

Organization's MONICA (Monitoring of Trends and Determinants in Cardiovascular Disease) (4) projects. These define a stroke as a sudden onset of neurological symptoms, which continue for a minimum of 24 h or result in death. Early case fatality was defined as patients who died within 28 days of the onset of a stroke event. The diagnosis of stroke type was based on clinical symptoms as well as computed tomography (CT) scans. A cerebral infarction was defined as a region of low-density absorption on a CT scan. An intracerebral hemorrhage was defined on the basis of a region of high-density absorption in the causal region due to a hematoma as shown on a CT scan. A subarachnoid hemorrhage was defined on the basis of a region of high-density absorption in the cerebrospinal fluid due to a hemorrhage as shown on a CT scan. Patients who satisfied clinical symptoms of acute stroke but whose type of stroke could not be determined based on clinical signs and/or CT scan results were labeled having as unclassified stroke. Cerebral infarction was classified as either cerebral thrombosis or cerebral embolism.

Items recorded at the registration of a stroke were:

- the date and time of the event,
- the situation and symptoms during the event,
- the extent of neurological symptoms during the event,
- clinical observations during the event (e.g., blood pressure, presence of fibrillation, level of consciousness, impairment of neurological function),
- past medical history,
- family medical history,
- smoking history,
- alcohol use,
- early (within one week) rehabilitation,
- fatality (within 28 days),
- cause of death,
- recurrence in acute stage, and
- CT scan observations.

On admission to hospital, patients were also examined for abnormal lipids and kidney function. Items investigated in the CT scan were the size of regions of low-density absorption in association with cerebral infarction, and the size of regions of high-density adsorption in

Table 2 Stroke cases within the Takashima Stroke Registration System area, Takashima County, Shiga, Japan (1988–2002)

Characteristics	Stroke cases
<i>Registered stroke cases</i>	1750
Total	
Men	937 (53.5%)
Average age of men	69.4 years
Women	813 (46.5%)
Average age of women	74.4 years
Up to 64 years	434 (24.8%)
65 years and older	1316 (75.2%)
<i>Stroke subtype</i>	
Cerebral infarction	1177 (67.3%)
Intracerebral hemorrhage	380 (21.7%)
Subarachnoid hemorrhage	167 (9.5%)
Unclassified	26 (1.5%)

association with cerebral hemorrhage. Cerebral angiography was used to investigate cerebral aneurysms and anomalies in the cerebral venous system, and secondary cerebral infarctions associated with subarachnoid hemorrhage.

Registered events

The Takashima Stroke Registry is an ongoing disease registry that has been compiling stroke cases since 1988. A total of 1750 (53.5% men and 46.5% women) cases have been recorded in the registry as of 2002. The majority of the stroke cases were of infarction type (67.3%), followed by hemorrhagic type (21.7%), of stroke. Table 2 shows the stroke cases of Takashima Stroke Registration System by gender, age, and sub-type.

Comprehensiveness

The comprehensiveness of the registration system for cardio-cerebrovascular diseases such as stroke is essential to determine the incidence and trends in a particular area (4, 5). A system to capture all patients in the study area, together with an accurate diagnosis, is required to ensure the comprehensiveness of the registration (6, 7). Factors that reduce the comprehensiveness of a register include missing cases or cases lacking a confirmed diagnosis, patients being admitted to hospitals outside the registration area,

and non-registration. The quality of our registration system was assured by its completeness. Our registry system was planned to capture all the cases in the study area by covering all the hospitals of the county. It has been estimated that more than 98% of all hospital admissions of Takashima County are seen in these institutions (2). To ensure that eligible patients hospitalized outside the county were not omitted, registration procedures were also conducted at three high-level medical facilities outside the county.

In Japan, almost 100% of residents are covered by health insurance under the control of the Ministry of Health and Welfares (2, 8). Therefore, people with mild stroke who visited general physicians in the community are almost always referred to secondary- or tertiary-level hospitals for extensive investigations. In addition to this, a 24 h, round-the-clock emergency ambulance service is available for all residents without charge. The usual practice in Japan is to take patients with any acute disease conditions to emergency facilities. Thus, we believe that few patients would be left out of our registration system.

Most of the stroke cases in Japan are referred to hospitals for admission and CT scans are performed on more than 90% of the admitted cases, even in rural areas (2, 9). The strength of this study is the accuracy of the diagnostic investigations, which allows almost complete

categorization of stroke sub-type. The two major hospitals in Takashima County both have CT facilities. Therefore, we believe that identification of stroke cases within the study area was almost complete and stroke diagnosis and classification was accurately recorded.

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