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Toxoplasmic Infection in Pregnant Women from Cluj County and Neighbouring Area

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Abstract: Toxoplasmosis is an antropozoonosis very frequent in population as a benign usually asymptomatic disease. The problems are raised by the congenital form of this disease that may occur if the women acquire the parasite during pregnancy leading to congenital toxoplasmosis. In order to prevent congenital toxoplasmosis many countries have screening programs design to diagnose the acute infection during fertile age of female population. Our prospective serologic study over a selected group of 510 pregnant women in Cluj county area showed a 39 % prevalence of toxoplasmic infection among women of fertile age, with a predominance of acute toxoplasmic infection during first trimester of pregnancy (66.66%), representing the predominant cause of abortion in our study group. Annual infection risk for female population aged 20-33 years old is K = 0.67% in our geographic area. A 4 % of cases had IgM persistence for more than 1-year period, and another 7% demonstrate positive IgM along with positive IgG raising the possibility of persistency to 11% of cases. We find out that half of women address laboratory by their own initiative and we calculate that medium age of pregnant women with toxoplasmic immunity (positive IgG) was 28 years old.

Keywords: Antitoxoplasmic serology; Pregnant women; Toxoplasmosis annual infection risk; IgM persistency.

Introduction

Toxoplasmosis is an antropozoonosis very frequent in population [1] as a benign usually asymptomatic disease. The problems are raised by the congenital form of this disease [2] that may occur if the women acquire the parasite during pregnancy leading to congenital toxoplasmosis. In order to prevent congenital toxoplasmosis many countries have screening programs design to diagnose the acute infection during fertile age of female population [3].

There is no official national program for the follow-up of pregnant women in our country. Studies regarding prevalence and annual incidence of toxoplasmic infection among women of fertile age are made by different independent group of researchers [4-6]. Powerful lobby among women of fertile age for performing this analysis is especially carried out by laboratory doctors specialized in parasitology [7], but with few support from family doctors and gynecologists regarding interpretation of the results according with actual criteria and their attitude towards the female patient. IgM persistence (residual IgM) [8,9] it's a phenomenon hardly recognized and rarely correct interpreted by clinicians leading sometimes to unnecessary stress for the female patient.

The objective of our study was medical and statistic interpretation of the epidemiologic, clinic and serologic data obtained by clinical and laboratory investigation in order to estimate:

- The prevalence of *T. Gondii* infection in women of fertile age from our geographic area,
- The annual infection risk,

- The percentage of persistent forms of toxoplasmic infection for the above-mentioned category of population.
- Appreciation of the association degree between acute toxoplasmic infection and pregnancy loss.

Material and Method

We performed a prospective study on a selected group of 510 pregnant women between 2005-2007 to whom we determine the serologic toxoplasmic profile (IgG, IgM and IgA) and registered epidemiological data (age, pregnancy age). Selection criteria were: living in Cluj county or neighbor counties (Alba, Mureş, Bihor, and Bistriţa), age between 16 - 42 years.

Laboratory diagnosis for the serologic profile of the studied cases was a manual Enzyme Linked Immunosorbent Assay (ELISA) performed with Bio-RAD, Platelia kits, and for IgG positive sera accompanied by IgM and/or IgA the avidity test was performed. All sera were analyzed in duplicate and the results were checked by the same method performed with a kit from another producer.

Statistic data analysis was made with the following programs: EPIINFO 6, EPIINFO 2000, SPSS10, standard level of statistic significance was considered $\alpha = 0.05$, and the tests used were: χ^2 (Hi-square) test, Mann –Whitney (U) test, Student Test (T). For frequencies and averages, confidence intervals were calculated. Annual infection risk was calculated based on published formula of Papoz & all. [10].

Results

The structure of this group of pregnant women show that the majority of pregnancies were present in the 26-30 years old group - 242 (Figure 1) and the repartition of pregnant women according with gestational age is presented in Figure 2.

Toxoplasmic infection seroprevalence, demonstrated by the presence of antitoxoplasmic IgG, was ascertained in 198 (39%), of 510 tested pregnant women, CI = [34.57% – 43.20%], the rest of 312 pregnant women (61%) being seronegative, CI = [56.79%-65.42%] (Figure 3). Detailed serologic profile of positive pregnant women is showed in Figure 4 and 5.

