

Seroepidemiological study of *Chlamydia trachomatis* infections in blood donors from the Santa Casa de Misericórdia de Porto Alegre, Rio Grande do Sul, Brazil *

Estudo soroepidemiológico de Chlamydia trachomatis em doadores de sangue da Santa Casa de Misericórdia de Porto Alegre, Rio Grande do Sul, Brasil

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Abstract

The prevalence of antibodies to *Chlamydia trachomatis* and epidemiological factors associated with the chlamydial infection were studied in donors of a blood bank located in Porto Alegre – RS/Brazil. In a total number of 494 blood samples, 149 (30.2%) were positive for *C. trachomatis*, 105 (28.2%) from males and 44 (36.4%) from females. The higher risk to acquire chlamydial infections was observed in 28-32-year old females with past clinical history of amniotic sac rupture and premature newborn as well as 23-27-year old males with past clinical history of gonorrhoea and/or other sexually transmitted diseases (STDs).

Keywords: *Chlamydia trachomatis* – Epidemiology - Porto Alegre, RS, Brazil.

Resumo

A prevalência de anticorpos para *Chlamydia trachomatis* e os fatores epidemiológicos associados com a infecção causada por essa bactéria foram estudados em 494 doadores de sangue de Porto Alegre (RS/Brazil). Do total de doadores, 149 (30,2%) foram soro-reagentes para *Chlamydia trachomatis*; 105 (28,2%) homens e 44 (36,4%) mulheres. Os resultados obtidos nesse estudo demonstraram que mulheres na faixa etária de 28 a 32 anos de idade, com história clínica de bolsa rota e parto prematuro, e homens na faixa etária de 23 a 27 anos de idade, com história clínica de gonorréia e outras doenças sexualmente transmitidas (DST), são mais suscetíveis à infecção clamidial.

Palavras-chave: *Chlamydia trachomatis* – Epidemiologia – Porto Alegre, RS, Brasil.

INTRODUCTION

Human chlamydial disease can result in serious clinical manifestations, as trachoma, epididymitis, hydrocele, endocarditis, prostatitis, proctitis, Reiter's syndrome, pelvic inflammatory disease, ectopic pregnancy, spontaneous abortion, tubal infertility and perinatal infections (MANAVI, 2006; BUDAI, 2007; ROCA, 2007; BÉBEAR; DE BARBEYRAC, 2009). *Chlamydia trachomatis* (*C. trachomatis*) infection is responsible by one of the more common sexually transmissible diseases (STDs) in the entire world, with the annual detection of 92 million new cases worldwide, including 43 million from South-East Asia (MALHOTRA et al., 2008). In Europe, North America and Brazil prevalence of chlamydial infection is approximately equal to 10% and 20% among adult females and males respectively (ISHAK et al., 1993; DA ROS; SCHMITT, 2008). Epidemiological studies on

chlamydial infections have been scarce in Brazilian population. However chlamydial infections are common in Brazilian population (ISHAK et al., 1993; JALIL et al., 2008). In this present study, seroprevalence of *C. trachomatis* was investigated among donors in a blood bank in Porto Alegre, a large city of South Brazil. The epidemiological factors associated with chlamydial infections were also studied.

MATERIALS AND METHODS

Serum samples from 494 blood donors (373 males and 121 females) from the Irmandade Santa Casa de Misericórdia de Porto Alegre, Rio Grande do Sul, Brazil, were analyzed for the presence of antibodies to *Chlamydia*. Total blood from each donor was collected in vacutainer tubes. Following, the serum were separated by low centrifugation (1,500 x g for 10 min) and stored at –80° C until using.

Chlamyrol test (Biolab Mérieux S. A.) was used for the serological analysis according to the instructions of the manufacturer. Indirect immunofluorescence test, a standard reaction for detection of *C. trachomatis*

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antibodies (BLACK, 1997; MYGIND et al., 2000), was performed on slides containing elementary bodies purified from *C. trachomatis* serotype L2, using 1/16 as serum starting dilution. The slides were examined under an Olympus immunofluorescence microscope (model BX40 F4), using a blue filter WB and 40X objective. The presence of specific immunoglobulin G (IgG) was revealed by bright green elementary bodies over a light purple background.

The clinical and demographic data of the patients were also investigated and the statistical data analysis was developed by Epi Info version 6.0 software.

RESULTS

The results of serological tests and the selected demographic parameters can be seen in Tables 1 and 2. Among 494 blood donors, 149 (30.2%) were positive to *C. trachomatis* IgG, 105 (28.2%) adult males (TABLE 1) and 44 (36.4%) adult females (TABLE 2). The IgG prevalence for *C. trachomatis* was significant ($p < 0.05$) in 23-27-year old males (TABLE 1) and 28-32-year old females (TABLE 2). Marital status, number of sexual partners and non use of condom had shown no statistical significance in this study (data not shown).

In males, gonorrhoea history ($p < 0.01$) and other STDs ($p < 0.05$) showed significant association with the presence of antibodies to *C. trachomatis* (TABLE 3).

Table 4 shows that complicated pregnancy (amniotic sac rupture and premature newborn) had significant statistical association ($p = 0.05$) with the presence of antibodies to *C. trachomatis*.

