

Toxoplasma antibody titers by indirect latex agglutination test in patients of Kangnam St. Mary's Hospital and Cheju Medical Center

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Abstract: Total 2,829 persons consisted of 1,019 general patients and 1,030 asthma-suspected patients who visited Kangnam St. Mary's Hospital and 780 general patients who visited Cheju Medical Center were examined for the antibody titers of *Toxoplasma* by indirect latex agglutination(ILA) test.

Nineteen out of 1,019(1.86%) cases in general patients group, 11 out of 1,030 (1.07%) cases in asthma patients group, and 45 out of 780(5.77%) cases in Cheju patients group showed positive ILA titers.

Concerned with the age and ILA positive cases, general and asthma patients expressed more cases at thirties to sixties while Cheju patients showed high incidence at children and adolescents in addition to the above mentioned ages.

Frequencies of ILA positive titers were highest in 1:32 and 1:64, and some cases showed 1:2,048 or higher titers.

Key words: *Toxoplasma gondii*, antibody titer, indirect latex agglutination test

INTRODUCTION

Toxoplasmosis is a typical zoonosis by *Toxoplasma gondii* which infects mammals and birds with very low specificity. It is a worldwide etiological agent except Antarctic Continent. Generally, it has been known that 20~30% of adult human and several ten percent of animals are infected with *Toxoplasma*, but infection rates are different by geographical distributions.

In Korea, since Soh *et al.*(1960) reported the human cases as 5.6% positive out of 373 by skin test using toxoplasmin, there have been many reports to estimate the prevalence of *Toxoplasma* antibodies among human and other animals(Moon, 1965; Choi, 1969; Choi *et al.*,

1982 & 1983; Kim and Choi, 1983; Choi *et al.*, 1984, 1985 & 1987).

In this study, we add a seroepidemiological data of *Toxoplasma* antibody titers in three patient groups consisting of general patients and asthma-suspected patients who visited Kangnam St. Mary's Hospital in Seoul and general patients who visited Cheju Medical Center in Cheju island by using indirect latex agglutination(ILA) test.

MATERIALS AND METHODS

Sera of 2,829 persons were obtained from 2,049 patients who visited Kangnam St. Mary's Hospital including 1,019 general patients and 1,030 patients clinically suspected as asthmatic and from 780 patients who visited Cheju Medical

Center.

Antigen and reagents used in this survey were purchased from Eiken Chem. Co., Japan, as a kit "Toxotest-MT(EST06)".

ILA antibody titers were assayed according to the method of Kobayashi *et al.* (1978). Briefly, sera were diluted serially in a U-shaped 96-well plate, reacted with sensitized latex antigen (Eiken) for 16 hr at room temperature. Antibody titers were determined by the last dilution number which precipitated latex agglutination of middle class dispersion, and the titers of 1 : 32 or higher were regarded positive.

RESULTS

Human sera were examined on the ILA test for antibodies of *Toxoplasma*. Nineteen out of 1,019(1.86%) cases in general patient group, 11 out of 1,030(1.07%) cases in asthma patient group, and 45 out of 780(5.77%) cases in Cheju patient group showed positive antibody

Table 1. Prevalence of ILA positive cases in general patients, asthma patients, and Cheju patients

Group	Positive*/Examined		
	Male	Female	Total
General patients	12/550	7/469	19/1019
Asthma patients	4/470	7/560	11/1030
Cheju patients	33/530	12/250	45/ 780
Total	49/1550	26/1279	75/2829

* ILA titers of 1 : 32 or higher were regarded positive.

titers as described in Table 1 and Fig. 1 when the titers of 1 : 32 or higher were regarded positive.

In respect to the sex, the positive rate of male was slightly higher than female in general patient group(2.18% vs 1.49%) and in Cheju patient group(6.23% vs 4.80%) while the rate was reversed in asthma patient group(0.85% vs 1.25%) as shown in Fig. 1.

