Epidemiological Study of Cerebral Apoplexy and Ischemic Heart Disease in Japan

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From a total of 670,372 deaths in 1966, 267,744 (40%) were caused by diseases of the circulatory system including cerebrovascular disease (CVD) and various heart diseases. 172,186 (26%) deaths were from CVD and 55,102 (8%) from ischemic heart disease.

This is to introduce some of the research projects in process. The cooperation studies performed have been: “Study on the standardization of diagnostic techniques in circulatory disease,” “Study on the environmental factors in the development of hypertension,” “Study on the prediction of apoplexy and cardiac attacks” and others.

On the Prediction of Occurrence of Cerebro-cardiac Accidents

In 1967, the Association with the support of the Welfare Ministry performed a “Study on diagnostic techniques in circulatory disease” and from this study, standardized criteria for examination of blood pressure, urine, eye-fundus and electrocardiogram were established. By using this criteria, a “Study on the prediction of cerebro-cardiac attacks” was performed. The duration of study was 3 years (1965–1967). The cerebral accidents totalled 676. Two hundred and seventy-three were caused by hemorrhage and 252 by infarction (109 by thrombosis, 18 by embolism and the remaining not clearly certified). The cardiac accidents totalled 126, the categories were:

(A) Myocardial infarction characterized by an apparent clinical attack and typical change in ECG,
(B) Apparent infarction attack clinically but without definite abnormal Q in the ECG,
(C) No apparent attack clinically but with a definite abnormal Q in the ECG,
(D) Acute cardiac death was defined as those expiring within 10 minutes after onset of an attack.

As to the control group, data from healthy matched in sex and age with a ratio of 1 diseased person to 2 healthy controls were gathered. Some of the relative risks revealed by this study will be reported.

The Figure shows the relative risk according to systolic blood pressure as divided into 4 groups, namely those under 140, from 140–160, 160–200 and above 200. The risk of a hypertensive patient with a systolic blood pressure over 200 having a cerebral hemorrhage is 13 times that of those with a blood pressure under 140. The risk of those between 160–200 is 8 to 9 times and from 140–160 is 4 to 5 times more than those under 140. In cerebral thrombosis, for those over 200 the risk is 11 times more, for the 160–200 group is 9.5 times and less than 3 times for those between 140–160. This is the tendency not observed in the cardiac cases.

The stages were divided into 5 in studying the relative risk from the standpoint of diastolic blood pressure. If below 84 is considered as 1, for those over 115 in cerebral hemorrhage, it is approximately 12 times more and in cerebral thrombosis 14 times more. No difference was observed in the cardiac.

The relative risk for those with past history of hypertension is 5 times more in cerebral hemorrhage, 2 times more in cerebral thrombosis and 2 times more in cardiac accidents.

Among subjective complaints, the anginal attack expressed as “Tightness of Chest” was 3 times more in cerebral hemorrhage and over 8 times in cardiac accidents.

In the ECG finding, where the Q-QS change appeared, the relative risk for both cardiac acci-
dent and cerebral infarction were high. There was no difference observed in cerebral hemorrhage. There was some tendency of a high R wave appearing in cerebral hemorrhage and cerebral accident. The relative risk is high with ST-T change in all cerebro-cardiac accidents.

In the eye fundus, the risk was somewhat high for cerebral apoplexy for those with narrowing of the retinal arteries. The risk with the crossing phenomenon was high in cerebral accidents. The risk mentioned indicates the importance of examination findings in prediction of cerebral and cardiac accidents.

**Study on some environmental factors influencing the development of circulatory diseases**

As a nutritional problem, a comparison was made on the average value of cholesterol according to sex, age and region. In both sexes, the cholesterol value was high in Osaka which is a typical urban district. In other rural districts, the cholesterol value was low in general. On a national level, the cholesterol value is generally low.

