

A Serological study of suspected cases of  
toxoplasmosis in Iran

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Introduction :

Toxoplasmosis caused by *Toxoplasma gondii*, an interacellular protozoan parasite, may be acquired or congenital (11).

It is usually assumed to be statistically associated with increased incidence of certain ocular symptoms, abortions, lymphadenopathy, infant hydrocephaly and other symptoms (12, 4).

Patients suffering with the above symptoms and some with persistent and undiagnosed fevers were subjected to serological checks in the course of our survey.

In this present study we looked for the co-relation between the different types of toxoplasmosis symptoms and toxoplasma antibody.

Materials and Methods :

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Altogether 874 patients and 150 "normal" subjects were examined and serologically tested. They represented a broad spectrum with ages ranging from 8 months to 65 years. The patients were among those calling at selected clinics and hospitals in Tehran region, who were then referred to us through co-operation of their treating doctors. However it is suspected that the one -visit patients or those with readily diagnosed ailments were never enlisted for our survey, this points to a possible bias in the selection of subjects which must be especially noted (see discussion).

The technique employed was the Indirect Fluorescent Antibody Test (IFAT), based on measurement of antibodies to cell wall antigens (7). The tests were performed according to usual standard procedures (5), with only minor modifications, the smears of *Toxoplasma gondii* (RH strain) harvested from infected mice (peritoneal fluid), fixed by heat. The lowest significantly positive titer was taken as 1:200 .

#### Results:

A total 1024 subjects were involved. The distribution through various age-groups of positive subjects is shown in Fig.1. Table 1 shows the numbers in each general category while Table 2 summarizes those with high ( $\geq$ 1:800)



antibody titers.

The main categories are the following:

1) Normal or control,

150 subjects (109 males, 41 females) were tested, number of positive were 14 or 9.2 %. The highest titer was 1:800.

2) Occular symptoms (mainly chorioretinitis),

Of 479 subjects (272 males and 207 females), 199 or 41.5 % were found positive. 24 had titers of 1:800 and over with the highest standing at 1:25600. The prevalent form of chorioretinitis was unilateral.

3) Abortions,

Of 333 women with history of one to twelve abortions, 126 or 37.8% were positive. 23 had titers of 1:800 and over with the highest at 1:6400.

The high titers were exclusive to patients with 1-2 abortion (Fig.2).

4) Hydrocephaly,

Among 12 children with this indication, 5 or 42 % showed positive sera, the highest titer was being 1:3200.

The five mothers were all found positive, two of them with exceedingly high titers of 1:102400. Yet none of

