

# Abstracts from the current global literature: Chlamydia and Infertility in Men

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## Chlamydial infection and its role in male infertility

Samplaski MK, Domes T, Jarvi KA. Adv Androl 2014;2014. Article ID 307950. <http://dx.doi.org/10.1155/2014/307950>

**Introduction:** *Chlamydia trachomatis* is an established cause of tubal factor infertility; however, its role in male fertility is not as clear. We sought to determine the prevalence of chlamydia in infertile men and evaluate its impact on male reproductive potential. **Materials and Methods:** We compared the incidence of chlamydia in our infertile male population with that reported in the literature. We then reviewed the impact of chlamydia infection on male fertility. **Results:** The incidence of chlamydia infection in our population of infertile men was 0.3%. There is considerable variability in the reported incidence, likely due to variation in the population studied, and detection technique. The optimal testing method and sample are presently unclear. The effect of chlamydia on male reproductive function is also variable in the literature, but appears to be relatively minimal and may be related primarily to sperm DNA fragmentation or female partner transmission. **Conclusions:** The prevalence of chlamydia in the infertile male population is low and routine testing is not supported by the literature. For high-risk infertile men, nucleic acid testing of urine  $\pm$  semen is the most sensitive method to detect

chlamydia. A validated testing system for semen needs to be developed, so that a standardized methodology can be recommended. In this way, the full implications of chlamydia on male fertility can be elucidated.

## Chlamydia trachomatis infection in HIV-infected women: Need for screening by a sensitive and specific test

Bhattar S, Bhalla P, Chadha S, Tripathi R, Kaur R, Sardana K. Infect Dis Obstet Gynecol 2013;2013. Article ID 960769. doi: 10.1155/2013/960769

**Introduction:** Reproductive tract infections (RTIs)/sexually transmitted infections are recognized as a major public health problem, particularly due to their relationship with HIV infection. Early detection and treatment of *Chlamydia trachomatis* infection (CTI) among HIV-infected and HIV-uninfected women may impact heterosexual HIV transmission. **Materials and Methods:** A total of 120 participants was enrolled: Thirty HIV-seropositive women with symptoms of RTIs, 30 HIV-seropositive women without symptoms of RTIs, 30 HIV-seronegative women with symptoms of RTIs, and 30 HIV-seronegative women without symptoms of RTIs. One endocervical swab was collected from all participants, and CTI was detected by real-time polymerase chain reaction (PCR) (COBAS TaqMan CT Test, version 2.0). **Results:** CTI was detected in 4 (6.67%) HIV-infected women and in 1 (1.67%) HIV-uninfected woman (odds ratio: 4.214; 95% confidence interval: 0.457-38.865). Vaginal discharge was present in almost half of HIV-infected and HIV-uninfected women; lower abdominal pain was present in 11 (18.3%) of HIV-infected and in 9 (15%) of HIV-uninfected women. **Conclusions:** This study showed that CTI is more prevalent among HIV-infected females as compared to

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HIV-uninfected females. As the use of real-time PCR is not feasible in most hospitals, efforts should be made to develop a simple, sensitive, and specific test to identify women with CTI for prevention of sequelae and HIV transmission.

### **Immunity, immunopathology, and human vaccine development against sexually transmitted *Chlamydia trachomatis***

Rey-Ladino J, Ross AG, Cripps AW. Hum Vaccin Immunother 2014;10. doi: 10.4161/hv.29683

Reproductive tract infections/sexually transmitted infections are recognized as a major public health problem, particularly due to their relationship with HIV infection. Early detection. This review examines the immunity, immunopathology, and contemporary problems of vaccine development against sexually transmitted *Chlamydia trachomatis*. Despite improved surveillance and treatment initiatives, the incidence *C. trachomatis* infection has increased dramatically over the past 30 years in both the developed and developing world. Studies in animal models have shown that protective immunity to *C. trachomatis* is largely mediated by Th1 T cells producing interferon-gamma which is needed to prevent the dissemination of infection. Similar protection appears to develop in humans but in contrast to mice, immunity in humans may take years to develop. Animal studies and evidence from human infection indicate that the immunity to *C. trachomatis* is accompanied by significant pathology in the upper genital tract. Although no credible evidence is currently available to indicate that autoimmunity plays a role, nevertheless, this underscores the necessity to design vaccines strictly based on chlamydial-specific antigens and to avoid those displaying even minimal sequence homologies with host molecules. Current advances in *C. trachomatis* vaccine development as well as alternatives for designing new vaccines for this sexually transmitted disease are discussed. A novel approach for chlamydia vaccine development, based on targeting endogenous dendritic cells, is described.

