

TOXOPLASMOSIS IN PREGNANCY

by

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Introduction

Toxoplasmosis is a protozoal infection caused by a parasite known as *Toxoplasma gondii*, which was first discovered by Nicolle and Mauceaux (1908). Pinkerton and Weimann (1940), Sabin (1941) and Pinkerton and Henderson (1941) were the first to report the acquired toxoplasmosis in man and since then many cases have been recorded. The exact portal of entry in man is not known. Experimental evidence suggests that it may be through the nasal or oral route or through ingestion of infected material (Craig Fans). *Toxoplasma* grows intracellularly in the nucleated cells and has a predilection for reticulo-endothelial cells. It also localises in the lymph nodes, brain, lungs etc.

Acquired toxoplasmosis may manifest with fever, malaise, lymph node enlargement, etc. Few cases of myocarditis, hepatitis with jaundice, and encephalitis have been recorded. 2 to 13% of un-

explained lymphadenopathy in human being is considered to be due to toxoplasma infection (Beverley and Beattie, 1958; Siim, 1961; Remington *et al*, 1962).

Congenital toxoplasmosis has a wide variety of manifestations. It may present as an acute encephalitic picture, purpuric patches, hepatosplenomegaly with jaundice, retinitis or uveitis. The foetus acquires infection from infected but healthy mother. Minute foci of toxoplasma parasitic lesions occur in the placenta and the uterus, which rupture and discharge toxoplasma in foetal circulation (Beckett and Flynn, 1953; Wildfuhr 1954). The extent of foetal affection depends upon the gestational period at which the mother is infected, the virulence of the strain, rapidity and the extent of antibody formation. If the mother is infected in the first trimester, the foetus usually escapes, but if the infection occurs in late gestation, chances of stillborn babies or congenitally abnormal babies being born are much higher. Toxoplasmosis has also been incriminated in causing repeated abortions. If infection occurs just before parturition, babies are born with manifestations of congenital toxoplasmosis. At one time it was thought that in order to infect the foetus, the mother must herself acquire infection during the said pregnancy and no congenital transmission of infection occurs in

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subsequent pregnancies. But this has been challenged by recent works of Langer and Geissler (1960) and Langer (1963).

In the present study, detection of toxoplasmosis was done during pregnancy and its role as a possible etiological factor in foetal wastage, if any, is presented.

Material and Methods

Various methods for detecting toxoplasma infection are—

(1) Direct demonstration of toxoplasmas.

(2) Dye test (Sabin and Feldman, 1948).

(3) Complement fixation test (Warren and Sabin, 1942).

(4) Indirect fluorescence test (Goldman, 1957).

(5) Indirect haemagglutination test (Jacobs and Lunde, 1957; Prakash 1966).

(6) Toxoplasmin skin test.

In the present study, indirect haemagglutination test was carried out. The test, in brief is as follows:

(i) 2.5% sheep cells in 7.2 pH phosphate saline were treated with 1; 80,000 tannic acid.

(ii) The tanned cells were sensitised with toxoplasma antigen in 6.4 pH phosphate saline for 15 minutes at room temperature.

(iii) The sensitised cells were suspended in 1% rabbit serum saline.

Decomplemented test sera were diluted with 1% rabbit serum saline in a four fold dilution. The sensitised cells were added to each aliquot and the mixtures incubated at 37°C in a water bath for 40 to 60 minutes. Control tubes containing a mixture of 2.5% sheep cells and appropriate dilution of test sera were kept side by side. The results of agglutination were noted at the end of two hour.

Our thousand eight hundred and eighteen women with past foetal losses were studied for toxoplasmosis and 266 pregnant women with no past foetal wastage or foetal malformation were selected as controls. Sera of these women were subjected to indirect haemagglutination test at our centre and also sent to Dr. Om Prakash, at All-India Institute of Medical Sciences, New Delhi for double check. The cases were selected from our antenatal and B.O.H. (Bad obstetric history) clinics at the KEM Hospital.

