

Serological screening for Herpes simplex virus during pregnancy

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Summary: 620 pregnant women living in the Province of Padua were submitted to serological screening for Herpes simplex virus antibody activity. A prevalence of 82.26% was found in the population; the Authors discuss the significance of the findings with special regard to relevant obstetric questions.

INTRODUCTION

Herpes simplex viruses (HSV) play an important role in human diseases worldwide, as a cause of various neurologic syndromes and of localized or disseminated diseases, particularly in the newborn and the immunologically defective (^{3, 28}), as a common venereal disease, as a synergic or associated factor in the etiology of carcinoma of the cervix and of the vulva (²¹), and as a possible cause of abortion and birth defects (²⁶).

In pregnancy, the greatest risk concerns genitally localized HSV infection because of its potential for infection of the foetus at birth, while passing through an infected birth canal or during prolonged rupture of membranes (> 4 hours) (^{16, 23}).

Both initial and recurrent genital HSV infections, in the face of demonstrable le-

vels of serum antibodies (^{16, 23}), and symptomatic or asymptomatic episodes may be associated with vertical transmission of HSV (^{11, 19}).

Despite the higher prevalence seen in lower income groups (^{3, 22, 35}), infection affects at all socio-economic levels. Recent reports from the USA highlight a progressive increase of new cases among white middle-class women (^{29, 34}) and a rise in the incidence of genital HSV infection in western populations (^{4, 5, 10}).

In view of the importance of Herpes viruses in both serious neonatal and various adult diseases, an opportunity was taken to investigate antibodies to HSV type 1 and type 2 in the sera of a representative sample of pregnant women, initially collected for the assessment of their pregnancies.

The purpose of the present inquiry has been to provide information of general value on the obstetric population distribution of HSV antibodies.

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MATERIAL AND METHODS

620 women in the seventh month of pregnancy attending the Out-patient Department of Obstetrics and Gynecology of the University of Padua during the study period September 1989 - September 1991 were submitted to serological tests aimed at ascertaining Herpes simplex virus antibodies.

In most of the cases the serologic status of the subjects in relation to the major infectious diseases relevant to Obstetrics was also available.

All the pregnant women (467 primogravidae, 153 plurigravidae) were born in the Veneto Region and resident in the Province of Padua. Ages ranged from 17 to 43 years, the average age being 28 years. The patients belonged to a middle and middle-to-upper socio-economic population.

The anamneses were negative for blood transfusions, hemodialysis and organ transplants.

Antibodies represent prior exposure to either HSV type 1 or type 2; the test used for the HSV antibodies detection was the "Yenzygnost" of the Bekring Institute (ELISA).

The statistical analysis of the results was carried out using the chi-square test.

RESULTS

510 subjects out of 620, equal to 82.26% (83.30% of the 467 primogravidae and 79.08% of the 153 plurigravidae) were HSV antibody positive, with a stable prevalence in the age ranges considered (Table 1, Figure 1).

Parity also does not appear to account for prevalence either (Table 2).

Available data of the serologic status of the subjects in this study in relation to the major infectious diseases relevant to Obstetrics are shown in Table 3.

Table 1. — HSV antibodies in individuals of varying age groups.

Age	No. subjects	No. with HSV antibodies
<26 yrs	129	106
26-30 yrs	303	251
>30 yrs	188	153
Total	620	510

P = n.s.

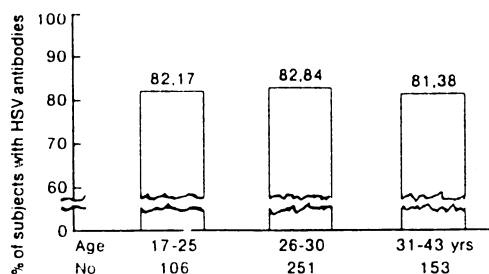


Fig. 1. — Per cent distribution of HSV antibodies in 510 individuals of varying age groups.

DISCUSSION

Previous Authors (^{3, 22, 24, 25, 35}), showed the influence of socio-economic conditions on the prevalence of Herpes virus hominis antibodies. In this survey no attempt has been made to classify the patients on a socio-economic basis, although it was thought that sera were from subjects of a mainly homogeneous group.

Apart from the difficulty of evaluating the background of the group included in a survey such as this, there are obvious difficulties in comparing the results of surveys carried out in different parts of the world, at different times, using a variety of antigens and techniques to estimate antibodies, employing different age groupings. In this study-emphasis was placed on the childbearing age in view of the interest to Obstetrics.

The overall rate for HSV (Type 1 and 2) antibody prevalence in Padua was 82.26 per cent, which seems to occupy a high position when compared with those reported for other areas (^{1, 7, 10, 11, 12, 14, 18, 23, 24, 33, 35, 36, 37}), Table 4).