DISCUSSION

The prevalence (30.2%) of *C. trachomatis* in blood donors found in this paper was similar to the results of other studies performed in Brazil (ISHAK et al., 1993; MACHADO et al., 2007).

Gonorrhoea ($p < 0.01$) and other STDs ($p < 0.05$) in male and complicated pregnancy as well ($p = 0.05$)

presented significant statistical association with chlamydial infections. These data confirm the histories of strong association between *Neisseria gonorrhoeae* and *C. trachomatis* infections, which can be also observed between *C. trachomatis* infections and the occurrence of amniotic sac rupture and premature newborn (GRAVETT et al., 1986; MARTIUS et al., 1988; VAN DUYNHOVEN et al., 1997; JALIL et al., 2008).

Table 2 - Demographic data of 121 female blood donors from Irmandade da Santa Casa de Misericórdia de Porto Alegre, Rio Grande do Sul, Brazil (1998), and presence antibodies of *C. trachomatis*.

Demographic characteristics	Seroprevalence to <i>Chlamydia trachomatis</i>		p*
	Positive (n = 44)	Negative (n = 77)	
Age group			
18 a 22	09 (20)	07 (9)	NS**
23 a 27	06 (14)	16 (21)	NS
28 a 32	12 (27)	07 (9)	<0.02
33 a 37	09 (20)	17 (22)	NS
≥ 38	08 (18)	30 (39)	NS***
Education (years)			
≤ 12	39 (89)	54 (70)	NS
≥ 12	04 (9)	23 (30)	NS***

Note: *p = probability of significance; **NS = no significance; *** to serum positives blood (onetailed test); () = percentage

Table 3 - Correlation between clinical manifestations presented by the 373 male blood donors from Irmandade da Santa Casa de Misericórdia de Porto Alegre, Rio Grande do Sul, Brazil, and the presence of antibodies to *C. trachomatis*.

Clinical history of diseases	Seroprevalence to <i>Chlamydia trachomatis</i>		p*
	Positive (n = 105)	Negative (n = 268)	
Gonorrhoea	27 (26)	37 (14)	<0.01
Other STDs	10 (9)	10 (4)	<0.05
Infertility	03 (3)	03 (1)	NS**
Prostatitis	01 (1)	01 (0,4)	NS

Note: *p = probability of significance; **NS = no significance; () = percentage

Table 1 - Demographic data of 373 male blood donors from Irmandade da Santa Casa de Misericórdia de Porto Alegre, Rio Grande do Sul, Brazil (1998), and presence of antibodies of *C. trachomatis*.

Demographic characteristics	Seroprevalence to <i>Chlamydia trachomatis</i>		p*
	Positive (n = 105)	Negative (n = 268)	
Age group			
18 a 22	18 (17)	40 (15)	NS**
23 a 27	11 (10)	55 (20)	0.03
28 a 32	22 (21)	45 (17)	NS
33 a 37	12 (11)	36 (13)	NS
≥ 38	42 (40)	92 (34)	NS
Education (years)			
≤ 12	93 (89)	238 (89)	NS
≥ 12	12 (11)	30 (11)	NS

Note: *p = probability of significance; **NS = no significance; () = percentage

Table 4 - Correlation between clinical manifestations presented by the 121 females blood donors from Irmandade da Santa Casa de Misericórdia de Porto Alegre, Rio Grande do Sul, Brazil, and the presence of antibodies to *C. trachomatis*.

Clinical history of diseases	Seroprevalence de <i>Chlamydia trachomatis</i>		p*
	Positive (n = 44)	Negative (n = 77)	
Conjunctivitis	24 (54)	32 (42)	NS**
Complicated pregnancy***	12 (27)	09 (12)	0.05
Pneumonia	10 (23)	08 (10)	NS
Spontaneous abortus	07 (16)	07 (9)	NS
Other STDs	03 (7)	06 (8)	NS

Note: *p = probability of significance; **NS = no significance; ***amniotic sac rupture and premature newborn; () = percentage

In the double infection by *C. trachomatis* and *Neisseria gonorrhoeae*, proteases produced by gonococcus could degrade local IgA, explaining in part the reactivating of latent *Chlamydia trachomatis* infections (BRUNHAM et al., 1983; BARNES et al., 1990; VIDARSSON et al., 2005).

A high serum positivity for *C. trachomatis* was observed in 28 - 32 years old females. Studies have demonstrated that chlamydial infections are more frequent in young females, which can be explained by the common larger areas of cervical ectopy (SCHOLES et al., 1998; MOSCICKI et al., 2001; DA ROS; SCHMITT, 2008).

Although the oral contraceptives increase the cervical ectopy and have been described as one of the risk factors for cervical chlamydial infection (CATES; WASSERHEIT, 1991; VAN DUYNHOVEN et al., 1997; MOSCICKI et al., 2001; DA ROS; SCHMITT, 2008), significative association between the use of oral contraceptives and serum positivity to *C. trachomatis* was not found.

At present, the serological tests carried currently in the blood banks for the selection of donors aim the identification of seropositive individuals for *Treponema pallidum*, *Trypanosoma cruzi*, hepatitis B virus, hepatitis C virus, HIV and HTLV. However, other microorganisms, including *C. trachomatis*, which can be potentially propagated by blood, were not studied until this moment. There are no evidences from the *C. trachomatis* hematogenic transmission but this form of transmission needs to be better investigated.

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