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AN ESTIMATION OF THE INCIDENCE OF CONGENITAL TOXOPLASMOSIS IN SÃO PAULO CITY, BRASIL

Euclides A. de CASTILHO

SUMMARY

An indirect method based on the prevalence rate of toxoplasmosis infection in women between 15 and 44 years of age and on the number of live births is used to estimate the incidence rate of congenital toxoplasmosis infection in São Paulo City, Brasil during 1970. The estimated rate was about 16 per 1,000 live births, regardless of clinical disease. With respect to symptomatic congenital toxoplasmosis a rate of 5 per 1,000 live births was estimated.

INTRODUCTION

It is generally accepted that congenital toxoplasmosis is found in infants born to mothers who acquired the infection during pregnancy. Three facts support this hypothesis: a) mothers who delivered a diseased child have a high antibody titer, suggestive of recent infection. b) mothers do not give birth to more than one diseased child, except to twins. c) if maternal chronic infection were able to be frequently transmitted to the fetus we would have a very high frequency of congenital toxoplasmosis, considering the worldwide high prevalence of infection by *Toxoplasma gondii*. The variability in the clinical manifestations of congenital toxoplasmosis and the difficulties of diagnosis [6, 9, 11] do not allow us to gain an idea about its frequency easily. An overview of the incidence of congenital toxoplasmosis has been achieved at the cost of very expensive follow-up studies [1, 5, 8]. In the present study, and indirect method is used to estimate the incidence of congenital toxoplasmosis in São Paulo City, Brasil.

MATERIAL AND METHODS

SABIN-FELDMAN dye tests [10, 11] were performed in 498 women between 15 and 44 years of age, at post-partum, in the "Hospital das Clínicas da Faculdade de Medicina de São Paulo". The proportion of positive dye tests was considered as an indicator of the prevalence rate of toxoplasmosis infection. Knowing the age-group specific prevalence rate, the age-group specific incidence rate was calculated by difference. The incidence of recent infections in the female population also makes an estimation of congenital infection possible from the number of live births. To do this the following assumptions were used: 1) Fresh infections occurring during pregnancy are the only ones that can induce fetal injuries [4]; 2) The probabilities of infections being transmitted from mother to fetus are 0.17, 0.25, and 0.65 respectively when the maternal infections were acquired during the first, second, and third trimester of pregnancy [5]; 3) The risk of acquiring infection during pregnancy is uniformly distributed in each calendar year; 4) The number of births is uniformly distributed in each calendar year; 5) The 19,163 mothers with unknown age have an age distribution identical to those with known age; 6) The incidence rate of *Toxoplasma gondii* infection is constant in each 5-year

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age group; 7) The incidence rate of *Toxoplasma gondii* infection is equal to 0 per 1,000 for women aged 45 or more.

Any deviation from these assumptions must be considered as able to alter the results.

RESULTS

The distribution of the number of live births according to age of the mothers in São Paulo City during 1970 is shown in Table I.

TABLE I

Number of live births according to maternal age — São Paulo City, 1970

Age Group (years)	No. of live births
Less than 15	148
15 |—| 19	11206
20 |—| 24	43795
25 |—| 29	35017
30 |—| 34	25261
35 |—| 39	12782
40 |—| 44	4241
45 |—| 49	651
50 |—| 54	119
55 |—| 59	44
Unknown	19163
Total	152427

Source: "Departamento de Estatística da Secretaria de Economia e Planejamento do Estado de São Paulo"

The frequency of positive dye tests (titer of 1:16 or more) is shown in Table II. Positive results increase as age increases. The overall prevalence rate of infection was equal to 747 per 1,000 women.

Table III shows the calculations of the presumed number of congenital toxoplasmosis based on the quoted assumptions. The number of infections in all live births gives a rate of 16 per 1,000 infected infants, regardless of clinical disease.

TABLE II

Age-group specific Sabin-Feldman dye tests positivity in puerperal women — 1969-1970

Age Group (years)	No. of cases	Sabin-Feldman dye test positivity	
		No.	(%)
15 |—| 19	105	74	70.5
20 |—| 24	163	115	70.6
25 |—| 29	115	84	73.0
30 |—| 34	58	43	74.1
35 |—| 39	47	46	97.9
40 |—| 44	10	10	100.0
Total	498	372	74.7

DISCUSSION

The positivity of Sabin-Feldman dye tests found in this study is close to that found by JAMRA [7] (71%) in women between 10 and 49 years of age in a section of São Paulo City in 1964 and to the rate of 64% found by BARUZZI [2] among Brazilian female Indians between 10 and 49 years of age. Therefore, there may not be a great source of bias in considering this hospital sample as representative of the general population with respect to the prevalence of toxoplasmosis infection. It is important to say that the 148 live births born to mothers with 15 years or less of age were not considered because data about the incidence of toxoplasmosis infection in that age group were not available. However, the small number certainly should not disturb the results seriously.

Observations by DESMONTS & COUVREUR [5] on large series show that only 34% of congenital infections are symptomatic (varying from mild to severe including neonatal deaths). Based on that result we can estimate that among the 152,258 live births in São Paulo City during 1970 there were 804 newborn children with symptomatic congenital toxoplasmosis, that is, a 5 per 1,000 incidence rate. This index is not very different from the mean annual rate of 1 case per 750 deliveries found by ALFORD et al. [1] in Birmingham, Alabama, during the period 1968 to 1973 or the rate of 3 to 4 per 1,000

TABLE III

Estimates of congenital toxoplasmosis infection in São Paulo City during 1970

Age Group (years)	Age group specific dye test positivity		Probability of toxoplasmosis infection during pregnancy	No. of live births	Estimated no. of congenital toxoplasmosis infection
	Prevalence (‰)	Incidence (‰)			
15 |—| 19	705	1	0.00027	12817	3
20 |—| 24	706	24	0.00642	50094	322
25 |—| 29	730	11	0.00294	40052	118
30 |—| 34	741	238	0.06366	28893	1839
35 |—| 39	979	21	0.00562	14620	82
40 |—| 44	1000	0	0	4851	—
45 and more	1000	0	0	931	—
Total	—	—	—	152258	2364

found by DESMONTS et al.[4] in Paris in follow-up studies. CZEIZEL & JANKÓ[3] also used an indirect method to estimate the incidence of congenital toxoplasmosis disease, but employed different assumptions. They estimated an incidence rate of 2 per 1,000 pregnant women in Hungary during 1967. The slightly higher incidence rate for São Paulo City when compared with those localities could be explained mainly by methodological reasons or because there exists a great incidence rate of infection among women in the fertile period of life in São Paulo City.

RESUMO

Estimativa da incidência de toxoplasmose congênita no Município de São Paulo, Brasil

A incidência de infecção congênita por *Toxoplasma gondii*, na cidade de São Paulo, Brasil, em 1970, foi estimada a partir do índice de prevalência da infecção e do número de nascidos vivos. Encontrou-se uma incidência de 16 casos por 1.000 nascidos vivos independentemente da presença ou não de manifestações clínicas da doença. O índice de toxoplasmose congênita sintomática foi estimado como sendo da ordem de 5 por 1.000 nascidos vivos.

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