### **Molecular detection of *Chlamydia trachomatis* and other sexually transmitted bacteria in semen of male partners of infertile couples in Tunisia: The effect on semen parameters and spermatozoa apoptosis markers**

Sellami H, Znazen A, Sellami A, et al. (2014) PLoS One J 9 (7): e98903. doi: 10.1371/journal.pone.0098903.

**Aim:** This study was undertaken to determine the prevalence of *Chlamydia trachomatis*, *Mycoplasmas*,

and *Ureaplasmas* in semen samples of the male partners of infertile couples and to investigate whether *C. trachomatis* could initiate apoptosis in human spermatozoa. **Materials and Methods:** A total of 85 male partners of infertile couples undergoing routine semen analysis according to World Health Organization guidelines was included. Specimens were examined for the presence of *C. trachomatis*, *Neisseria gonorrhoeae*, *Mycoplasma hominis*, *Mycoplasma genitalium*, *Ureaplasma urealyticum*, and *Ureaplasma parvum* by real-time quantitative polymerase chain reaction. Semen specimens were analyzed for the appearance of apoptotic markers (sperm DNA fragmentation, activated caspase 3 levels, mitochondrial membrane potential [ $\Delta\Psi_m$ ]) using flow cytometry. **Results:** *C. trachomatis*, *N. gonorrhoeae*, *U. urealyticum*, *M. genitalium* were detected in semen samples of 13 (15.2%), 5 (5.8%), 5 (5.8%), and 3 (3.5%) male partners of infertile couples, respectively. *M. hominis* and *U. parvum* were detected in the semen sample of only one patient (1.1%). The semen of infertile men positive for *C. trachomatis* showed lower mean of semen count and lower rapid progressive motility (category [a]) of spermatozoa compared to uninfected men with statistical significances ( $P = 0.02$  and  $P = 0.04$ , respectively). Flow cytometry analyses demonstrated a significant increase of the mean rate of semen with low  $\Delta\Psi_m$  and caspase 3 activation of infertile men positive for *C. trachomatis* compared to uninfected men ( $P = 0.006$  and  $P = 0.001$ , respectively). DNA fragmentation was also increased in sperm of infertile men positive for *C. trachomatis* compared to uninfected men but without statistical significances ( $P = 0.62$ ). Chlamydial infection was associated to loss of  $\Delta\Psi_m$  and caspase 3 activation. **Conclusion:** Thus, *C. trachomatis* infection (CTI) could be incriminated in apoptosis induction of spermatozoa. These effects may explain the negative direct impact of CTI on sperm fertilizing ability.

### **Effect of human papillomavirus and *Chlamydia trachomatis* co-infection on sperm quality in young heterosexual men with chronic prostatitis-related symptoms**

Cai T, Wagenlehner FM, Mondaini N, D'Elia C, Meacci F, Migno S, Malossini G, Mazzoli S, Bartoletti R. BJU Int 2014;113:281-7.

**Objective:** The objective was to investigate the effect of human papillomavirus (HPV) and *Chlamydia trachomatis* (Ct) co-infection on sperm concentration, motility and morphology, in a large cohort of young heterosexual male

