SURVEILLANCE OF TOXOPLASMOSIS IN DIFFERENT GROUPS

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Mughisuddin Ahmed (Department of Pathology, Dow Medical College and Basic Medical Sciences Institute, Jinnah Postgraduate Medical Centre, Karachi.)
Amtul Hafiz (Department of Microbiology, Dow Medical College and Basic Medical Sciences Institute, Jinnah Postgraduate Medical Centre, Karachi.)

Abstract

Two hundred and twenty three serum samples were screened for the antitoxoplasma antibodies of IgG type by a direct agglutination method, of these 78(34.9%) were sero-positive. In high risk groups 71(40.1%) of 177 cases were positive, while in the low risk groups 7(15.2%) out of 46 cases were positive. Sero-positive males were more than females, and the disease increased steadily with age. Of the high risk group the prevalence of toxoplasmosis was 53.7% in immunocompromised group, 44.7% in animal handlers, 39.8% in pregnancy wastage group and 25.8% in a congenitally abnormal children. A high percentage prevalence of toxoplasmosis was noticed in high risk groups as compared with low risk group (JPMA 39:183, 1989).

INTRODUCTION

Toxoplasmosis is a common infection of mammals and birds which occasionally results in protean disease. The causative agent, Toxoplasma gondii, belongs to the Protozoa group. The disease is transmitted from a definitive host belonging to the domestic cat family (Felus catus) which eats infected mice, rats, birds or meat containing Toxoplasma cysts and then passes oocyst in the feces[1,2]. Many animals including sheep, cows and humans act as intermediate host and acquire infection mainly due to ingestion of oocyst[3]. In humans the infection is acquired by feeding on breast milk of mother infected during peurperium, ingestion of under cooked meat, raw cow's milk and bird's eggs or by swallowing oocysts discharged in feces of infected cats, or by inoculation of trophozoites through the skin, or by inhalation. Toxoplasma infection in adults is mostly asymptomatic[4,5]. Common presenting symptoms are non-specific generalised lymphadenopathy with pyrexia. In patients with advanced cancer or on immunosuppressive agents, it is of increasing significance as a complicating infection. Transplacental infection in earjy pregnancy results in abortion and still birth[6,7]. In late pregnancy it gives rise to congenital toxoplasmosis which may manifest as microcephaly, micro-ophthalmia, seizures, mental retardation, hepatosplenomegaly, pneumonitis, or hydrocephaly[8]. The incidence of disease varies between 5-95% in various human population groups[9]. The organism has frequently been incriminated in the causation of habitual or repeated abortion, premature or stillbirths and congenitally abnormal babies[10-12]. The diagnosis of toxoplasmosis can be made by serology, histology of infected tissues or isolation of the pathogen. From a practical clinical point of view, serologic tests are the most readily available. Both IgG antibody responses are produced in infected individuals to toxoplasma antigens. Detection of IgM antibodies establishes the diagnosis of recently acquired or reactivated infection, but these antibodies soon disappear or decrease to very low levels followed by the appearance of IgG which stays longer. Recognition of IgG antibodies, however, does not help in establishing the diagnosis of toxoplasmosis since chronic asymptomatic infection can also be associated with a high antibody titer of IgG, but its detection in serum is of great epiderniological significance, since it will indicate previous contact of the individual with the organisms[13]. In recent years cases of toxoplasmosis

have been observed at an increasing rate in inimunocompromised individuals[14,15]. The magnitude of the toxoplasmosis in Pakistan is still uncertain, although the incidence of abortions, still births, congenital malformation and deaths are quite sizeable. The present study was therefore planned to do a small scale seroepidemiological surveillance for toxoplasmosis in different population groups for Toxoplasma IgG antibodies. It was hoped to give information on the prevalence of toxoplasmosis in Pakistan in different population groups.

