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Increasing toxoplasma seropositivity in women with bad obstetric history and in newborns

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ABSTRACT

Background. Most infants with congenital *Toxoplasma gondii* infection have no symptoms at birth but few may develop retinal diseases or neurological abnormalities later in life. The presence of significant titres of antitoxoplasma antibodies in women in the reproductive age group indirectly indicates that *Toxoplasma gondii* is the cause of such congenital abnormalities and also sporadic abortions in some women.

Methods. We did a retrospective analysis of antitoxoplasma antibodies detected by indirect haemagglutination assay, in women with bad obstetrical history and in newborns clinically suspected of congenital toxoplasmosis during 1981–91.

Results. A significant increase in seropositivity in women and newborns was seen during 1989–91 as compared to 1981–88. More seropositive patients were recorded between April–June and October–December. However, no significant correlation could be observed between rising incidence of seropositivity and the seasonal distribution or age of women.

Conclusion. Epidemiological studies are required to ascertain the reason for the increasing trend of toxoplasma seropositivity and to suggest appropriate control strategies as it is possible to prevent congenital infection.

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INTRODUCTION

Toxoplasma gondii (T. gondii), an obligate intracellular protozoon that is ubiquitous in nature, is an important cause of infection and disease in humans and domestic animals. Human infection results from ingestion of tissue cysts or oocysts and the parasite has been shown to invade the placenta and the foetus resulting in abortion, stillbirth or congenital infection.[1–8] The prevalence of toxoplasmosis in women with a bad obstetrical history (BOH) is known to be significantly higher than in those without it.[3,8,9] Toxoplasma infection may be acute or chronic, symptomatic or asymptomatic. Acute infection poses the greatest hazard to the immunodeficient patient and the foetus *in utero*. The infant infected *in utero* with or without signs of infection at birth may develop serious sequelae such as impaired vision, neurological disorders and sensorineural hearing loss. The diagnosis is made on the basis of presence of specific antibodies as methods for isolation of the organism are less sensitive.

We did a prospective study during 1990–91 to determine the seropositivity rate of women with a BOH and of newborns clinically suspected to have toxoplasmosis. These data were compared with a retrospective analysis of the data available for 1981–89 in similar groups.

PATIENTS AND METHODS

A total of 7222 patients (5916 women with BOH and 1306 newborns, clinically suspected to have toxoplasmosis) who attended the Obstetrics and Gynaecology Department of the Nehru Hospital, Postgraduate Institute of Medical Education and Research, Chandigarh, between 1981 and 1991 were studied. Both the percentage seropositivity and the number of seropositive cases seen each year were taken into account to determine the trends of toxoplasmosis. Five ml of clotted blood was obtained from each patient and the serum was stored at –20 °C till used.

Preparation of antigen

The RH strain of *T. gondii* being maintained in Swiss albino mice was used for preparing the antigen.[10] Tachyzoites were harvested from the peritoneal cavity of Swiss albino mice, infected 3 days earlier, and filtered on 3 μm polycarbonate membrane (Mucleopore, CA). These were then washed twice with 10 mM PBS (pH 7.2). The pellet was resuspended in distilled water at a concentration of 6×10^8 tachyzoites/ml. The parasites were disrupted by sonication (×1 minute) in an MSE ultrasonic disintegrator (SONIPREP) and then centrifuged at 10 000 *g* for 60 minutes. The supernatant used as soluble antigen was stored at –20 °C in an aliquot till used.

Indirect haemagglutination assay (IHA)

All the serum samples were analysed for specific antitoxoplasma

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antibodies by indirect haemagglutination assay as described by Lewis and Kessel.[11] The optimal dilution of every batch of antigen used was determined by conventional block titrations done against standard positive and negative control serum samples. The patterns of agglutination were read after 2 hours of incubation at room temperature followed by overnight incubation at 4 °C. Known positive and negative serum controls were tested simultaneously with every batch. Serum samples with a titre of more than 1:128 were considered positive.[8] The results were analysed by the Student's t-test.