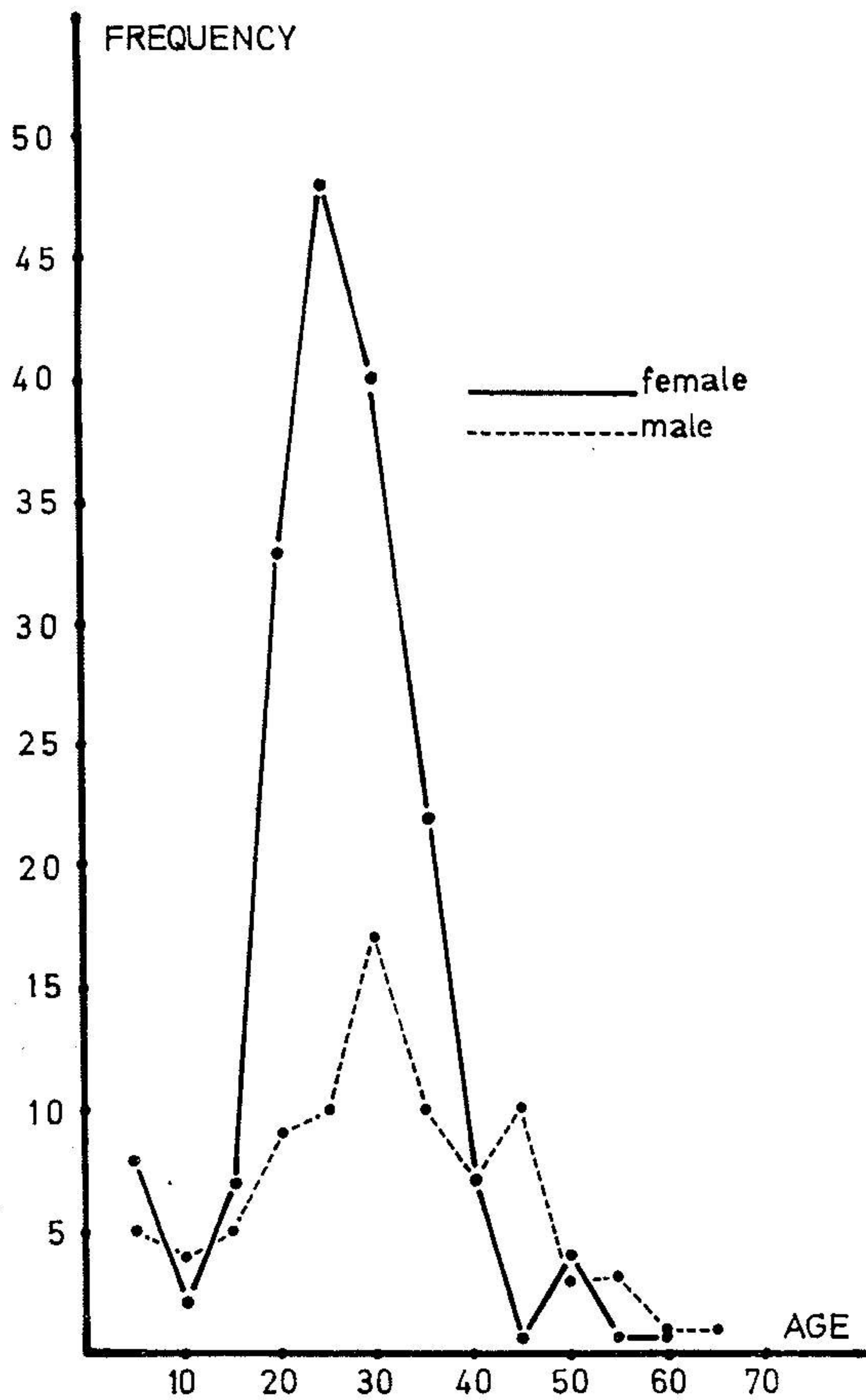
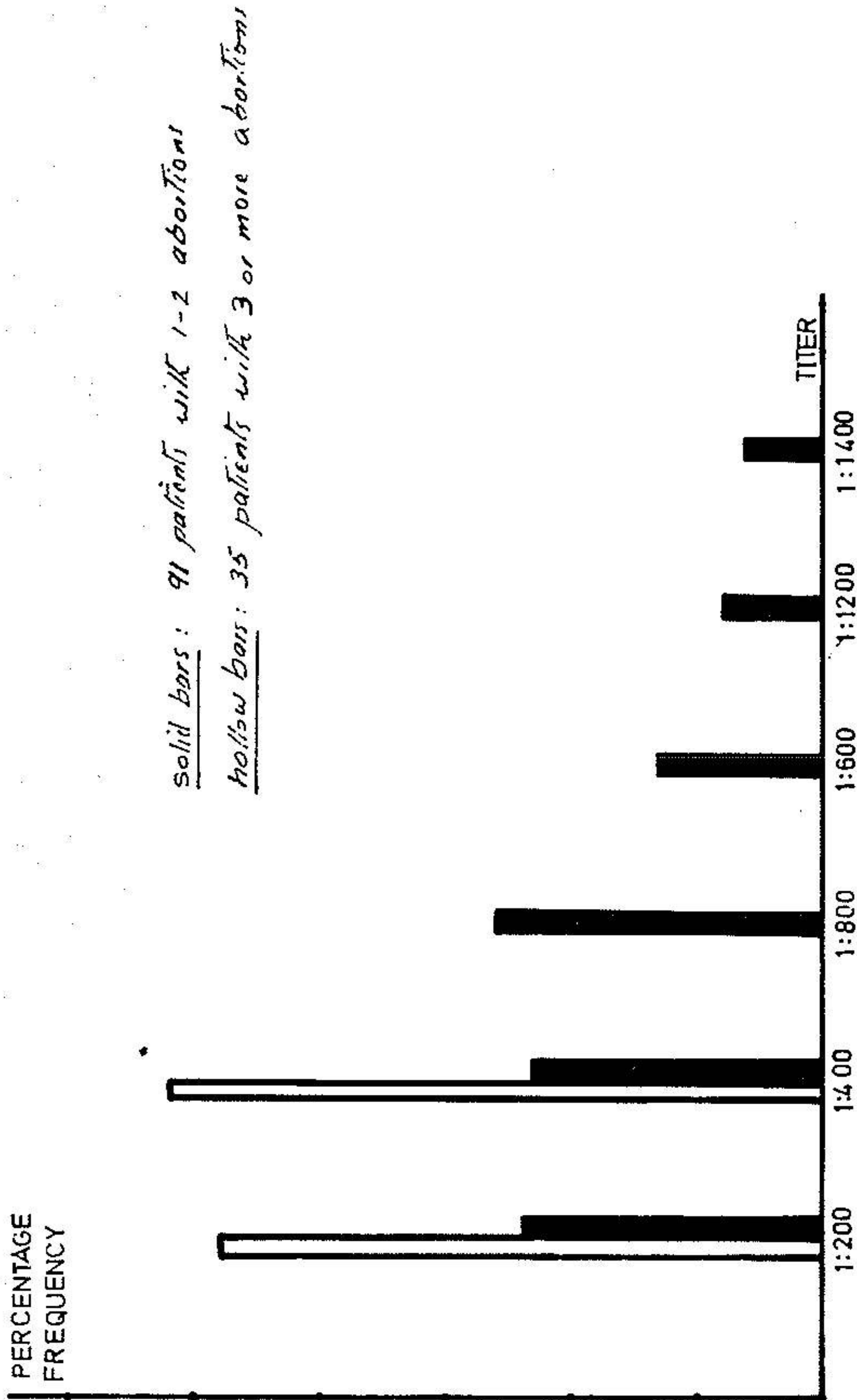