MATERIALS AND METHODS

A total of 223 individuals comprising of advanced cancer, animal handlers, pregnancy wastage, and congenitally abnormal children were included in this study. The cases were collected from various hospitals and welfare centers of Karachi during the period July 1986 to May 1987. Blood samples were collected and serum was stored at -20°C until ptocessed for analysis. Antitoxoplasma antibodies (IgG) were detected in sera by direct agglutination test using Toxo-screen DA (kit No.7—548—IC bio Merieux, France). Two dilutions of serum (1:44) and 1:4000) were incubated in 2-mercaptoethanol with a suspension of Toxoplasma treated enzymatically. This sensitized antigen, standardized to the WHO reference, enables detection of IgG antibodies specific to Toxoplasma gondii down to the level of approximately 4 I.U./ml which is given by a 1:40 dilution of positive serum. After 12-18 hours of incubation the presence of agglutination was checked. If a case was positive at 1:4000 but negative at 1:40, it was due to the prozone phenomenon at lower dilution and the test was repeated.

RESULTS AND OBSERVATIONS

Results of the antitoxoplasma antibody screening test in various groups is given in Table I.

TABLE I. Toxoplasma IgG antibodies in different Groups.

Category	Total Sero-positive	Percent Sero-positive
Advanced cancer patients (38 + 3* = 41)	22	53.7
Animal handlers (22 + 3* + 13** = 38)	17	44.7
Women with history of pregnancy wastage. (70 + 13** = 83)	33	39.8
Congenitally abnormal children (31)	8	25.8
Healthy individuals or low risk (46)	7	15.2

Note:- Since cases in different groups are overlapping, the total is more than actual total.

* Animal handlers + immunocompromised.

** Animal handlers + pregnancy wastage.

No. in parenthesis is total number of cases in each group.

The highest number of positive cases was among cancer patients (Immunocompromised individuals) followed by animal handlers, women with a history of abortion or pregnancy wastage and congenitally abnormal children (high risk group). Very few cases were positive in those who did not belong to any of the above groups (low risk group) as compared to the high risk group. When immunocompromised patients (advanced cancer patients) were compared with immunocompetent persons matched for age and sex, more than 50% of the patients in the earlier group had antitoxoplasma antibodies as compared to 22.2% of the healthy individuals. When animal handlers (seropositive 44.4%) were compared with non-animal handlers (sero-positive 15.0%) it was more often seen among the earlier group. The same was true in women with a history of pregnancy wastage (sero- positive 39.8%) versus those with normal reproductive performance (sero-positive 15.8%). Children with congenital anomalies were also more sero-positive (25.8%) as compared to normal children (5.9%). The percentage number of sero-positive cases gradually increased with age indicating that exposure to Toxoplasma increased with advancing age (Figure).

