

## Timorian filariasis and ABO blood groups

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There are conflicting reports as to whether there is an association between ABO blood groups and microfilaraemia in infection with *Wuchereria bancrofti* (see AYRES *et al.*, 1976; GYORKOS *et al.*, 1983). Clarification is needed. It is arguable that the clinical expression of disease in filariasis (episodic fevers, lymphangitis, lymphadenitis, lymphoedema, elephantiasis, hydrocele, pulmonary or blood eosinophilia) is an outcome of host responses to the parasite, and that antibodies to microfilariae might play an important role in pathogenesis. An association between blood groups and parasitaemia would have implications for host control of parasitaemia and immunopathogenesis.

In Flores, Indonesia, a group of villagers exposed to infection with *Brugia timori*, and to a lesser extent *W. bancrofti*, has been observed for several years. The immunological status of these people and the prevalence, clinical signs and epidemiology of filariasis are well recorded (PARTONO & PURNOMO, 1978; PARTONO *et al.*, 1978; HIGGINS *et al.*, 1985). Sera from 292 randomly selected adults were examined against reference erythrocytes and ABO antisera (provided by the M.R.C. Blood Group Reference Laboratory, London) to determine the isoantibody specificities and hence the ABO blood groups. The results were retrospectively compared with the filariasis status of each villager. Six clinical/parasitological classifications were possible based on microfilaraemia (+/-) (determined by membrane filtration of 3 ml lysed blood), signs of acute disease (+/-) (episodic fevers with adenolymphangitis) and signs of chronic disease (+/-) (lymphoedema, elephantiasis, hydrocele); eosinophilia was not routinely determined. One of the possible classifications (microfilaraemia +/- chronic disease +) was rare and none was included in this study.

If the data were classified according to the same system as GYORKOS *et al.* (1983), i.e., microfilaraemia versus amicrofilaraemia irrespective of disease status (Table I), a significant association with blood groups was seen ( $\chi^2 = 8.14$ ;  $p = 0.04$ ). Groups A and AB were more prevalent, B and O less prevalent, among

people with microfilaraemia. However, if disease picture was included in the classification, to achieve the five clinical and parasitological combinations (Table II), there was no apparent relationship with blood groups ( $\chi^2 = 17.46$ ;  $p = 0.13$ ). Examination of disease status alone, irrespective of microfilaraemia status, also did not show a significant relationship with blood group distribution.

There are two possible explanations for the lack of association between ABO blood groups and microfilaraemia after subdividing the microfilaraemic and amicrofilaraemic groups on the basis of disease picture. The first is that there was no real association. The second is that disease was irrelevant and its inclusion obscured the association. This possibility cannot be determined without a more rigorous multiple dimension contingency analysis. However, our data emphasize the importance of correct classification for statistical analysis of associations. A larger study would be worthwhile, preferably based on detection of erythrocyte antigens rather than isoantibodies. The possibility that microfilariae were absorbing isoantibodies, so reducing their serum concentration, cannot be ruled out; this might explain why the percentage of AB (no detectable isoantibodies) was highest in the group showing microfilaraemia and acute disease signs.

If the result is confirmed, the mechanism of the association should be examined. It is unlikely that linkage exists between the AB locus and genes governing susceptibility or immune responsiveness to filariasis, and even more unlikely that the disequilibrium required for association with individual blood groups exists. If, indeed, antibodies are involved it is interesting that no relationship exists between blood groups and occurrence of disease. However, heterophile isoantibodies and specific antibodies produced in response to microfilariae might have different capacities for the initiation of immunopathology, differences mediated possibly by affinities, isotypes and cytophilic and complement binding properties. Blood group antigens might also cross-react with those of adult *B. timori* and the infective stage (L3)

Table I—Relationship between ABO blood group distribution and microfilaraemia in *Brugia timori* filariasis

| Microfilaraemia | Blood group [No. (%)] |           |          |            | Total |
|-----------------|-----------------------|-----------|----------|------------|-------|
|                 | A                     | B         | AB       | O          |       |
| YES             | 29 (32.2)             | 14 (15.6) | 9 (10.0) | 38 (42.4)  | 90    |
| NO              | 50 (24.7)             | 44 (21.8) | 7 (3.5)  | 101 (50.0) | 202   |

$\chi^2 = 8.14$ ;  $p = 0.04$

Table II—Relationship between ABO blood group distribution, microfilaraemia (mf) and disease in *Brugia timori* filariasis

| Group | Filariasis |                  |                 | Blood group [No. (%)] |           |          |            | Total |
|-------|------------|------------------|-----------------|-----------------------|-----------|----------|------------|-------|
|       | mf         | Acute disease    | Chronic disease | A                     | B         | AB       | O          |       |
| 1     | +          | -                | -               | 14 (34.1)             | 7 (17.1)  | 3 (7.3)  | 17 (41.5)  | 41    |
| 2     | +          | +                | -               | 15 (30.6)             | 7 (14.3)  | 6 (12.2) | 21 (42.9)  | 49    |
| 3     | -          | +                | -               | 16 (23.2)             | 9 (13.0)  | 5 (7.2)  | 39 (56.5)  | 69    |
| 4     | -          | -                | +               | 14 (28.0)             | 13 (26.0) | 1 (2.0)  | 22 (44.0)  | 50    |
| 5     | -          | -                | -               | 20 (24.1)             | 22 (26.5) | 1 (1.2)  | 40 (48.2)  | 83    |
|       |            | whole population |                 | 79 (27.0)             | 58 (19.9) | 16 (5.5) | 139 (47.6) | 292   |

$$\chi^2 = 17.46; p = 0.13$$

larvae. It will be interesting to compare blood group allotypes with the population distribution of stage-specific antibodies to *B. timori* in this same population (MAIZELS *et al.*, 1983).

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