RESULTS

A steadily rising trend in percentage seropositivity and total number of seropositive cases (Table I) was observed during 1989–91, there being a three-fold increase in 1989, four-fold in 1990 and seven-fold in 1991. This rise in seropositivity was statistically significant ($p<0.001$) and was seen both in women with BOH and in newborns suspected to have toxoplasmosis. The mean age of women with BOH was 25.5 years (range 18–37 years) and the majority (49.6%) were in the 23–27 years age group (Fig. 1). A bimodal peak of seasonal distribution of cases was observed with more seropositive patients during April–June and October–December (Fig. 2). There was no significant correlation of the rise in seropositivity with either the age of women with BOH or seasonal distribution of cases.

DISCUSSION

The presence of antibodies to *T. gondii* suggests that the person has either been exposed to the infection in the past or has been infected recently.[2,3] It has been hypothesized that when these organisms are present in the genital tract especially near the implantation site, abortion, stillbirth or congenital infection may occur.[3,4] The presence of significant titres of antitoxoplasma antibodies are considered an indirect evidence of the organism being the cause of BOH in women of the reproductive age group. Isolation of the parasite from the endometrium, placenta or products of conception is usually difficult.[3,5,12–14]

Our data indicate a rising trend in seropositivity to *T. gondii* in women with BOH and newborns who were clinically suspected to have toxoplasmosis. The reason for this rising trend is not clear. Chandigarh is a city of white collar people and the living conditions are good and hygienic. There are only a few slums with stray animals. There has been a change in the eating habits of people, with meat being eaten more often. This might be one of the contributing factors. Ours being a referral hospital, patients from different socio-economic strata, religions and faith attend it from practically the entire northern region of the country. This report indicates that there is a need to investigate the epidemiological

TABLE I. Toxoplasma seropositivity from 1981 to 1991

Year	*n*	Total seropositive (%)	Women with BOH	Neonates
1981	563	13 (0.02)	12	1
1982	450	11 (0.02)	10	1
1983	553	11 (0.02)	11	0
1984	545	11 (0.02)	9	2
1985	525	11 (0.02)	9	2
1986	534	13 (0.02)	9	4
1987	704	12 (0.02)	9	3
1988	829	9 (0.01)	8	1
1989	800	49 (0.06)	42	7
1990	860	68 (0.08)	55	13
1991	859	127 (0.15)	107	20

BOH bad obstetric history

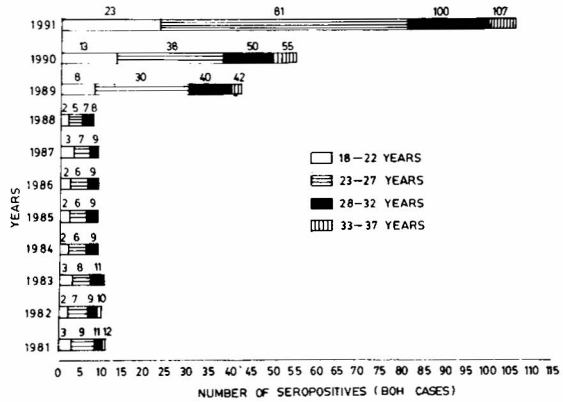

FIG 1. Seropositive women with bad obstetrical history (BOH) during 1981–91, classified by age

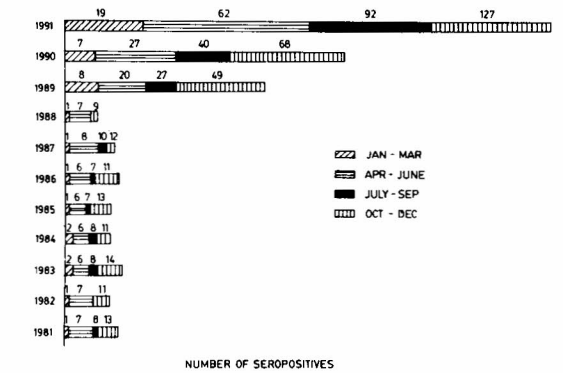

FIG 2. Seasonal distribution of seropositive cases during 1981–91

factors causing this rising trend in toxoplasma seropositivity in this region. With an increasing number of acquired immunodeficiency syndrome (AIDS) patients, this infection may produce acute life-threatening conditions such as encephalitis, myocarditis or pneumonitis.

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