

Red blood cells' auto-agglutination as an indicator test in human trypanosomiasis

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Summary

Spontaneous red blood cells' auto-agglutination was assessed as an indicator for the diagnosis of human African trypanosomiasis. This test is easily carried out by health workers with minimum qualification. It presents a high sensitivity (0.91) and a high predictive value of a negative result (0.99). Although a positive result gives a low indication of infection, the health care workers should refer the patient to a screening centre.

Introduction

Early this century, several authors demonstrated red blood cells' auto-agglutination in patients infected with *Trypanosoma gambiense* (Dutton *et al.* 1904; Martin *et al.* 1909; Tood 1910; Dubois 1912). This phenomenon has also been observed in animals infected with *T. congolense* and *T. brucei* (Duke & Wallace 1930). However, despite its great simplicity, this test has been overlooked. The diagnosis of human trypanosomiasis currently relies on serological tests (agglutination, indirect immunofluorescence), but in secondary health centres the detection of trypanosomes is the only feasible examination. However, the insensitivity of the parasitological methods results in some patients remaining undetected. In order to minimize screening difficulties in basic medical facilities, we decided to reconsider red blood cells' auto-agglutination as a simple indicator test and to assess this technique in comparison with parasitological and serological tests.

Materials and methods

The sensitivity of red blood cells' auto-agglutination was assessed on 100 patients with parasitologically-confirmed trypanosomiasis (group 1). The test was also carried out on 170 randomly selected subjects (group 2), before conducting serological and parasitological examinations. These subjects lived in an endemic region, in which the prevalence of sleeping-sickness has been estimated at 3% (Noireau *et al.* 1987). A wet film of capillary blood was made under a cover glass and examined immediately after collection under the microscope ($\times 20$) for red cells' auto-agglutination. The reaction was considered positive when the red cells were no longer separate or in 'piles of money' formations, but adhered to each other in homogeneous aggregations of various shapes and sizes. Only marked agglutination reactions were considered. Indirect immunofluorescent antibody test (IFAT) was carried out on dried blood, according to the method used in the Congo (Noireau *et al.* 1988). The card agglutination test (CATT) was carried out with serum, and reactions $> 1/4$ were considered to be positive. The blood was examined for parasites by the microhaematocrit centrifugation technique (Woo 1971). When possible, lymph node aspirate was examined. Parasitologically negative subjects who presented co-positive CATT-IFAT results were considered to be infected with *T. b. gambiense* (Noireau *et al.* 1988).

Results and discussion

Of the 100 trypanosome infected subjects in group 1, 91 presented red cells' auto-

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agglutination, giving the estimated sensitivity of the test as 0.91. In group 2, four patients were detected by serological tests, of whom only one was confirmed parasitologically. All four patients presented red cells' auto-agglutination. This was also observed in 16 of the 166 subjects without trypanosomiasis. Overall, for the subjects in group 2, the specificity of the test was 0.90. Predictive values for this test, calculated by Bayes' theorem based on the rate of local endemicity of trypanosomiasis, were estimated at 0.99 (predictive value of a negative result) and 0.21 (predictive value of a positive result).

Several authors reported that red cells' auto-agglutination is observed frequently in subjects without sleeping sickness (Todd 1910; Dubois 1912). The specificity of the test can however be increased if only the markedly positive agglutination reactions are taken into account. Although this study was carried out on a small number of subjects, it has demonstrated the high sensitivity of the test. In addition, the auto-agglutination test presents a high predictive value of a negative result in trypanosomiasis foci of moderate prevalence. This enables the absence of auto-agglutination to be considered as a valid indicator of non-infection. This simple test could be carried out as a preliminary examination by health workers in deprived areas, in order to exclude with near certainty the possibility of sleeping sickness. Although a positive result does not enable a diagnosis to be made, it indicates that the suspect should be referred to qualified medical workers capable of

carrying out serological and parasitological examinations.

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