

Herpes Simplex Virus and Cytomegalovirus in Pregnant Chilean University Students¹

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Virus isolation tests were performed during the first, second, and third trimesters of pregnancy on a group of 163 students who received prenatal care at the University of Chile's Student Medical and Dental Service to determine the possible existence of genital herpes or cytomegalovirus infections. Vaginal secretion samples tested for herpes simplex virus (HSV) and urine samples tested for cytomegalovirus (CMV) were inoculated onto cell cultures and examined by immunofluorescent procedures using monoclonal antibodies. HSV was detected in five subjects, only one of whom had herpetic lesions, and was identified as type 2 in all cases. Cytomegalovirus was detected in seven subjects.

It is known that viruses such as rubella virus, hepatitis B virus, human immunodeficiency virus, papilloma virus, herpes simplex virus, and cytomegalovirus have a special relevance for the health of pregnant women and their children (1).

Herpes simplex virus (HSV) and cytomegalovirus (CMV), both members of the family Herpesviridae, are highly prevalent in the general population and can persist in the host after an initial infection, giving rise to recurring symptoms. Both the initial infection and re-

currences caused by these viruses in a pregnant woman can infect the fetus and newborn during pregnancy, delivery, and the postnatal period. Such perinatal infections caused by these viruses can take many different forms—ranging from the asymptomatic pictures more common in the case of CMV infections to the severe syndromes frequently seen in cases of neonatal HSV infection (2, 3).

CMV infection generally occurs during infancy. The virus typically remains in different cells of the organism, giving rise to recurrences that lead to its periodic presence in blood, vaginal secretions, urine, milk, and saliva. As noted above, infection of the fetus or newborn may occur during pregnancy, delivery, or the postpartum period. It is asymptomatic in 90% of the cases but can later result in neurologic, auditory, or ocular complications in 5% to 15% of those infected (4, 5).

Genital herpes infection occurs primarily during active sexual life. Neonatal infection originates when a child passes through a birth canal that is symptomatically or asymptotically infected. Neonatal infection by HSV is generally symp-

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tomatic and grave, producing over 60% mortality (6).

The study reported here sought to determine the proportion of pregnant university students who were excreting HSV or CMV, and who were therefore in a position to transmit these viruses to their children.

MATERIALS AND METHODS

The Study Population

Between June 1988 and December 1989 an investigation was performed to assess the degree of HSV and CMV infection in 163 pregnant university students receiving obstetric care at the University of Chile's Student Medical and Dental Service. This study group included all of the pregnant students receiving obstetric care at the facility who voluntarily agreed to provide samples. Each participant filled out a questionnaire on her sexual life, gynecologic and obstetric history, and history of herpes infection. Tests designed to isolate HSV from vaginal secretions and CMV from urine were performed with samples obtained successively from the study subjects during the first, second, and third trimesters of pregnancy.

Isolation and Classification of HSV

Vaginal secretions to be tested for HSV were obtained from the vulvovaginal area (or from the areas with herpes lesions if such were present) using a sterile cotton swab. The swab was transported in Dulbecco medium with serum and antibiotics at 4°C and was inoculated within four to six hours of procurement onto a single confluent layer of VERO cells. The inoculated cultures were incubated at 37°C and observed daily for a week. If after this period no cytopathic effect was observed, the sample was considered neg-

ative; if there were nonspecific changes, a subculture was done and observed for another week. Any cultures showing a viral cytopathic effect were frozen at -70°C for subsequent classification.

Isolated HSV strains were classified as type 1 or type 2 by means of the direct immunofluorescence technique using the Pathfinder® detection system (Kallestad Laboratory, Austin, Texas, U.S.A.).

Isolation of CMV

Urine samples to be tested for CMV were transported to the laboratory at 4°C and processed within two hours of their procurement. The samples were preincubated with a mixture of antibiotics for 30 minutes. Each was then inoculated onto a human fibroblast cell culture that was maintained for a month at 37°C and was examined periodically for viral cytopathic effects.

Positive isolations were confirmed by means of indirect immunofluorescence using mouse monoclonal antibodies (DAKO-CMV®, Dakopatts, Denmark).

RESULTS

The average age of the 163 study participants was 24.8 years; 93.8% said they were pregnant for the first time. The average age at which the participants said they had commenced sexual activity was 19.4 years. Nearly all (95.1%) said they had had only one sex partner.

Regarding sexually transmitted diseases, 85.4% had no history of them; 7.9% had a history of *Trichomonas* infection, 3.7% of genital herpes, 1.8% of condyloma (venereal warts), 0.6% of syphilis, and 0.6% of chlamydia. Approximately a third of the group (31.9%) had a history of buccolabial herpes.

HSV (type 2 in all cases) was isolated from five (3.1%) of the study participants. Two of the isolations were made

from samples obtained during the first trimester of pregnancy, another two from samples obtained in the second, and one from a sample obtained in the third.

CMV was isolated from seven (4.3%) of the participants, including one from whom HSV was also isolated. These CMV isolations were made from samples obtained during the first trimester of pregnancy in two cases, during the second trimester in another two, and during the third trimester in three.

The remaining 152 pregnant women (93.3%) whose virus isolation tests were negative reported ages for commencement of sexual activity that averaged out to 19.5 years. Of these 152, 48 (31.6%) reported a history of buccolabial herpes, while three (2.0%) had a history of genital herpes.