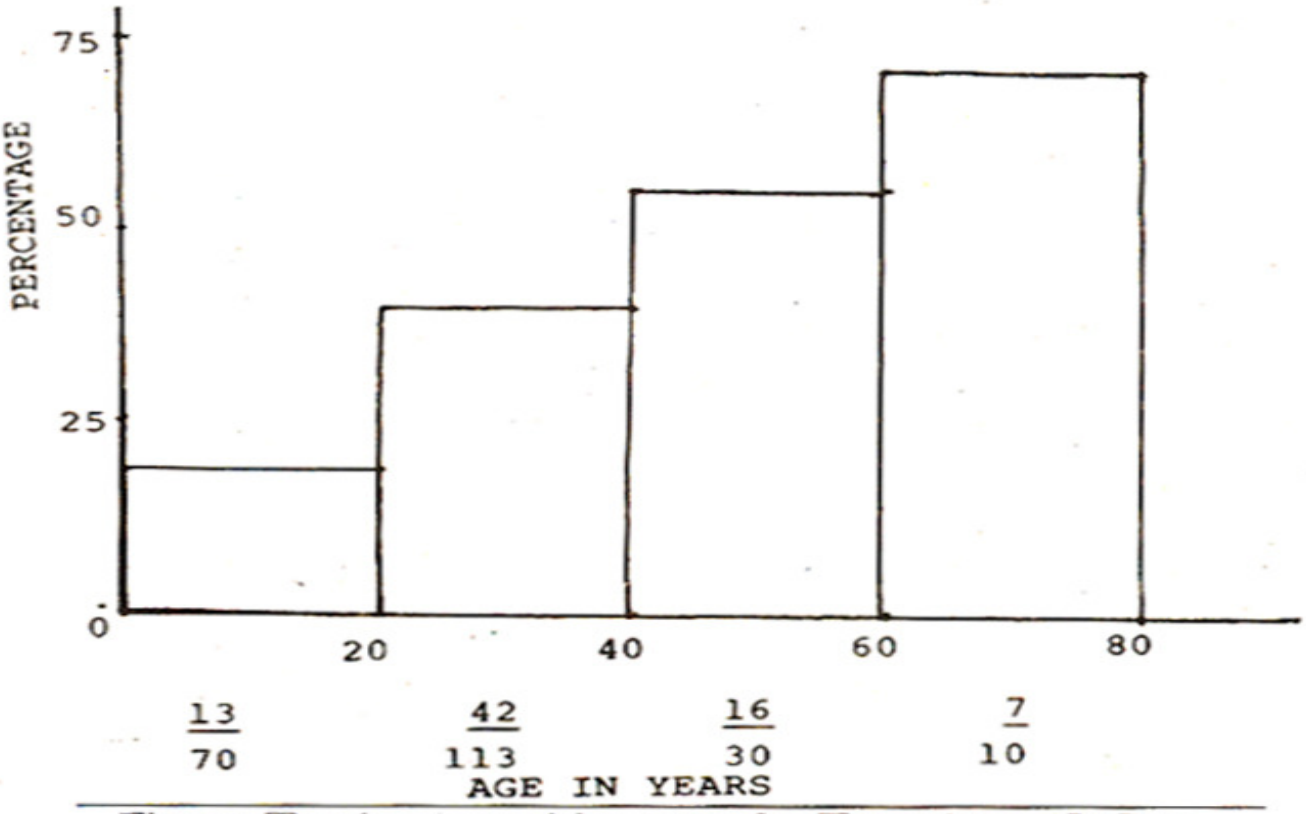

Figure. Total sero-positive cases for Toxoplasma IgG antibodies according to age.

Males were more often sero-positive than females in all the groups (Table II).

TABLE II. Toxoplasma sero-positive cases in high and low risk Groups with respect to Sexes.

Sex	High risk		Low risk	
	Total	Positive	Total	Positive
Males	68	31 (45.6)	19	4 (21.1)
Females	109	40 (36.7)	27	3 (11.1)

Figures in parenthesis indicate percentage.

DISCUSSION

The present study was carried out to ascertain Toxoplasma Sero- positive cases in different population groups in Pakistan. Highest number of positive cases were in high risk groups, whereas comparatively less in total group and least number in low risk group. Studies were not carried in high risk and low risk basis previously. The striking feature was that males were found more Seropositive than females in all comparable groups matched for age and sex (Table II) in contrast to another study where female dominance was conspicuous [16]. The chances of toxoplasmosis substantially increased with the

advancement of age, as per previous findings and the results of present study are more or less identical[17]. In an immunocompromised group, out of 41 cases, 22(53.0%) were Sero-positive as compared to immunocompetent cases viz., 6 out of 27 cases (22.2%). In previous records few cases were reported in immunocompromised and cancer patients[14,15]. In animal handler's group out of 38 individuals, 18 were positive (47.4%) while out of 40 non animal handler's only 6(15%) were positive. Previous studies were not done on above basis. In women with a bad obstetrical history 33 (39.8%) out of 83 cases were Sero-positive in the entire group, 36(35.3%) cases were Sero-positive out of 102 as compared to women with normal reproductive performance out of 19 cases 3 (15.8%) were positive. The result of this study was close to study conducted in Benghazi, 1982 where in whole group 45.8% were Sero-positive, in pregnancy wastage group 63.9% and 11.1% in women with normal reproductive performance[9]. In congenitally abnormal children antitoxoplasma antibody was present in 8 (25.8%) out of 31 cases tested as compared with healthy children where there was only 1(5.9%) case out of 17 cases. The results of this study, wherein 18% patients with congenital anomalies were found Sero-positive. [17] In the light of the above appraisal, it can be safely affirmed that toxoplasmosis is present in Pakistan and that its prevalence is more in high risk groups as compared to low risk groups. The chances of acquiring this disease increase with age and males are more likely to be affected than females. Substantial number of Sero-positive cases are present in all groups. The highest number of positive cases are in immunocompromised group, followed by animal handler's, pregnancy wastage group, congenitally abnormal children and least in healthy individuals.

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