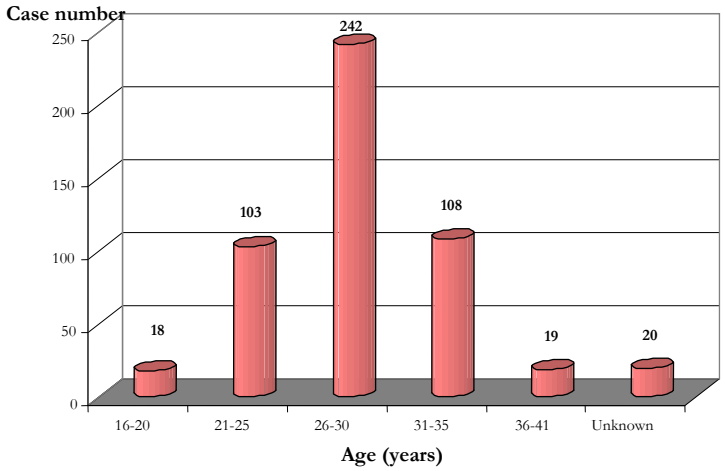

Figure 1. Pregnant women distribution according with age

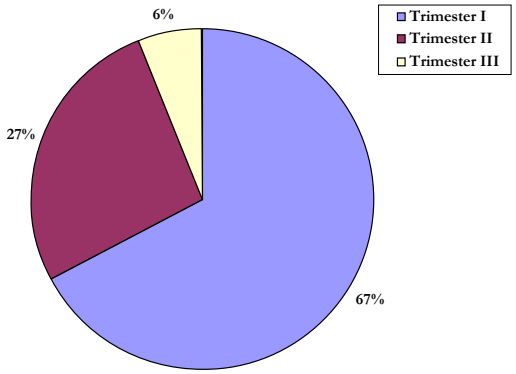

Figure 2. Pregnant women distribution according with pregnancy age

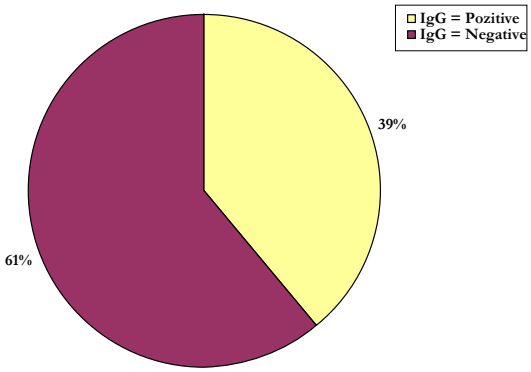

Figure 3. Seroprevalence of toxoplasmic infection in pregnant women group

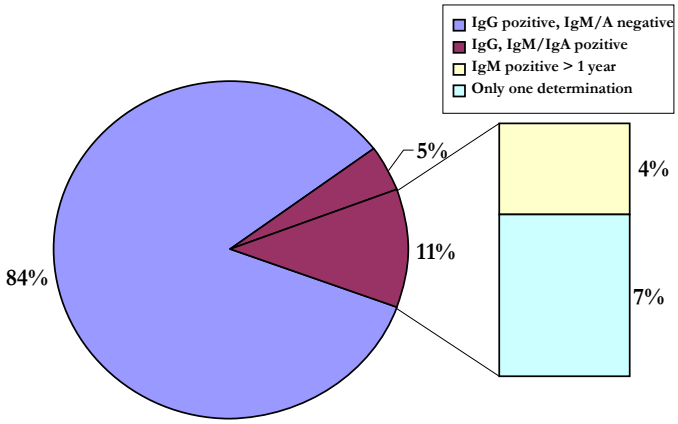

Figure 4. Serologic profile of studied cases. Emphasize of IgM persistence

Repartition of acute toxoplasmosis cases during pregnancy according with the time of the pregnancy was 66.66%, CI=[40.99-86.65] trimester I, 27.77%, CI=[9.69-53.48%] in trimester II and only 5.5%, CI=[0.1%-27.29%] in trimester III (Figure 6); acute toxoplasmosis effect on pregnancy evolution is demonstrated in Figure 7.

In order to calculate the annual risk of infection with T. gondii in pregnant women with the age in 20-26 years interval and 27-33 years interval the following date are used (Table 1).

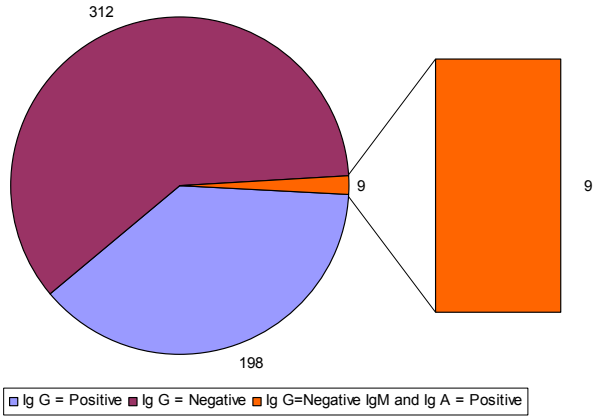

Figure 5. Detailed serologic profile of pregnant women

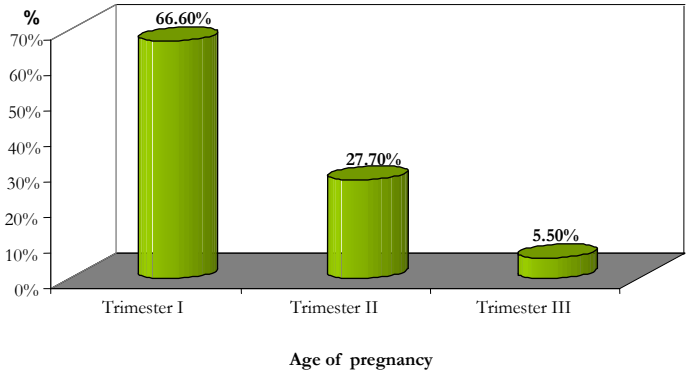

Figure 6. Repartition of toxoplasmic infection during pregnancy according with pregnancy trimester