FIG 1. Variation with age of case frequencies in males and females among 356 IFAT positive subjects.



*FIG.2 Percentage frequency of antibody titers in Toxoplasmosis patients with history of abortions*



Symptoms	Total No. of patients	Total positive		Positive		Positive	
		No. (PC)	No. of females	No. (PC)	No. of males	No. (PC)	No. (PC)
Occular	479	199 (41.5%)	207	77 (37.1 %)	272	122 (44.8%)	
Abortion	333	126 (37.8%)	333	126 (37.8%)	-	-	
Adenopathy	30	18 (60%)	16	11 (68.7%)	14	7 (50%)	
Hydrocephaly	12	5 (41.6%)	7	3 (42%)	5	2 (40%)	
Fever	20	4 (20%)	14	2 (14.2%)	6	2 (33.3%)	
Total	874	352 (40.2%)	577	219 (37.9%)	297	133 (44.7%)	

Table 1- Chart of 874 patients as divided by symptoms, positive (1:200) antibody levels and sex.

Antibody titer	No. of Patients								Total
	1:800	1:1600	1:3200	1:6400	1:12800	1:25600	1:102400	1:409600	
Occular	8	4	10	-	1	1	-	-	24
Abortion	8	6	6	3	-	-	-	-	23
Adenopathy	2	-	1	3	2	3	1	1	13
Hydrocephaly	-	-	2	-	-	-	-	-	2
Fever	1	1	-	1	1	-	-	-	4
Mother with infected child	2	-	-	-	-	-	2	-	4
Total	21	11	19	7	4	4	3	1	70

Table 2-- Patients with anti Toxoplasma antibody titer > 1:800.

the mother had any clinical symptoms.