Results and Discussion

TABLE I
Incidence of Toxoplasmosis in Pregnancy

Type of cases	Total No. of cases	No. of positive cases	No. of significantly positive cases i.e. titre of 1:256 and above	% of significantly positive cases
Control group (Normal pregnancy)	266	18	5	1.87
Study group (Women with foetal losses)	1818	92	55	3.02

This shows that the percentage of significant antibody titre in the sera is higher in cases with foetal losses. Hingorani *et al* found that out of 27 cases in the control group, only 2 cases had significant antibody titre, while in the study group comprising of patients with past foetal wastage, 6 cases out of 90 had high antibody titre. The incidence of toxoplasmosis in general population as reported by Wright (1957) is 6.94% and by Rawal and Jhala (1956) as 3%. We have not studied the incidence in general population.

The women with past foetal losses were further analysed and grouped into those who had history of abortions, stillbirths, neonatal deaths, etc., as shown in Table II.

isolated *T. gondii* from products of conception in habitual aborters. Feldman and Eichenwald (1953), however, failed to find evidence of active toxoplasmosis in any of the 95 women who had aborted. Toxoplasmosis has been universally accepted as being responsible for neonatal deaths. MacGregor in 1962 has said that 1 out of every 500 perinatal deaths is due to this infection. Robertson (1960) has also reported high perinatal mortality with this infection. As to it being responsible for stillbirths, Essback in 1962 found that only 1 case was positive in 960 cases of stillbirths studied.

It is difficult in our series to give the incidence of the infection in women who had abnormal babies since all the mothers with abnormal babies born at K.E.M.

TABLE II
Past Obstetric History in Positive Cases

Past Obstetric history	Total No. of cases	Positive cases					% of Significant titre cases
		Total No.	1:16	1:64	Significant titres of		
					1:256	1:1024	
H/o. abortion	1385	53	12	7	30	4	2.48
H/o. Pr. births	190	20	8	2	6	4	5.2
H/o. stillbirths	225	17	4	3	5	5	4.4
H/o. neonatal deaths	18	2	-	1	-	1	5.5

There is a great deal of controversy regarding toxoplasmosis being a cause of recurrent abortions. Langer in 1963 isolated *T. gondii* organisms in 23 out of 70 women who were habitual aborters. Remington in 1964 isolated these parasites. Magnusson (1951) and Wildfuhr (1954)

Hospital were not studied. Only 8 women who delivered malformed babies were studied and we found that significant antibody titres were present in 4 out of 8 cases. Feldman and Miller (1956) and Feldman (1958) found toxoplasmosis in 22% of hydrocephalic babies and 21% of

TABLE III
Toxoplasmosis and Congenital Abnormalities of Foetus

Type of cases	Total No. of cases	Positive cases				
		Total No.	1:16	1:64	Significant titre of	
					1:256	1:1024
1. Patients with past H/o. congenital abnormal babies	10	3	-	1	-	2
Hydrocephalus	6					
Anencephaly	-					
Miscellaneous	3					
1. Foetal malformation in present pregnancy	8	5	-	1	-	4
Hydrocephalus	4					
Anencephaly	1					
Microcephaly	1					

microcephalics. Eichenwald (1956) states that 5% of hydrocephalus are caused by toxoplasmosis.

Treatment and Follow-up

Of all the cases studied, 29 pregnant and 21 non-pregnant patients could be followed up. Of these, 18 pregnant patients and 9 non-pregnant women were treated with Spiramycin 1 gm. daily for 3 weeks. The other drugs used for treatment were Pyrimethamine and Sulphamethoxydiazine.

Table IV shows the outcome of toxoplasma infected patients in treated and untreated group.

As seen in this table, in the treated group the foetal salvage was 83.33%,

while it was 63.63% in the untreated group. However, of the 5 cases who were found to be toxoplasma infected in the control group all had full term live-births, though not a single case received any treatment. Thus, it is difficult to assess whether treatment benefitted the patients in the study group.

Conclusions and Summary

(1) Two hundred and sixty-six patients with normal pregnancy and 1818 cases with past foetal losses were studied to find out the incidence of toxoplasmosis.

(2) 1.87% of women during pregnancy suffered from toxoplasmosis, while 3.02% of women with past foetal losses were found to be suffering from this infection.

TABLE IV
Outcome of Positive Cases

Type of cases	No. Total	Outcome			Total salvage %
		FTND	Total loss	Ectopic	
Treated group	18	15	2	1	83.33
Untreated group	11	7	4	-	63.63

(3) Highest incidence of toxoplasmosis was found in women with past history of neonatal deaths (5.5%).

(4) Toxoplasmosis seemed to be the cause of congenital abnormal babies in 4 out of 8 cases.

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