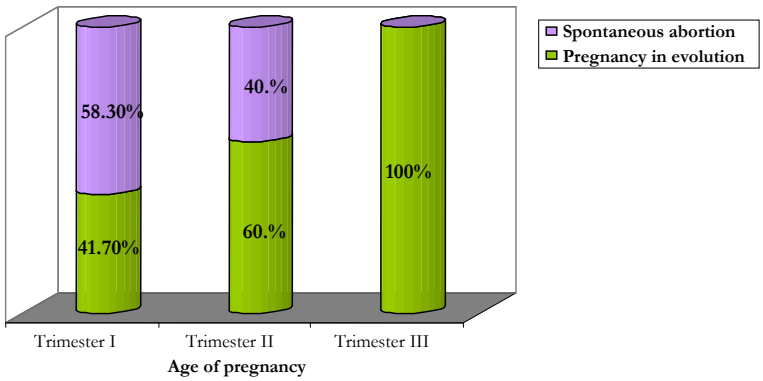

Figure 7. Effect of toxoplasmic infection acquired during pregnancy on the evolution of pregnancy

Table 1. Annual infection risk (K) for 20-33 years of age interval

Age group (years)	Pregnant women number	IgG+	% IgG+	IgG-	% IgG
20-26	196	78	39.79592	118	P0= 60.20408
27-33	282	121	42.9078	161	P1= 57.0922

Annual infection risk is: K= 0.6697%.

Analyzing the source which determine pregnant women to address laboratory for testing we obtained the following results: 56 % address from their own initiative (42 % of them having a normal pregnancy in evolution and 14 % because they had a spontaneous abortion in recent history or a child with congenital abnormalities); 27 % were send to the laboratory by the general practitioner and 17% were send by the gynecologist (Figure 8).

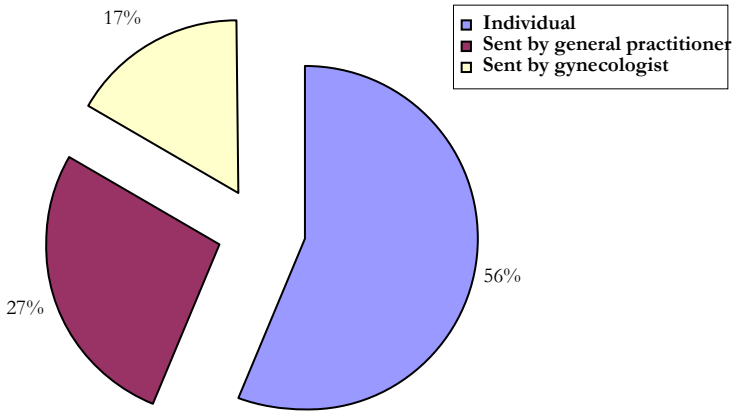

Figure 8. Addressability according to source

Discussion

The percentage of positive serology (IgG positive 39 %) in pregnant women group follows the line of IgG positivity in females of fertile age between 35-40% found by other studies across Europe [11] and in our area [12].

In the cases of 167 pregnant women CI = [78.51% - 89.1%] with positive, constant and low level of IgG and negative IgM and IgA, categorization as immune to toxoplasmosis was simple. Clinic interpretation became more complicated in those cases where the presence of IgG was accompanied by the presence of IgM and/or IgA, 31 of them, CI = [10.89 % –21.48 %], belonging to these category. In order to establish the diagnostic in these cases we had to consider other parameters as follows: for 9 cases (29%), positive IgM and IgA and high values for IgG (>250 UI/ml), we performed affinity/avidity test that allow us to frame this cases within category of toxoplasmosis during pregnancy, because the avidity was low. It has to be considered that a low affinity may not give a correct interpretation as a single parameter because it may persist in some cases for at least 6 moths, but when summed to other results (as in our case) it can make the difference between chronic infection and recently infection [13] and it may ensure a good evolution of pregnancy with no risk for the transmission of the infection to the child [14].

Conclusions

1. Antitoxoplasmic seropositivity in pregnant women from our geographic area is 39%, annual infection risk for female population with age between 20-33 years old is K = 0.67%, with an age increasing evolution.
2. Medium age of pregnant women with toxoplasmic immunity (positive IgG) was 28 years old
3. Addressability of pregnant women for testing is reaching a maximum during first trimester of pregnancy and is mainly due to self initiative, followed by recommendation from family doctor and gynecologist. The interest for testing decrease with the evolution of pregnancy.
4. Diagnosis of acute toxoplasmic infection during pregnancy was established in 3% of all tested women, majority of them during first trimester of pregnancy, being the major cause of abortion in our study group.

5. Almost half of pregnant women with positive IgG need additional tests for confirmation of the clinical status due to a complex serology (presence of IgM and sometimes IgA) in a punctual determination (disadvantages of non-dynamic follow-up).
6. Antitoxoplasmic IgM persistence phenomenon (residual IgM) is frequent (CI=2-34 %) in female population with positive serology..

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