5) Lymphadenopathy,

Of 30 subjects 18 or 60 % were found positive, the majority at 1:800 or higher. One sample stood at 1:409600 being the highest encountered by us.

6) Intractable fever,

20 patients with this primary symptoms were tested. 4 or 20 % showed positive with the highest titer at 1:12800.

Discussions:

Laboratory diagnosis is an indispensable tool in diagnosis of toxoplasmosis. The clinical picture usually resembles that of various other diseases and the physician must ultimately depend on the laboratory findings. The reader is referred to works of Fletcher (5), Lunde (11), Karim and Ludlam (10) and Gehle (7), among others for full descriptions and comparison of various available techniques, (1,2,6,8,15,17,18).

In our laboratory which also serves as the reference lab for this and other immunological tests throughout the country, we are now using IFAT almost exclusively, for routine and general diagnosis of toxoplasmosis. While being highly specific and reproducible, we find this test advantageous due to ease of performance and sharp readings.



We have already made mention of a possible bias in the selection of patients tested. It is not easy to assess the size of this unavailable bias. However we believe the results will be statistically viable if it is borne in mind that the cases presented are mainly those left after an initial clinical screening which eliminated the ones with the most obvious diagnostic possibilities.

This especially true of cases of abortion which should be more properly called "undiagnosed abortions".

Meaningful interpretation of serological tests naturally depend on determining the pattern of variations of serum antibody levels in the course of the disease Karim and Ludlam (10) provide such a pattern. Their study indicates a rapid rise of antibody at the onset and then a slow drop during following months or years. In ocular cases we find occasional high titers indicating the more acute phase of the disease, in contrast with the findings of Lunde (11) of only low titers and late development of the symptoms. Also unilateral form of chorioretinitis is found predominant rather than the bilateral form (3, 19).

An interesting correlation is found between numbers of abortions in a subject and her antibody titer (fig. 2). While the patients with only 1-2 abortions show a rather

flat spread through a wide range of titers, those with a history of 3 or more abortions are confined to titers of 1:200 and 1:400.

Jones (9) reports a significantly greater incidence of abortion in patients with high antibody titers, but here we have an association of high titers and hence the relatively acute phase of the disease with first or second abortions, while the habitual aborters show consistently lower titers; a situation which may only be explained by assuming that the abortions start at the active phase but stay and become habitual later on.

The high proportion of incidence of toxoplasmosis in cases of hydrocephaly combined with lack of any clinical symptoms in the infected mothers is especially noteworthy, considered with the additional risk of abortion mentioned above. It points to the importance problem of toxoplasmosis in pregnant women (16).

The predominantly, high antibody titers in the cases of adenopathy confirms other reports (10) that this is one of the earliest symptoms of the disease. In fact enlargement of cervical lymph nodes is usually the first complaint of the patients (4).

It has been advised that all cases of primary lymphadenopathies and those of unknown origin should be tested for toxoplasmosis.



We did not follow up the patients with intractable fever it seems they may show other manifestations afterwards. In normal group we find 9.2 % positive, while Lunde (11) reports 30 % positive in adult, Riemann (15) 20 % and Remington (13) 20 %.

The difference between this study and their reports may be because of the methods and the lowest titer considered which in our study was at 1: 200. The local variations may be also a factor.

#### Summary:

Indirect fluorescent antibody test was used to determine frequency distribution of toxoplasmosis in patients with certain specific clinical symptoms namely, chorioretinitis, abortions, lymphadenopathy, hydrocephaly and intractable fevers.

Tests on sera samples of general population "normal" subject are included for comparison and control.

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