



AMERICAN SOCIETY FOR
REPRODUCTIVE MEDICINE



American Society for Reproductive Medicine 2020 Virtual Congress

October 17-21, 2020

CYTOMEGALOVIRUS IMMUNOPOSITIVITY DOES NOT CORRELATE WITH ABNORMAL SPERM PARAMETERS WITHIN A LARGE SPERM DONOR POPULATION

Ariella Farzan Nikou, BS¹, Joanne Won, BS², Stephanie Pan, MS¹, Hyewon Choi, MS¹, Joseph A. Lee, BA², Christopher Antonelli, BS³, Natan Bar-Chama, MD², Jaime M. Shamonki, MD and Alan B Copperman, MD¹

1. Obstetrics, Gynecology and Reproductive Science, Icahn School of Medicine at Mount Sinai, Klingenstein Pavilion 1176 Fifth Avenue 9th Floor New York, New York, United States, 10029.
2. Reproductive Medicine Associates of New York, 635 Madison Ave 10th Floor New York, New York, United States, 10022
3. Generate Life Sciences, Los Angeles, CA

OBJECTIVE:

Studies have shown that cytomegalovirus (CMV) can be detected in sperm samples [1-3]. CMV infected cultures of human testes have been shown to have decreased number of precursor sperm cells when compared to uninfected cultures [4]. However, there is conflicting evidence about the association between CMV infection, sperm quality, and reproductive potential [2, 5-7]. This study aimed to assess the association between CMV immunopositivity in sperm donors and sperm quality.

DESIGN:

Retrospective study

MATERIALS AND METHODS:

The study included male sperm donors between November 2007 and December 2017. Group A included donors who tested CMV IgG+ within a month of first donation. Group B included donors who tested IgG- for the duration of all donations. The following sperm parameters were collected at donation: BMI, age, total sperm count (M), total motile sperm (M), average motility (% of total sperm, motile), and average concentration (M/mL). The association between IgG status and donor parameters was calculated with Student's t-tests or Wilcoxon rank-sum tests. The association between IgG status and sperm quality was evaluated using a general estimate equation (GEE) model to account for the repeated donations per donor.



RESULTS:

A total of 1310 sperm donors participated in the study. CMV IgG+ donors (n=394) were compared to CMV IgG- donors (n=916). Demographic factors and sperm parameters at the initial visit are shown (Table 1). CMV IgG status did not affect sperm parameters when accounting for all of a donor’s donations: total sperm count ($\beta=-8.89$, $p=0.16$), total motile sperm ($\beta=-5.79$, $p=0.25$), average motility ($\beta=0.47$, $p=0.36$), and average concentration ($\beta=2.68$, $p=0.18$). Controlling for age and BMI, the effect sizes trended upwards but did not reach statistical significance: total sperm count ($\beta=-10.02$, $p=0.12$), total motile sperm ($\beta=-6.44$, $p=0.21$), average motility ($\beta=0.55$, $p=0.28$), and average concentration ($\beta=2.92$, $p=0.15$).

Table 1: Donor Parameters at Initial Visit

Donor Parameters	Total	CMV IgG+	CMV IgG-	p-value
Age	26 (23,29)	26 (24, 30)	25 (23, 29)	0.002
BMI	24.3 (22.5, 26.1)	24.3 (22.4,26.4)	24.3 (22.5, 26)	0.35
Total Sperm Count (M)	245 (171, 340.2)	232.6 (156, 335.8)	250.4 (177.4, 346.8)	0.02
Total Motile Sperm (M)	183.7 (124.3, 253.4)	173.2 (112.9, 247.5)	186.5 (129, 259.9)	0.02
Average Motility (%)	75 (69, 82)	76 (69, 81)	75 (69, 82)	0.92
Average Concentration (M/mL)	80 (62, 103)	77 (61, 99)	80 (62.5, 104)	0.18

CONCLUSIONS:

This study of sperm donors demonstrated that immunological evidence of prior CMV infection does not significantly correlate with sub-optimal sperm parameters. Reproductive medicine practitioners can be reassured that CMV IgG+ status does not significantly impact sperm parameters when compared to CMV IgG- status.

REFERENCES:

1. Mansat, A., et al. "Cytomegalovirus detection in cryopreserved semen samples collected for therapeutic donor insemination." *Human reproduction (Oxford, England)* 12.8 (1997): 1663-1666.
2. Kapranos, Nikiforos, et al. "Detection of herpes simplex virus, cytomegalovirus, and Epstein-Barr virus in the semen of men attending an infertility clinic." *Fertility and Sterility* 79 (2003): 1566-1570.



AMERICAN SOCIETY FOR
REPRODUCTIVE MEDICINE



3. Naumenko, V., et al. "Detection and quantification of human herpes viruses types 4–6 in sperm samples of patients with fertility disorders and chronic inflammatory urogenital tract diseases." *Andrology* 2.5 (2014): 687-694.
4. Naumenko, Victor A., et al. "Detection of human cytomegalovirus in motile spermatozoa and spermatogenic cells in testis organotypic culture." *Herpesviridae* 2.1 (2011): 7.
5. Mohseni, Majid, et al. "Frequency of cytomegalovirus in fertile and infertile men, referring to Afzalipour Hospital IVF Research Center, Kerman, IRAN: A case-control study." *International Journal of Reproductive Biomedicine* 16.7 (2018): 443.
6. Habibi, Masoud, et al. "Study of cytomegalovirus infection in idiopathic infertility men referred to Shariati hospital, Tehran, Iran." *Iranian journal of reproductive medicine* 12.2 (2014): 151.
7. Eggert-Kruse, Waltraud, et al. "Cytomegalovirus (CMV) infection—related to male and/or female infertility factors?." *Fertility and Sterility* 91.1 (2009): 67-82.