TOXOPLASMIN SKIN SENSITIVITY IN THE MOTHER AND CHILD AMONG CASES OF MENTAL RETARDATION IN IRAQ*)

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Abstract. 418 mentally retarded children and their mothers were given Toxoplasma antigen intradermally. The positive reaction rate of the mothers was 13.15 % and of the children 1.65 %. These rates are lower than the rates found in a previously reported random sample of the population of Baghdad (Iraq). The conclusion is that toxoplasmosis does not play a great role in the causation of mental retardation in Iraq.

Toxoplasmosis has been known to exist in Iraq for a long time. Mac Hattie (1938) reported a natural incidence of this infection in stray dogs of Baghdad. No active case in man has been reported until now. Surveys of skin sensitivity to toxoplasmin in various Arab countries have confirmed the existence of the disease in man in this area of the world. Rifaat and Nagaty (1959) found a positive reaction rate of 15.6 % in Egypt. Abou Daud and Schwa be (1960) found a positive reaction in 57 % of a group of Lebanese and Syrian citizens. In Iraq, Najim and Al-Saffar (1961) testing 204 cases (128 females and 76 males) within an age range of 7—74 years proved a positive reaction rate of 20.5 %. The same authors (1963) surveying skin sensitivity in 204 children in the age group of 1—12 years demonstrated a sensitivity rate of 4.9 %. Al-Saffar and Najim (1965) found a positive rate of 11.4 % among 70 mentally retarded children within an age range of 1—15 years.

The purpose of this paper is to correlate the incidence of skin sensitivity to toxoplasmin in the mother and child with the occurrence of mental retardation as an indirect evidence of the role of the parasite in causing the disease.

MATERIAL AND METHODS

In our experiments we used toxoplasmin prepared in the Laboratory of Parasitic Zoonoses and Toxoplasmosis (Head Dr. J. Jíra), Institute of Parasitology, Czechoslovak Academy of Sciences, Prague. A skin test was made for 418 mentally retarded children (274 males and 144 females) all of them being outpatient cases of the Children's Welfare Hospital of Baghdad, Iraq. The same test was performed for the mothers of these children. Following the technique of Jirovec and Jíra (1961) the external aspect of the upper left arm was cleaned with a mixture of equal parts of 80 % alcohol

*) Sensitivity of Iraqis to the Toxoplasmin Intradermal Test, Part VI.
Table 1. Toxoplasmin skin sensitivity in the mothers of 418 mentally retarded children in Baghdad

<table>
<thead>
<tr>
<th>Number tested</th>
<th>Age in years</th>
<th>Total</th>
<th>Strength of reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19</td>
<td>20—29</td>
<td>30</td>
</tr>
<tr>
<td>Number of positive reactors</td>
<td>67</td>
<td>172</td>
<td>128</td>
</tr>
<tr>
<td>%</td>
<td>7.4</td>
<td>8.7</td>
<td>20.3</td>
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</table>

and other coloured a light yellow with several drops of iodine. Using a tuberculin syringe and needle the control injection was made intradermally above the deltoid muscle and a blob of about 7—8 mm was produced. About 10 mm below the control site and using a separate tuberculin syringe, toxoplasma antigen was injected to produce about the same size of blob. The results were read after 24 and 48 hours measuring the size of the erythema and induration in millimeters. An area of reaction measuring 10 mm in diameter or more was considered a positive reaction; 10 mm was considered as $-$, up to 20 mm $2+$, up to 30 mm $3+$ and more than 30 mm $4+$. A skull radiogram was made for every child for evidence of intracranial calcifications. Funduscopy was performed in all children who gave a positive skin-test either in the child or in the mother.