patients with chronic prostatitis-related symptoms. **Patients and Methods:** Patients with chronic prostatitis-related symptoms, attending the same center for sexually transmitted diseases from January 2005 to December 2010, were consecutively enrolled in this cross-sectional study. All patients underwent clinical and instrumental examination, microbiological cultures for common bacteria, DNA extraction, mucosal and serum antibodies evaluation for Ct, specific tests for HPV, and semen analysis. The semen variables analyzed were: Volume; pH; sperm concentration; motility; and morphology. Subjects were subdivided in two groups: Group A, patients with Ct infection alone and Group B, patients with Ct and HPV co-infection. The main outcome measurement was the effect of Ct and HPV co-infection on the semen variables examined. **Results:** Of 3050 screened patients, 1003 were enrolled (32.9%) in the study. A total of 716 (71.3%) patients was allocated to Group A, and 287 (28.7%) to Group B. Significant differences between the two groups were reported in terms of percentage of motile sperm (degrees of freedom [df] = 1001;  $t$ -test = 11.85;  $P < 0.001$ ) and percentage of normal morphological forms (df = 1001;  $t$ -test = 7.18;  $P < 0.001$ ), while no differences were reported in terms of semen volume or pH. According to World Health Organization thresholds for normal semen, 364 (50.8%) men in Group A and 192 (66.8%) men in Group B were subfertile (odds ratio = 1.95; 95% confidence interval: 1.46-2.60;  $P < 0.001$ ). No correlation between HPV genotype, mucosal IgA type, and semen variables was found. **Conclusion:** In a population of prostatitis-related symptoms attributable to Ct infection, co-infection with HPV has a significant role in decreasing male fertility, in particular with regard to sperm motility and morphology.

### **Transient exposure to *Chlamydia trachomatis* can induce alteration of sperm function which cannot be stopped by sperm washing**

Al-Mously N, Eleyc A. Middle East Fertil Soc J. Available from <http://www.sciencedirect.com/science/article/pii/S1110569014000338> [Last accessed on 2014 May 19]. DOI: 10.1016/j.mefs. 2014.04.003

**Background:** Previous experiments have shown that *Chlamydia trachomatis* can directly affect sperm function and, therefore, may be an unrecognized contributor to male sub-fertility. However, the precise mechanism of sperm – chlamydial interaction remains unknown. **Aim:** This experimental study attempted to replicate a transient exposure of sperm to *C. trachomatis* that might occur prior to assisted

conception. **Methods:** Six ejaculates from sperm donors were spiked with *C. trachomatis* serovar E and subjected to density centrifugation 1 h later using a standard sperm washing technique. At 0, 6, and 24 h postwash, the recovered motile suspension was evaluated for sperm motility, viability, phosphatidylserine externalization, DNA fragmentation, and tyrosine phosphorylation. **Results:** The results show that even after a relatively short exposure to *C. trachomatis*, changes in sperm motility, viability, phosphatidylserine externalization, and sperm DNA fragmentation were detected up to 24 h later. Only tyrosine phosphorylation was unaffected. **Conclusion:** These results suggest that sperm washing cannot protect sperm from the deleterious effects of *C. trachomatis* exposure, and this may explain some cases of poor *in vitro* fertilization outcome or fertilization failure. We suggest that all patients should be screened and treated for *C. trachomatis* prior to assisted conception. This is one of the current guidelines also recommended by the British Fertility Society.

### **Possible role of *Chlamydia trachomatis* in the male partner of infertile couples**

Noruziyan Z, Roghanian R, Hosseinzadeh S, Golbang N, Nasr Esfahani MH. Comp Clin Path 2013;22:421-4.

**Background:** *Chlamydia trachomatis* is the most prevalent sexually transmitted bacterial infection, with an estimated 92 million new cases occurring each year worldwide. **Aim:** The aim was to detect the microorganism from semen samples of asymptomatic male partners of infertile couples using polymerase chain reaction (PCR) and enzyme-linked immunosorbent assays (ELISA). **Materials and Methods:** Semen and blood specimens were obtained from 93 infertile and 93 fertile men attending an infertility center by our diagnostic laboratory for the detection of *C. trachomatis*. The presence of *C. trachomatis* was examined by PCR assay. **Results:** Serum IgG and IgA antibodies to *C. trachomatis* were also monitored using ELISA in all samples. The rates of *C. trachomatis* infection by PCR were 19.4% and 7.5% in infertile and fertile men, correspondingly, which was significantly different using  $\chi^2$  test ( $P = 0.01$ ). The prevalence of IgG and IgA antibody levels was 4.3% and 2.2% (in infertile) and 3.2% and 1.1% (in fertile men), respectively. **Conclusion:** The present study showed a remarkable correlation between infections caused by *C. trachomatis* and infertility in men. Our data revealed that *C. trachomatis* caused a persistent infection among infertile couples.