

SEROEPIDEMIOLOGIC CORRELATIONS IN MALARIA

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ABSTRACT

Serologic measurements of humoral immunity have been used to estimate malaria transmission in endemic areas. The usual methods employ enzyme linked immunosorbent assays (ELISA) and immunofluorescent antibody tests of a wide variety of malaria antigens. In theory, higher levels of antibody reflect higher levels of exposure to malaria antigen i.e., disease. However, one must carefully consider variables such as endemicity, species of malaria present, age of the group examined, and the antigen/test array selected. Without doing so, it is easy to draw erroneous conclusions. This presentation provides guidelines to selecting a test and antigen appropriate for deriving given epidemiologic conclusions from serologic surveys. Also, recent work on DNA probes of malaria and serum markers of cell-mediated immunity is described in context of epidemiologic measures of malaria transmission.

QUESTIONS AND ANSWERS :

1. Question: Taking blood samples from children is extremely difficult, but if you only examine adult volunteers in seroepidemiology, the result will not give the malaria situation in the endemic area.

Answer : I disagree. A very important point in my presentation was that seroepidemiologic surveys are most valuable in areas where public health officials have very limited access, and therefore little malariometric data. When doing a seroepidemiologic assay it is essential to do a point prevalence measurement in *all* age groups and a spleen rate should be obtained. But those two measurements taken at one single point of time tell us almost nothing about the overall level of transmission. The seroepidemiologic measurement provides a broader view of malaria intensity by permitting us to see antibody from prior infections. It is a relative measurement to be compared with others, both these from populations of known levels of transmission and with other villages where the malaria situation is unknown. To do this you must use all age groups because antibody levels to heterogeneous antigen preparations are age dependent. The seroepidemiologic survey provides more reliable data than point prevalence, i.e. spleen rate alone, and this can be used by public health officials who must decide where to place valuable malaria control resources.

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2. Question: When the seroepidemiology is conducted as you have recommended, how does the ELISA/IFA results correlate c parasitaemia/endemicity using the asexual parasites ? And is there any correlation with other parameters. Any indication that the antigen used has relationship with morbidity ?

Answer : We do have solid epidemiologic data which show that antibody levels to heterogeneous asexual parasite antigen preparations are very low where there is little malaria transmission, and high where there is hyper to holoendemic malaria. We have found no antibody assay which predicts susceptibility to malaria among all age groups. For this purpose, I think highly specific antigens would be more productive.

3. Question: - How important is the IgM in estimating the problem in endemic areas ?
- Which Ig is much related to age in your figure ?

Answer : I think that depends upon whether there is stable or unstable malaria. Where there is stable malaria, the mean IgM value does not change much. Both IgG and IgM correlate closely with age in hyperendemic areas.

4. Question: Do you make bloodsmear at the time you take blood for serology ?
Positive bloodsmears indicate active transmission.
Positive sera present a past transmission.

Answer : Yes, we always take blood films and use that to provide diagnosis and treatment in the field. With present technologies, taking serum serves no diagnostic purpose in the field.

5. Question: In epidemiology studies
- Why you use *adult* volunteers only.
- Why you choose the young trophozoites for antigen.

Answer : - For point prevalence we measure all age groups, but for serologic survey of malaria transmission we use only adults so that our antibody levels may be compared among villages.
- Young asexual parasites are the easiest to obtain and purify and I believe them to be most relevant to antibody with recurrent parasitemia.

6. Question: Considering the more severe implications of malaria for children, what are your ideas on giving priority to refining testing procedures (or a testing procedure) for this age group ?

Answer : That clearly makes a lot of sense. Any technology which finally addresses the need for real rapid diagnosis in the field, and not in a laboratory, should be directed at children with malaria.