**RESULTS**

Table I presents the results of the toxoplasmin test among the mothers of the mentally retarded children. The age given in the table represents the age of the mother at the time of birth of her child in question. Out of 418 mothers tested 55 (13.15 %) gave a positive skin test. The younger mothers showed a lower incidence of positive skin reaction; those below 20 years gave a positive reaction rate of 7.4 % and those between 20—29 years a rate of 8.7 %. The highest rate of positive reaction was found in the age group of 30—39 years who gave a positive reaction in 20.3 %. Only one mother showed a very strong skin reaction with systemic manifestations of fever, malaise and head ache. Her baby was suspected on clinical grounds to be a case of toxoplasmosis as he had a congenital bilateral cataract with retardation of the milestones of development and generalised hyperactive reflexes. His skull radiogram did not show calcification, his skin sensitivity showed a week positive reaction and serological test is not available. Funduscopy was not possible because of the cataract. 8 other mothers gave a rather brisk reaction, but in the majority of 46 the reaction was evaluated as $+$. Table II presents the results of the skin tests among both sexes and in different age groups of the mentally retarded children. Of 418 cases only 7 children were positive giving a percentage of 1.65 %. The skull radiograms of these children were all free of calcifications. Funduscopie examination revealed a normal fundus in all of them. No positive reaction was found during the first year of life and a lower rate was observed in the age group of 1—4 years than in the older children. Both sexes were almost equally affected. Only once did we obtain a positive reaction in both mother and child. The rest of the positive reactors had negative reacting mothers.
DISCUSSION

Sabin et al. (1952), examining serologically the mothers of affected children, found evidence indicating that these mothers must have been infected for the first time with toxoplasmosis during the pregnancy in question. Since all these women gave birth to healthy children, congenital infection is not thought to occur in more than one child of the same mother. Repeated abortions, however, caused by congenital infection with *Toxoplasma gondii* were reported by Langer (1963). Deamonts et al. (1965) working in Paris found that 16% of pregnant women lack protective antibodies and, hence, can be infected during gestation. They also found that the frequency of toxoplasmosis acquired by women during pregnancy in Paris was about 8/1000 and that the number of infected newborns would be 3—4/1000. By comparison with the Parisian birth statistics they feel that there should be 1—2/100000 infants with apparent congenital toxoplasmosis. Kräubig and Wolf (1965) in Göttingen report a congenital toxoplasmosis infection in 0.5% among 3212 women examined serologically. These data from Paris and Göttingen indicate that a few cases of mental retardation with a probable toxoplasma aetiology may be discovered.

The skin tests are thought to be valuable only for population surveys and the detection of chronic and past cases of toxoplasmosis, because these tests are negative during the acute and subacute stages of the disease (Frenkel and Friedlander 1951). On the other hand Fisher (1951) and Jacobs et al. (1956) found a high correlation between the dye and the skin tests. In view of these facts we felt that a positive skin sensitivity rate in the mentally retarded children and their mothers which proves to be significantly higher than that in the general population may be an indirect indication of the role of Toxoplasma in causing mental deficiency. However, our results in this work did not confirm this theory. The positive reaction rate of 13.15% in mothers of this series of mentally retarded children was lower that that of 20.5% found by Najim and Al-Saffar (1961) in a random sample of adults in Baghdad. In mentally retarded children positive reactors composed a minority of 1.67%, a rate significantly lower than the finding of 11.4% by Al-Saffar and Najim (1965) in 70 children with mental retardation. Indeed, it is also lower than the rate of 4.9% found by Najim and Al-Saffar (1963) in a random sample of the children population of Baghdad. The most likely explanation of this difference is the younger age group in the present series of cases (Table 2), 315 children or 75% of the cases belonging to the 0—4 year old group, as compared with the previous series mentioned above. The conclusion is that toxoplasma infection does not play an important role in causing mental retardation in Iraq.

<table>
<thead>
<tr>
<th></th>
<th>Sex</th>
<th>Total</th>
<th>Age in years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>♂</td>
<td>♀</td>
<td>0—1</td>
</tr>
<tr>
<td>Number tested</td>
<td>274</td>
<td>144</td>
<td>418</td>
</tr>
<tr>
<td>Number of positive reactors</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>%</td>
<td>1.82</td>
<td>1.38</td>
<td>1.67</td>
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Table 2. Toxoplasma skin sensitivity according to sex and age in 418 cases of mental retardation in Baghdad
REFERENCES


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