

## Aneurysmal Subarachnoid Hemorrhage in Izumo City and Shimane Prefecture of Japan. Seasonal Variation.

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### ABSTRACT

During the five year period from 1980 to 1984, 83 patients with aneurysmal subarachnoid hemorrhage (SAH) were hospitalized in Izumo City and 548 patients in Shimane Prefecture. The seasonal variation in the onset of aneurysmal SAH in both areas was investigated. The number of patients with aneurysmal SAH was great in January, May, October and December, while small in April, June and July. No association could be demonstrated between the incidence of aneurysmal SAH and the mean ambient temperature or humidity. The incidence of aneurysmal SAH in this area may therefore be slightly higher in winter, but its seasonal variation does not appear to be so evident as other types of stroke such as hypertensive intracerebral hematoma.

**Key words:** *Subarachnoid hemorrhage, Cerebral aneurysm, Seasonal variation*

During the five year period from 1980 to 1984, the incidence of subarachnoid hemorrhage (SAH) only due to rupture of aneurysms was investigated in Izumo City having a population of 79,026 and Shimane Prefecture which includes Izumo City and has a population of 789,712<sup>2,3)</sup>. The crude annual incidences of aneurysmal SAH in Izumo City and Shimane Prefecture were 21.0 and 13.9 per 100,000 population for all ages and the age adjusted annual incidences to the 1980 population of Japan were 18.3 and 11.0 per 100,000 for all ages, respectively<sup>2)</sup>.

In the present study, we studied the seasonal variation in the onset of aneurysmal SAH in Izumo City and Shimane Prefecture.

### MATERIALS AND METHODS

Izumo City is located in the northeastern part of Shimane Prefecture which is long from east to west with the Sea of Japan on the north and Chugoku Mountain on the south. The former covers an area of about 175 square kilometers and the latter has an area of approximately 6,628 square kilometers. Shimane Prefecture has four major hospitals having a neurosurgical department, that is, Shimane Prefectural Central Hospital with 665 beds, Shimane Medical University Hospital with 616 beds, Matsue Red Cross Hospital with 750 beds and

Matsue Municipal Hospital with 511 beds. In Shimane Prefecture as a whole, the majority of patients suffering from SAH are transferred to the neurosurgical department of one of the foregoing four hospitals. The cases of the present study comprise patients suffering from SAH due to ruptured intracranial aneurysm who were admitted to the neurosurgical department of one of the four hospitals during the five year period from 1 January 1980 to 31 December 1984. During this period, a total of 83 aneurysmal SAH patients were hospitalized in Izumo City and 548 patients in Shimane Prefecture. The seasonal variation in the onset of aneurysmal SAH was investigated in both areas.

### RESULTS

Figure 1 shows the seasonal variation of aneurysmal SAH in Izumo City and Shimane Prefecture. The number of patients in each month is plotted against average monthly temperatures and humidities in Izumo City for 5 years from 1980 to 1984. In both areas, the number of aneurysmal SAH was great in January, May, October and December, and small in April, June and July. An association between the incidence of aneurysmal SAH and the mean ambient temperature or humidity could not be observed.

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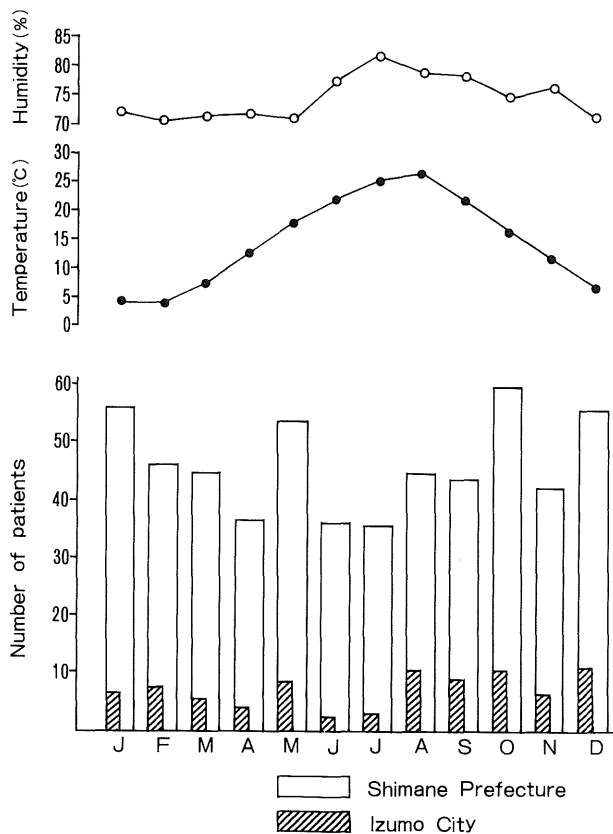


Fig. 1. Month by month incidence of aneurysmal subarachnoid hemorrhage in Izumo City and Shimane Prefecture compared with mean monthly temperatures and humidities in Izumo City.

### DISCUSSION

Up to the present, few studies on the seasonal or diurnal variation in the occurrence of aneurysmal SAH have been reported<sup>4,7</sup>. Diurnal variation in blood pressure has been well described<sup>5,6</sup>. The lowest blood pressures are observed between 0200 and 0600 hours and the highest blood pressures at 1000 to 1200 with the second diffuse rise in pressure occurring at 1600 to 2000. Tsementzis et al<sup>8</sup> have reported that SAH increased in frequency as the blood pressure rose early in the morning, but had a second peak at 1800 to 2000 hours. Komatsu et al<sup>4</sup> also observed a bimodal distribution in occurrence of aneurysmal SAH with peaks at 0700 and 1800.

Seasonal variation in stroke has been usually studied in relation to the average monthly temperatures<sup>1</sup>. In general, not only the incidence but also the mortality rate in stroke are higher in winter<sup>1,9</sup>. Komatsu et al<sup>4</sup> have cited that the occurrence of ruptured intracranial aneurysms was apt to be frequent in winter and infrequent in summer in Tohoku district. On the other hand, Takara et al<sup>7</sup> reported that seasonal changes, especially in temperature and humidity, were not major factors for the rupturing of intracranial aneurysms in Okinawa Prefecture.

In the present study, the number of patients with

aneurysmal SAH was great in January, May, October and December, while small in April, June and July. No association could be observed between the incidence of aneurysmal SAH and the mean ambient temperature or humidity. Thus, the incidence of aneurysmal SAH in Izumo City and Shimane Prefecture may be slightly higher in winter, but its seasonal variation may not be so evident as other types of stroke such as hypertensive intracerebral hematoma.

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