The five pregnant women (3.1%) who tested HSV-positive reported ages for commencement of sexual activity that averaged out to 17.8 years. Of the five, two reported a history of labial herpes and three a history of genital herpes. Only one of the five women in this group had genital herpetic lesions.

The seven pregnant women whose urine yielded CMV virus reported ages for commencement of sexual activity that averaged out to 19.1 years. In this group, two of the women reported a history of labial herpes and one reported a history of genital herpes.

DISCUSSION AND CONCLUSIONS

In recent years, increasing attention has focused upon herpes infection of pregnant women as awareness has grown of its potentially severe consequences for maternal and child health.

The group of 163 pregnant university students participating in the survey constituted a generally unpromiscuous population. Well over 90% of the study sub-

jects indicated that they had had only one sex partner. Nevertheless, HSV was detected in the vaginal secretions of 3.1% of the subjects, a higher positive percentage than those observed in previous studies of other populations of pregnant Chilean women, where 1% to 2% of the subjects were found to have HSV in their vaginal secretions (7, 8).

In the event it was not due to chance, this difference could be explained by the fact that our research samples were taken from each pregnant woman during the first, second, and third trimesters, a circumstance that could have favored detection of the virus in more subjects. It is also possible (especially considering that the population involved was relatively well-educated) that pregnant women with some kind of genital symptoms would have been particularly likely to have come to the Student Medical Service for consultation, which could have resulted in preselection of potentially positive subjects. Another possibility is that the prevalence of genital herpes infection could have been relatively high within the university student population.

A previous study of herpetic infection in a group of female Chilean university students conducted by the same authors in 1984–1986 obtained positive genital viral isolates from 2.8% (9), indicating a prevalence of genital herpetic infection (28% HSV type 1, 72% HSV type 2) higher than that found among other groups of Chilean women of similar age (10) but lower than that reported by a foreign study conducted among college women where the HSV infection rate was 4.3% (11).

The fact that all the HSV isolated in the present study was type 2 tends to affirm the greater prevalence of this agent in genital herpes infections and its selective advantage for becoming established permanently with periodic recurrence.

Two findings from the present study seem especially relevant: First, only one

of the five pregnant women yielding HSV isolates had genital lesions produced by herpesvirus at the time the sample was taken; the remaining four HSV excreters were asymptomatic. This observation tends to affirm the seriousness of the problem currently posed by inapparent secretions as a source in HSV dissemination. Second, the study findings underscore the importance of a history of genital herpes infection. Specifically, three of the five pregnant women found to be excreting HSV had a history of genital herpes episodes. In this same vein, HSV was isolated from 50% (three out of six) of the study subjects with a history of genital herpes but from only 1.3% (two out of 157) who had no such history. This points up the importance of such medical history data for identifying the group of pregnant women at greatest risk of transmitting HSV to their unborn children. Within this context, it is noteworthy that our previous study of the prevalence of herpes infection among female university students who were not pregnant also detected a significant difference between those testing positive and negative for the virus with regard to a prior history of infection—61% of those yielding HSV but only 3.1% of those found uninfected having had a history of prior genital herpes infection (9).

Regarding CMV infection, the prevalence of 4.3% found by examining urine from the 163 study subjects was lower than prevalences found by studies of pregnant women in the United States, where positive percentages have been reported to range from 5% to 15% (4); and it was also lower than the prevalence of 7.8% found by a prior study of ours concerning pregnant Chilean women with low economic status (12). However, the latter study's results were derived from examination of both urine specimens and samples of vaginal secretions. If the two Chilean studies are compared on the ba-

sis of urine test results alone, the percentages yielding positive results in both studies are similar.

The critical reason for identifying pregnant women excreting HSV in the genital tract is that this permits the adoption of measures directed at preventing neonatal herpes. In a similar fashion, identification of pregnant women with CMV secretions helps to ensure that their newborns are checked for the existence of congenital or perinatal CMV infection, with a view to arranging for periodic follow-up visits that permit the detection and early treatment of any auditory, ocular, or neurologic symptoms. As previously noted, such symptoms afflict 5% to 15% of the children born with asymptomatic congenital CMV infection (13).

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Drugs and Sports

The most recent Olympic Games—which featured the expulsion of several participants who tested positive for banned substances as well as unproved allegations and suspicions of performance-enhancing drug use by some athletes—once again brought to the forefront of public attention the widespread problem of drug use at all levels of sports. Limited surveys of athletes carried out in Australia, Canada, Italy, the United Kingdom, and the United States of America have found that 6% to 20% of those questioned had used some drug, excluding alcohol and tobacco. On average, about 6% had used one or more diuretic, anabolic steroid, or stimulant within the previous year. Anabolic steroid use, which can lead to a host of adverse physical and psychological reactions, is not limited to athletes: evidence indicates that many nonathletes take steroids for cosmetic purposes, often starting as teenagers.

In recognition of this problem, the World Health Organization has begun a preliminary cross-cultural research project with the goal of developing substance abuse prevention and education materials. The objectives of the research project include defining drug use patterns associated with different types of sports, identifying critical health and social problems caused by athletes' use of drugs, and cataloguing current national and international drug abuse prevention policies and strategies.

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