A SKIN-TESTING SURVEY WITH TOXOPLASMIN ON POSITIVITY IN THE DIFFERENT AGE- AND SEX GROUPS OF THE NORMAL URBAN POPULATION OF KADUNA (NIGERIA)

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Abstract. A skin-testing survey with toxoplasmin was performed with 1,411 persons of different age and sex. In persons with a dark skin, the results could be assessed mainly from the size of the induration, because, generally, an erythema was not visible. Men of the normal population reacted more frequently than women, and positivity increased with age. Differences in the positivity of men and women were statistically significant in age group 10—29 years. Positivity of men in the three age groups was 39.2%; 32.4%; 36.6%, in women of the same age groups 16.3%; 17.0%; 23.0%.

A considerable amount of information has been published on infection of man with the parasite Toxoplasma gondii (Nicolle and Manceaux, 1908). This large number of references has been arranged in a comprehensive monograph by Jíra and Kozojed (1971). The necessity of a critical standpoint to interpretations of immunological reactions in the diagnosis of toxoplasmosis has been indicated by the frequent incidence in the normal population of Europe and America. The number of positive responses to the toxoplasmin skin test increases with age, because its positivity persists for a longer period than that of other seroreactions (Jíra and Bozděch 1960). In women after delivery of a healthy child, the frequency of positive skin tests is 31%. Inflammatory infections with Trichomonas vaginalis, yeasts or other microbial organisms do not influence the incidence of positive findings. The rate of positive findings is similar in the various European countries, e.g., in Poland (Kozar 1958), Greece (Papanayiotou et al. 1970). The unspecificity of the skin test has not been confirmed as yet.

The high incidence of toxoplasmosis in a normal urban population has been indicated by numerous findings. Jiřovec et al. (1958) obtained the same results with toxoplasma antigen from chick-embryo choriolantois and that from tissue culture. Of interest is the recent report by Disko et al. (1971) on the presence of toxoplasma organisms in about 3% of ejaculates from men.

In Asia, the incidence of positivity is less frequent in comparison with that in Europe, i.e., 2.9% in Vietnam (Sery et al. 1959), 10% in India (Jiřovec et al. 1958). Similar results were obtained by Wong and Field (1969) from Hongkong; positive reactions to the Sabin—Feldman test were given by 10% only, and that in the lowest titers.
In Africa, positivity is generally higher, i.e., 48% in the Congo (Giroud and Jadain 1954), 31% in the Bantu from South Africa (Schneider et al. 1955), 21% in a group of school children (skin test) from Cairo (Aboul-Dahab et al. 1963; Rifaat et al. 1963). In Tunisia, positivity in children aged 6–10 was 20%, in 16-year-old juveniles 33%, in age group 21–30 56%, in age group 30+ 67% (Bláha et al. 1968).

**MATERIAL AND METHODS**

The technique employed for skin testing with toxoplasmin has been described in earlier papers (Jirovee and Jira 1961a; Jirovec et al. 1959). Antigen was provided by courtesy of our colleagues from the Institute of Parasitology, Czechoslovak Academy of Sciences; Zoological Department, Faculty of Biology, Charles University; Toxoplasma Laboratorium der Universität-Kinderklinik Wien. Toxoplasmin was injected into the volar side of the forearm where the skin was thinnest, generally of a lighter colour, without ornamental tattoo or scars. An erythema was either indistinct or did not develop. The results were evaluated by induration only. Negative tests were those in which induration did not develop after 48 hrs. p. i. The size of induration indicated the degree of the reaction, i.e., 5 mm = weak (+); 5–10 mm = medium (++; ) with a well-tangible induration; above 10 mm = strong.

We tested persons coming to our laboratory for routine laboratory examination (men before starting a new job, women at the beginning of pregnancy, etc.). The numbers of persons of both sexes in the individual age groups were these: for age group 10–19–43 boys, 293 girls; age group 20–29 – 122 men, 504 women; age group 30+ – 41 men, 318 women. The total number of persons tested was 1,411. Statistical significance was assessed with the test of relative values suggested by Reisenauer (1970).

**RESULTS**

The increase of positivity in the three male age groups was from 30.2% to 32.4% to 36.6%. Differences between the individual age groups were not statistically significant (Table 1). A more marked increase in positivity in relation to age was observed in the female groups, i.e., 16.3%; 17.0%; 23.0%, with a statistically significant increase between age group 20–29 and 30+; probability was less than 0.05. Differences in the incidence of positivity in males and females were high and statistically significant in age group 10–19 (30.2% : 16.3%) and in age group 20–29 (32.4% : 17.0%). Differences were lower and not statistically significant in age group 30+ (30.6% : 23.0%); probability was slightly more than 0.05.