When the age was concerned to the ILA

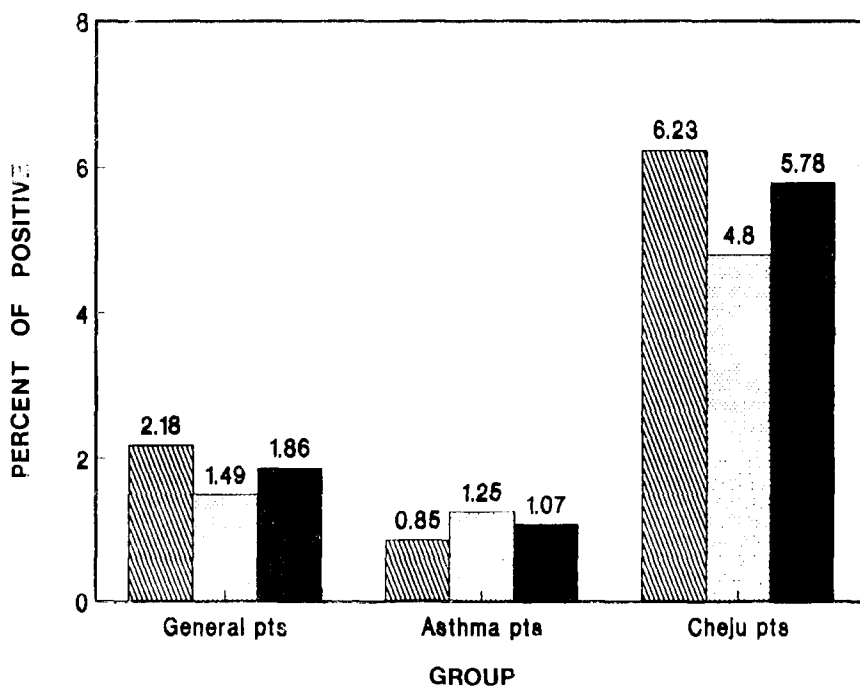


Fig. 1. Percentage of positive cases in general patients, asthma patients, and Cheju patients. In each group, male patients were designated by ; female patients ; and total . Numerals indicate the exact percentage.

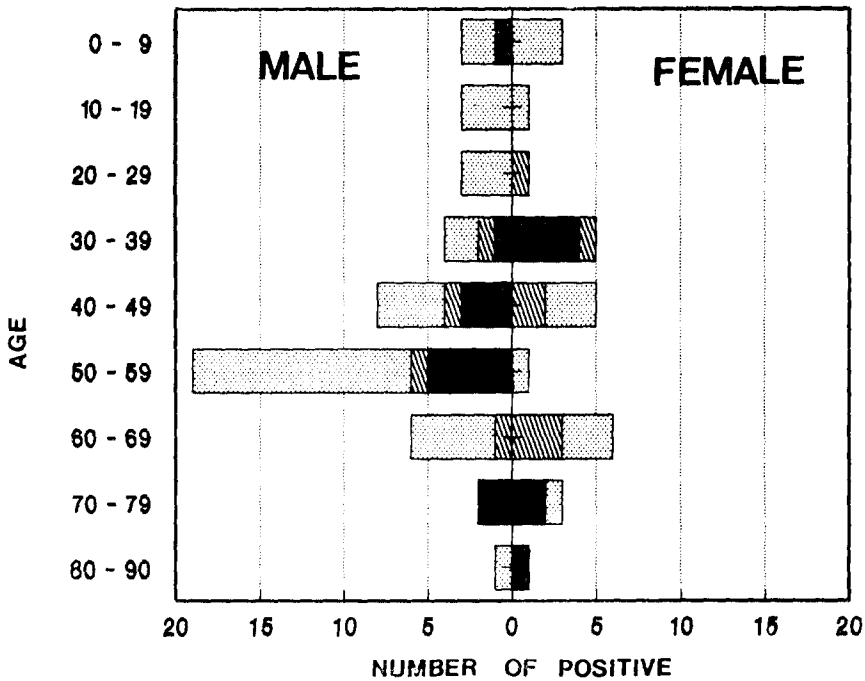


Fig. 2. Distribution of positive cases related to ages. ■ indicate positive cases of general patients, ▨ those of asthma patients, and ▩ Cheju patients.

positive cases, general and asthma patients expressed more positive cases at thirties to sixties, but Cheju patients showed high incidence of children and adolescents in addition to the above mentioned ages as shown in Fig. 2.

As described in Table 2, frequencies of ILA positive titers showed similar profile among these three groups, and were high in 1 : 32, 32

Table 2. Frequency by ILA positive titers of general patients, asthma patients, and Cheju patients.

Titers	Group			Total
	General patients	Asthma patients	Cheju patients	
1 : 32	6	3	23	32
1 : 64	5	6	10	21
1 : 128	3	1	4	8
1 : 256	2	0	4	6
1 : 512	1	1	1	3
1 : 1024	0	0	0	0
1 : 2048*	2	0	3	5
Total	19	11	45	75

* titers of 1 : 2,048 or higher

cases(42.7%) followed by 1 : 64, 21 cases (28.0%), 1 : 128, 8 cases(10.7%), 1 : 256, 6 cases(8.0%), 1 : 512, 3 cases(4.0%), and 1 : 2,048 or higher, 5 cases(6.7%).