When data were analyzed by age grouping, no rise in prevalence of antibodies to HSV was found (P=n.s.): it seems likely that factors more strictly related to prevalence rate (that is, factors of crowding (²⁵) and sexual behaviour (^{1, 14, 20, 23, 30})) had already been influential at an earlier age.

Table 2. — *HSV antibody prevalence in relation to parity.*

No. pregnancies	HSV antibody positive		HSV antibody negative		Total	
	No.	%	No.	%	No.	%
0	389	83.30	78	16.70	467	100
≥1	63	76.83	19	23.17	82	100
Abortions *	58	81.69	13	18.31	71	100
Total	510	82.26	110	17.74	620	100

P = n.s.

(*) Induced or spontaneous.

Table 3. — *Serologic status in relation to relevant obstetric infections.*

	Rubella	Toxo plasmois	Syphilis	Hepatitis (HbsAg)	HIV	CMV	HSV
Pos.	532 (95.51%)	233 (39.29%)	0 (0%)	2 (0.37%)	0 (0%)	472 (76.13%)	510 (82.26%)
Neg.	25 (4.49%)	360 (60.71%)	552 (100%)	541 (99.63%)	513 (100%)	148 (23.87%)	110 (17.74%)
Data lacking	63	27	68	77	107	0	0
Total	620	620	620	620	620	620	620

Similarly previous pregnancy does not appear to account for an increase, since no statistically significant differences were found between the PARA-specific rates for prevalence of HSV antibodies (P = n.s.).

There have been reports from the United States, the United Kingdom and the Scandinavian countries noting an increase over the years of genital Herpes and/or neonatal Herpes^(7, 25). Though which factors influence geographic differences in disease incidence is still not completely clear.

In contrast to these reports, we failed to observe any increase in either genital (Minucci, manuscript in preparation) or neonatal Herpes (no discharge from the Dept. of neonatology with such a diagnosis) over a five year period, from 1986 to 1991 (our Obstetric Department has 1500 deliveries a year).

On the ground of our results, which show a comparatively high prevalence and a lack of age rise in the groups, it may be assumed that immunity (mostly represented by HSV type 1) is acquired in this very population at an early age and may then determine a reduction of symptoms and signs of possible consequent genital Herpes (even if caused, as usual, by HSV type 2⁽¹⁷⁾), thus reducing the number of clinical consultations.

As regards the newborn, the majority of the most serious infections are caused by HSV type 2⁽¹⁹⁾, the mother's birth canal being the source of infection. But if the mother has had type 1 infection previously when she contracts type 2, the shedding of virus is somewhat less intense⁽⁸⁾. Moreover, in secondary, in recurrent and in asymptomatic infections in the mother, the infectivity is lower^(6, 13, 15, 31) because viral excretion is less frequent, less intense and of shorter duration^{(8, 9, 11, 19, 31,}

Table 4. — *HSV antibody prevalence in different Countries.*

Location	No. of subjects studied	HSV antibody prevalence	Study population	
Italy, all geographical regions, 1987	1166	85%	recruits	HSV-1
Edinburgh, U.K., 1967	395	76%	general population	HSV-1&2
Birmingham, U. K., 1982	18	89%	pregnant women	HSV-1
Copenhagen, Denmark, 1988	170	81%	pregnant women	HSV-1
Stockholm, Sweden, 1983	1759	32%	pregnant women	HSV-2
Atlanta, Georgia, 1970	120	75%	pregnant black women lower socio-ec.	HSV-1&2
Seattle, Washington, 1971	777	65%	women of childbearing age, white	HSV-1
Birmingham, Alabama, 1983	1170	68%	women, white middle class	HSV-1
Madison, Wisconsin, 1985	147	47%	general population white	HSV-1&2
Houston, Texas, 1985	230	34% 12%	women of childbearing age, white middle class	HSV-1 HSV-2
3 cities, USA, 1990	1093	44%	university students male & female black & white	HSV-1&2
Pittsburgh, Pennsylvania, 1990	4527	67%	women of childbearing age	HSV-1&2
Santiago, Chile, 1986	461 371	97% 88%	pregnant women lower socio-ec. middle class	HSV-1 HSV-1

³²⁾. The infant has also some protection through the high level maternal antibody activity passively transferred (^{2, 8, 31}).

We may therefore consider HSV infection to be a low risk factor in our obstetric population, since the prospective possibility for transmission from a silent excretion is relatively reduced.

CONCLUSIONS

The Padua results, with age and parity specific rates, based on more than 600 sera, provide information on the prevalence of HSV infection in a middle-to-upper-class white population of pregnant women. Such information should not only

contribute to an understanding of the epidemiology of infection in a group with these characteristics, but should be useful as a base line on which to compare rates from segments of the population whose experience with these infections might be different.

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