

**SUBACUTE SCLEROSING PANENCEPHALITIS  
IN IRAN**

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**ABSTRAC.** Subacute sclerosing panencephalitis (SSPE) was observed in a relatively high incidence in Iran . During last 10 years from 1975 to 1984, 200 cases were diagnosed as SSPE in Tehran. History records of these patients were analyzed. The age at the onset of SSPE in 88 cases ranged from 3 to 25 years with a mean of 10.8 years. The ratio of numbers of male patient to female patient was 2.7:1. The time of natural measles infection was available for 31 patients:22 (71%) of these patient suffered from natural measles before their second birthday . The interval between the measles infection and the onset of SSPE in these 31 cases ranged from 2 to 22 years with a mean of 8.8 years. Of the 200 patients, only 2 patients had a history of vaccination with live attenuated measles virus 4 or 5 years before the onset of SSPE. Hemagglutination inhibitig (HI) antibody titers to measles virus were determined with serum and cerebrospinal fluid (CSF) samples from 110 patients. HI titers of the sera ranged from 45 to 16,384 and those of the CSF from 2 to 1,024 . Serum HI titers of individual patients showed a positive correlation with their CSF HI titers. Measles HI antibody was detected in the saliva from 48 patients (71.6%) of 67 Patients tested. HI titers in the saliva ranged from 1

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to 128.

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MEASLES VIRUS

## **INTRODUCTION**

Subacute sclerosing panencephalitis (SSPE) is relatively common in Iran, From 1975 to 1984, 200 cases were diagnosed as SSPE in Tehran. History records of these patients were analyzed. Since there were controversial views regarding the influence of immunization with measles vaccine on the occurrence of SSPE,<sup>5,7,9)</sup> it appeared interesting to investigate association of SSPE with measles vaccination. Samples of serum and cerebrospinal fluid were collected from some of the patients and tested for hemagglutination-inhibiting (HI) antibody titers against measles virus. Saliva was also collected and tested for measles HI antibody, as previously we detected measles antibody in the saliva from SSPE patients.<sup>3)</sup>

## **MATERIALS AND METHODS**

### **Patients**

Most of the SSPE patients studied were hospitalized in Dr. Shariaty University Hospital and some of them in two other hospitals, Imam Khomeini and Center of Children Diseases. These hospitals received patients from Tehran City (population over 10 millions) and nearby towns and villages. These patients, 200 in total, were diagnosed clinically and by electroencephalography. We obtained history records of the patients including histories of measles infection and vaccination. However, many of the

history records were incomplete and data available for the analysis were limited.

#### Hemagglutination-inhibition (HI) test

HI antibodies against measles virus were assayed in microplates by the method of Rosen.<sup>8)</sup> The serum sample for HI test was treated with Kaolin to remove nonspecific inhibitors, whereas the samples of cerebrospinal fluid (CSF) and saliva were not treated. The saliva was collected with a pipette. The HI antibody titer was expressed by the reciprocal of the highest dilution which showed complete inhibition of hemagglutination with 4 units of hemagglutinin.

## RESULTS

### Analysis of history records

The age and sex distributions of 88 patients are shown in Table 1. Their ages at the onset of SSPE ranged 3 to 25 years with a mean of 10.8 years. The ratio of the numbers of male patient to those of female patient was 2.7:1.

The age at natural measles infection was available for only 31 patients. As shown in Table 2, 22 (71% of these patients suffered from measles infection before their second birthday. The interval between the measles infection and the onset of SSPE in these 31 patients ranged from 2 to 22 years with a mean of 8.8 years (Table 3).

Of the 200 patients, only 2 patients had a history of vaccination with live attenuated measles virus. In the first case the mother was not sure of the time of vaccination of her child. However, the interval between the

vaccination and the onset of SSPE was probably 4 or 5 years. The child had no natural measles. In the second case the parents positively confirmed vaccination of the child at the age of one year and were certain that the child had no natural measles. The onset of SSPE was 5 years after the vaccination. The remaining 198 patients had suffered from natural measles mostly before their second birthday.

#### HI titers to measles virus

HI titers to measles virus were determined with serum and CSF samples from 110 patients. The serum and CSF samples were taken simultaneously from each patient. The results are illustrated in Fig.1. HI titers ranged from 45 to 16,384 with serum samples and from 2 to 1,024 with the CSF samples. HI titers of the serum samples were much higher than those of the CSF samples. Serum HI titers of individual patients showed a positive correlation with their CSF HI titers.

Saliva was collected from 67 patients and tested for HI titers to measles virus. As shown in Table 4, HI antibodies were detected in 48 (71.6%) patients of the 67 cases. The HI titers ranged from 1 to 128.

**Table 1. Age and Sex Distributions of SSPE Patients**

Age (years)	Sex		Total
	Male	Female	
3	2	0	2
4	2	0	2
5	2	0	2
6	3	3	6
7	7	0	7
8	9	4	13
9	4	2	6
10	4	3	7
11	5	2	7
12	7	3	10
13	4	1	5
14	3	3	6
15	4	0	4
16	1	0	1
17	2	2	4
18	1	0	1
19	3	0	3
20	0	1	1
25	1	0	1
Total	64 (72.2%)	24 (27.3%)	88 (100%)
Average age(yr.)	10.6	11	10.8

**Table 2. Age at Time of Measles infection of SSPE patients**

	Age in years						Total
	<1	1	2	3	4	5	
No. of cases	3	11	8	4	4	1	31

**Table 3. Interval between Measles Infection and Onset of SSPE**

	Interval in Years					Total	Average (years)
	2-4	5-7	8-10	11-14	15-22		
No. of cases	5	6	10	8	2	31	8.8