DISCUSSION

Many serological tests had been developed for the detection of antibodies of *Toxoplasma*. Of these, indirect latex agglutination test had been used for several years in this laboratory because of its easiness to perform and its comparable sensitivity and specificity after the improvement by Tsubota *et al.*(1977) and by Kobayashi *et al.*(1977) which resulted in the agreement of 94.4% with those of dye test (Sabin and Feldman, 1948). With this method, Choi *et al.*(1982) obtained 4.3% positives out of 412 patients of St. Mary's Hospital, and Kim and Choi(1983) obtained 7.2% positives out of 874 patients of Seoul Red Cross Hospital. Choi *et al.*(1983) screened 573 patients in Seoul National Mental Hospital that resulted

in 1.9% of positive rate, with especially high percentage in hypochondriacs of 7.4%. Later, Choi *et al.*(1984) examined 515 swine sera in outskirts of Seoul which resulted in 12.4% positive rate, and Choi *et al.*(1985) screened 377 pregnant women and 43 pelvic tumor patients of Kangnam St. Mary's Hospital which resulted in 0.5% in the former and 7.0% in the latter. Choi *et al.*(1987) obtained 20 out of 131(15.3%) cases in mammals, 2 out of 75 (2.7%) cases in birds, and none of 10 cases in reptiles from Seoul Grand Park.

In this study, we compared the general patient group with asthma patient group to suggest the possibility of low positive titers in asthmatic patients whose cell-mediated immunity might be exaggerated by some other factors which can act as a protection against infections. We observed slightly less positive titers in asthmatic group compared with general patient group, 1.07% *vs* 1.86%, although it did not explain the suggestions exactly.

When the locality was considered, Cheju patients showed a high positive percentage of 5.18%, three or four times higher than the other groups which suggested the effects of environmental factors such as social and economic problems or habitual traditions for the prevalence of *Toxoplasma*. The prevalence of *Toxoplasma* antibody titers of inhabitants in Cheju island was reported first in this study, and the results were higher as expected than the other regions of Korea where the rate is about 0.7% to 4.3%.

When the incidence of positive cases was correlated with the age, increasing patterns were shown after thirties in general patients and asthma patients with some exceptions at seventies and eighties, while Cheju patients expressed an increasing pattern similar to the other groups with earlier onset of infection in children and adolescents additionally.

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==국문초록==

강남성모병원과 제주의료원 내원 환자의 간접 Latex 응집 반응에 의한 *Toxoplasma* 항체가

가톨릭의대 기생충병연구소

최원영 · 남호우 · 윤지혜 · 김운규 · 김운식

강남성모병원의 일반 내원 환자 1,019명, 내원 환자 중 천식으로 진단된 1,030명, 그리고 제주의료원에 내원한 환자 780명 등 총 2,829명에 대하여 *Toxoplasma* 항체를 측정하기 위해 간접 latex 응집반응을 실시하였다.

간접 latex 응집반응의 양성 항체를 1:32로 볼 때, 강남성모병원 일반 내원 환자에서는 19명이 양성으로 1.86%(남자 550명 중 12명으로 2.18%, 여자 469명 중 7명으로 1.49%), 천식 혹은 알레르기 환자에서는 11명이 양성으로 1.07%(남자 470명 중 4명으로 0.85%, 여자 560명 중 7명으로 1.25%)이었으며, 제주의료원 내원 환자에서는 45명으로 5.77%(남자 530명 중 33명으로 6.23%, 여자 250명 중 12명으로 4.80%)이었다.

연령적 분포로는 강남성모병원 일반 환자와 제주의료원 내원 환자의 남자에서 50대에 높은 빈도를 보였고, 전체 여자에서는 일반적으로 30대, 40대 및 60대에서 높은 빈도를 보였다.

양성 항체를 보인 75명의 항체가별 분포로는 1:32가 32명으로 42.7%, 1:64가 21명으로 28.0%, 1:128이 8명으로 10.7%, 1:256이 6명으로 8.0%, 1:512가 3명으로 4.0%, 그리고 1:2,048 혹은 그 이상의 항체를 보유한 사람은 5명으로 6.7%였다.