**DISCUSSION**

Our results of the incidence of positivity and its increase in relation to age are roughly consistent with those by Bláha et al. (1968) from Tunisia, having regard to the fact that an estimation of positivity from the erythema was practically impossible. It is of interest that the increase of positivity with age was very low in men, and that differences among the individual age groups were of no statistical significance. In women, positivity increased surprisingly with age remaining practically at the same level in the lower age groups (from 10–29). A marked increase of positivity occurred in age group 30+.

The difference in the frequency of positivity between males and females was most surprising. In all age groups, positivity in men was more frequent than that in women, and in two age groups we found even differences of statistical significance. These differences may be ascribed to the fact that the mode of life of the two sexes is different:
Table 1. Positivity of the toxoplasmin skin test in the population of Kaduna

<table>
<thead>
<tr>
<th></th>
<th>Age group</th>
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<tbody>
<tr>
<td></td>
<td>10—19</td>
<td>20—29</td>
<td>30+</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of positive findings</td>
<td>30.2</td>
<td>32.4</td>
<td>36.6</td>
</tr>
<tr>
<td>Chi-square</td>
<td>0.3</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Significance of the difference</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>No. of examined</td>
<td>43</td>
<td>122</td>
<td>41</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of positive findings</td>
<td>16.3</td>
<td>17.0</td>
<td>23.0</td>
</tr>
<tr>
<td>Chi-square</td>
<td>0.2</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Significance of the difference</td>
<td>0</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>No. of examined</td>
<td>293</td>
<td>594</td>
<td>318</td>
</tr>
<tr>
<td>Difference of incidence in the sex groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-square</td>
<td>2.2</td>
<td>3.8</td>
<td>1.8</td>
</tr>
<tr>
<td>Significance of the difference</td>
<td>B</td>
<td>A</td>
<td>0</td>
</tr>
</tbody>
</table>

Explanations: 0 = statistically insignificant difference  
A = statistically significant difference (probability below 0.01)  
B = statistically significant difference (probability from 0.01—0.05)

Women are generally confined to their homes, men go out to work, meet at the mosque, at various other places, etc.

Differences in the degree of infestation were observed by the present author (Bozděch 1971a, b). The incidence of schistosomes was more frequent in males than in females from Accra, and the same applied to infestation with hookworms.

In Czechoslovakia, similar values were disclosed in both sexes in the frequency of positivity assessed with complement fixation- and skin tests with toxoplasma antigen (Jírová and Jíra 1961b, Jíra and Bozděch 1960).

**CONCLUSION**

A toxoplasmin skin-testing survey among 3 age groups of the normal, urban population of Kaduna disclosed a higher percentage of positivity in men than in women (30.2 : 16.3; 32.4 : 17.0; 36.6 : 23.0); this may be ascribed to the different mode of life of the male and female population in this area.

Our results indicate that the incidence of positivity in men increased negligibly in relation to age (30.2 %—32.4 %—36.6 %); in women, this increase with age was considerably higher attaining values of statistical significance between age group 2 and 3 (16.3 %—17.0 %—23.0 %).
ОБСЛЕДОВАНИЯ НА ПОЛОЖИТЕЛЬНУЮ ТОКСОПЛАЗМИНОВУЮ КОЖНУЮ РЕАКЦИЮ РАЗНЫХ ПО ВОЗРАСТУ И ПОЛУ ГРУПП ГОРОДСКОГО НАСЕЛЕНИЯ В Г. КАГУНА (НИГЕРИЯ)

В. Боздех и И. С. Моронфой

Резюме. Обследовано 1411 разных по возрасту и полу лиц на положительную токсоплазмино-новую кожную реакцию. У лиц с темной кожей результаты можно было определить главным образом по величине звергона, т. к. зрение была неясным. У мужчин положительная реакция встречалась чаще чем у женщин и ее встречаемость повышалась с их возрастом. Ранцы в положительных реакциях мужчин и женщин имели статистическую значимость. У возрастной группы 10—29 лет положительные реакции у мужчин трех возрастных групп встречались в 30,2 %; 32,4 %; 36,6 %, у женщин тех же возрастных групп — в 16,3 %; 17 %; 23 %.

REFERENCES


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