The occasional negatives by IEOP in sera containing antigen at $>$1:32 was usually due to prozone effect; dilution of such sera to 1:4 gave positive IEOP reactions.

The principal difference in the sensitivity of the tests was manifest in sera giving partial fixation. Approximately 3% of all sera tested gave such reactions and 90% of these were IEOP positive. Reasons for the partial fixation reaction in these sera, many of which contain large amounts of antigen by titration in IEOP, is uncertain; the possibility that such sera contain anti—HB IgM antibodies which block complement fixation by the immune antisera used in the CF test or contain principally immunocomplexes of HB Ag with saturated antibody or complement sites is intriguing. In any case, sera giving partial fixation account for about 25% of IEOP positive sera encountered in Bangkok.

Strong AGD reactions were generally found only in sera that were IEOP positive with CF titer $\geq$32. IEOP positive sera with undetermined CF reaction or partial fixation generally gave weak or no precipitins in AGD.

Table 1.

Comparison of CF and IEOP test in detection of HB antigen

CF Titer	Sera Tested (No.)	IEOP Positive (No.)	IEOP Negative (No.)
negative (<2)	3008	66	2942
2—4	20	11	9
8—32	72	69	3
>32	124	115	9
undetermined	131	27	104
partial fixation	90	81	9