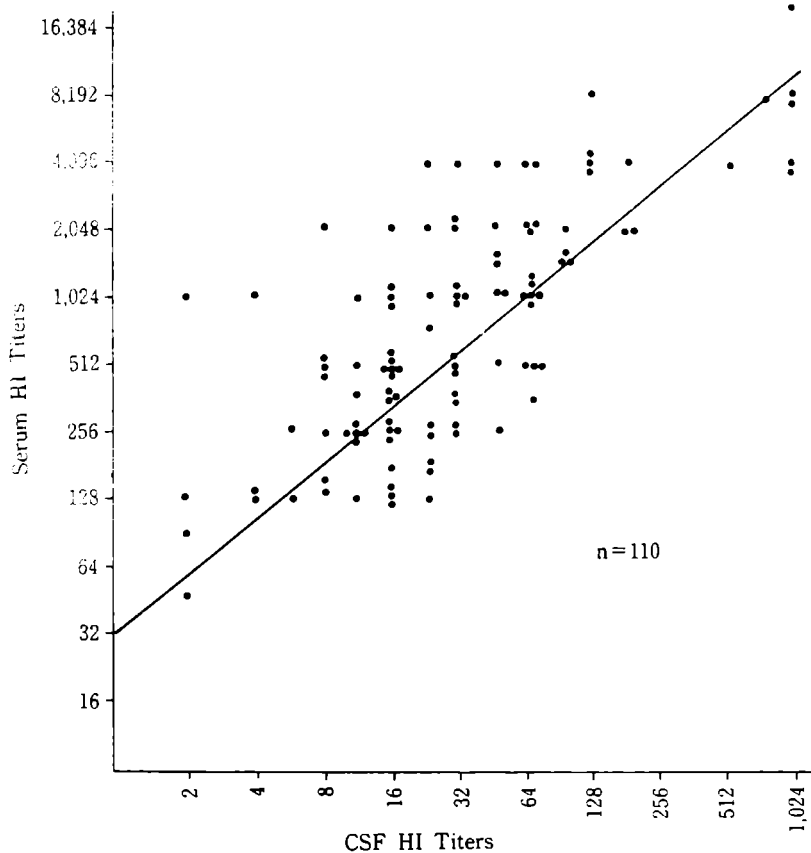


Fig. 1. Correlation of Measles HI Antibody Titers of Serum and Cerebrospinal Fluid (CSF) in Individual SSPE Patients.

Table 4. Measles HI Antibody Titer in Saliva of SSPE

HI Titer	No. of Cases
Negative	19
1	4
2	10
4	8
8	9
16	7
32	7
64	2
128	1
Total	67
Positive %	71.6%

## DISCUSSION

In the present study on 200 cases of SSPE, the disease hardly could be attributed to measles vaccination, but was clearly associated with natural measles infection. Out of the 200 patients studied only two cases had a history of measles vaccination 4 or 5 years before the onset of SSPE, and the remaining 198 cases had natural measles infection before the onset of SSPE.

In the United States of America only one case of suspected SSPE occurred within one month after measles vaccination over the period from 1963 to 1971. Another suspected case was observed in this country in 1973 in a child who had a history of measles vaccination 5 years earlier.<sup>2)</sup> On the other hand, the data from the SSPE registry in the United States have shown the disease to be on a trend of consistent decrease.<sup>1,4,5)</sup> Sever<sup>9)</sup> speculated that this decrease in the occurrence of SSPE may be resulted from the widespread use of measles vaccine.

In the other countries, however, the decrease of the disease following measles vaccination has not been so evident. In Slovakia, for example, 5 notified cases were in children who had received one or two doses of live measles vaccine.<sup>7)</sup> Data from 4 other countries show that in 2 to 30% of SSPE cases the disease may follow measles vaccination with no history of natural measles.<sup>6)</sup>

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## REFERENCES

- 1- Bellman, M.H. and Dick, G.: Register of cases of subacute sclerosing panencephalitis. *Med. J.*, 1:430-431, 1977.
- 2- Cho, C.T., Lansky, L.J. and D'Souza, B.J.: Panencephalitis following measles vaccination. *J. Amer. Med. Assoc.*, 224: 1299, 1973.
- 3- Derakhshan, I., Mirchamsy, H. and Shafiyi, A.: Subacute sclerosing panencephalitis. Immunological findings in saliva and salivary glands, *Neurol.*, 18:79-83, 1979.
- 4- Gilden, D.H.: Slow virus diseases of the CNS. 1. Subacute sclerosing panencephalitis, progressive rubella panencephalitis and progressive multifocal Leukoencephalopathy. *Postgrad. Med.*, 73: 99-118, 1983.
- 5- Hinman, A., Kirby, C.D., Eddin, D.L., Orestein, W.A., Bermier, R.H., Turner, P.M. and Bart, J.K.: Elimination of indigenous measles from the United States. *Rev. Inf. Dis.*, 5: 538-545, 1983.
- 6- Jalbut, S.D. and Hadda, F.S.: First International Symposium on subacute Sclerosing Panencephalitis (SSPE). P.72, Beirut, Lebanon, 1983.
- 7- Mitroga, E., Buc, M., Hatiaroa, Z., Benko, J. and Perkarek, I.: First International Symposium on Subacute Sclerosing Panencephalitis (SSPE), P.70, Beirut, Lebanon, 1983.
- 8- Rosen, L.: Hemagglutination and Hemagglutination-inhibition with measles virus. *Virology*, 13:139-141, 1961.
- 9- Sever, J.L.: Persistent measles virus infection of the central nervous system. *Rev. Infec. Dis.*, 5: 467-473, 1983.