Recent Trends in the Epidemiology of Intracerebral Hemorrhage

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Stroke was the leading cause of death from 1951 to 1980 in Japan, but was overtaken by neoplasia in 1981, and is currently the fourth leading cause of death. Cerebral hemorrhage was the major subtype of stroke from 1950 to 1970, but by 2009, 75% of stroke patients suffered cerebral infarction and only 17.8% suffered cerebral hemorrhage, according to the Japan Stroke Data Bank. Recent chronological changes in both the locations of cerebral hemorrhage and contributing risk factors in Japan are well described in a paper in this issue of the Journal entitled “Trends in the incidence and survival of intracerebral hemorrhage by location in a Japanese community: the Hisayama study” by Gotoh et al.

In Japan, mortality from stroke has declined continuously from the 1960s to the 2000s, and this in turn has resulted in increased longevity of the population. Nationwide efforts to prevent and control hypertension have contributed to the substantial decline in stroke mortality in Japan. On the other hand, recent increases in the prevalence of dyslipidemia and diabetes mellitus are contributory risk factors for ischemic stroke and ischemic heart disease.

There are geographic and racial variations in the incidence of
Chronological changes in cardiovascular risk factors were examined in 5 study cohorts (1st cohort 1961, 2nd cohort 1974, 3rd cohort 1983, 4th cohort 1993, 5th cohort 2002) in the Hisayama study. The prevalence of glucose intolerance, hypercholesterolemia and obesity increased progressively with time. The proportion of current smokers in both sexes and that of male drinkers declined linearly over the cohorts. The prevalence of severe hypertension also significantly decreased.

The effect of blood pressure on the different types of stroke was also examined in the Hisayama study. The age-adjusted incidence of total stroke rose progressively with increasing blood pressure levels in both sexes. A similar pattern was observed for lacunar infarction in both sexes and for ICH in men.

There has not been a previous population-based study concerning secular trends in the incidence of ICH by geographic location. The recent Hisayama study showed that the incidence of putaminal hemorrhage decreased steadily, mainly in subjects aged 60–69 years, whereas the incidence of thalamic hemorrhage increased, especially in those aged over 70 years. Both hypertension and alcohol intake were strong risk factors for ICH in the first cohort, but their influence declined with time. The incidence of thalamic hemorrhage has shown an increasing trend, especially in the elderly, in recent years. In contrast, a decreasing incidence of putaminal hemorrhage was observed. The etiology of thalamic hemorrhage is unclear, but several mechanisms, including aging-related changes, might be implicated. Further investigations are needed to clarify the true mechanism.

These days, oral antiplatelet and anticoagulant therapies are widely used to prevent atherosclerotic and atheromatous disorders. A cohort study involving patients with atrial fibrillation showed that Asians had a 4-fold greater risk of ICH than primary intracerebral hemorrhage (ICH). In a consecutive series in the National Institute of Neurological and Communicative Disorders and Stroke (NINCDS) Data Bank, primary ICH accounted for 10.7% of deaths in the United States in 1984. Similar values were obtained in population or community studies from Denmark (10%) in 1977, Holland (9%) in 1980, Oxfordshire, England (10%) in 1990 and Italy (13.5%) in 2009. However, most Asian countries, except for Japan, have higher age-adjusted mortality from cardiovascular disease (Figure 1). As shown in Figure 2, the influence of high blood pressure was stronger for hemorrhagic stroke than for ischemic stroke and cardiovascular disease. These associations are stronger in Asian populations than in Oceanic populations. Since the 1960s, there has been a general trend toward declining incidence of cerebral hemorrhage in European countries. A similar decline subsequently occurred in the United States. Furlan et al noted a significant decrease in incidence between the first and second parts of this period: 13.3% per 100,000 for 1945–1960 and 6.7 per 100,000 for 1961–1976. These data correlated with a similar decline in the frequency and severity of hypertension. A similar declining trend in the incidence of ICH has been found in Hisayama, Japan, and this was similarly related to a decline in the frequency of hypertension.

The Hisayama study was a prospective cohort study of cardiovascular disease conducted in the town of Hisayama, Japan. During the study period, 93% of first-ever stroke patients underwent morphological examinations by autopsy and/or brain imaging, and more than 80% of surviving patients participated in repeated follow-up examinations. The incidence of ICH steeply declined by 61% from the first to the second cohort in men only, and then remained unchanged for both sexes in the third cohort.

![Figure 2. Multivariable-adjusted hazard ratios for the development of cardiovascular disease according to blood pressure categories in Asian and Oceanic populations.](image-url)
Caucasians. Toyoda et al reported that prior medication with antiplatelet agents, warfarin, or both was predictive of cerebellar hemorrhage, hematoma enlargement and early death in Japanese ICH patients. The excess risk of hemorrhagic stroke is particularly high in patients receiving dual antiplatelet therapy, or a combination of antiplatelet and anticoagulant therapies and in the 1st year after stroke/TIA. An increase in blood pressure levels during antithrombotic medication was positively associated with development of ICH. We should examine the effect of antithrombotic agents on the incidence of ICH in a future large cohort study. Future research should also focus on the effect and management of hypertension, the use of antithrombotics and aging-related changes in patients with ICH, because there may be differences depending on the underlying vessel disease.

References