As for the intake of staple food, the consumption of rice per person is 371 g daily in Osaka, 453 g in Akita. The farmers consume 624 g in Osaka and 712 g in Akita. The data is from 1965 and is on the decrease at present. However it is said that in 1935 farmers consumed as much as 1.5 kg at one meal. The rice intake provoke salt intake, in comparison to the high intake of over 20 grams in Akita where the prevalence of apoplexy is high, the intake is 13 grams in Osaka and
approximately 10 grams less than that of Akita.

As for labour, according to the data compiled by Chiba et al. of the National Railway, it was found that apoplexy developed most in the heavy work group on night shift. Even within the heavy work group the day shift did not show high incidence.

In studying the prevalence of cerebral apo-

plexy and cardiac accidents, it was found that those working in the boiler room all developed cerebral apoplexy in comparison to the ratios of 2/3 of accidents being cerebral apoplexy and 1/3 cardiac accidents in the light work office employees.

As for weather, temperature, humidity, rain, atmospheric pressure and their change should be studied. However, the relationship between cerebral accidents and the cold front alone was demonstrated here.

In 1964, between 16–21 of January, the center of cold depression passed the southern part of the main island. Six cerebral apoplexy occurred successively with the passing of the cold front from Chugoku to Hokkaido (northern island). There appears to be some relationship between the occurrence of cerebral apoplexy and the passing of the cold front. But there were not enough cases for evidence for such relation and it is known also that apoplexy occurs without any relationship to the cold front. As for cardiac accidents, there were not enough cases to prove any relationship between accident and weather. Further studies will be necessary in both cases.

The average temperature of winter (January) and cerebral accidents were studied. According to correlative study, mortality rate from cerebral accidents and cold climate correlated highly in the northern region of Japan such a Akita and 5 other districts in Tohoku in comparison to that of the warmer regions such as Kagoshima and Wakayama. However, the exception is Hokkaido.
Despite the fact that the average temperature is $-10^\circ\text{C}$, the death rate is lower not only than the northern districts but in comparison to other regions in Japan. This is probably due to the effective heating system employed in Hokkaido.

In studying the relationship of residence, economy and cerebral accidents, it was very difficult to find a proper index of the quality of residence and economy. Tentatively, the percentage of families keeping gas or oil stoves was used as one of economic powers. The index was compared with the corrected mortality rate of cerebral accidents. The index is high in urban cities such as Tokyo, Aichi (Nagoya), Osaka and Kyoto and the death rate low. However, it was found that the index was relatively low in the 6 districts of Tohoku, especially in Akita and the death rate high.

The fact that the economic index is low in the southern region must be due to the lesser need of heaters due to warm climate. The economic index
is low in Hokkaido since coal heaters were not included in the index.

**COMMENT**

From the data presented, I would like to express my opinion on this phenomena. It may be a obscure way of stating it, however it appears to have developed historically by the following reasoning.

The Yamato race (Japanese) migrated to the Kyushu island from south Asia and later emerged with migrants from the Asian continent and moved up north to the main island (Honshu). Since Japan has many natural disasters such as typhoons and earthquakes, a cottage type house was built in favor of study house and such accommodations were comfortable in the summertime. However such houses were cold during the winter season which made the people wear heavy clothes and keep themselves warm by using such...
heating facilities as fire places and other local heating. Overmore, the toilet was usually placed outside. With such mode of living, the people migrated further up north. There were other historical factors which caused the people to live in such manner, such as the war period (Sengoku era) when many of the land lords fought each other for ownership of land. Though the people migrated up north, their living arrangements became unsuitable to tolerate the cold climate of Hokkaido. Then the people adopted the accidental way of heating the house. However, it appears that the heating arrangements remained the same in the southern up to the northern region of Japan. Furthermore, in the rice producing regions, the people engaged in heavy work and consumed large amounts of rice with soy bean soup and pickles. Beans were the cheapest source of protein. The tragedy of such form of living appears to remain in our culture of today. Needless to say there are many other complex factors including genetic problem involved, however, I believe the way I have looked at the development of hypertension and cerebral apoplexy is one form of interpretation.

FURTHER STUDY

The projects now in progress are “Study on the management of hypertension and arteriosclerotic diseases.” It is intended to establish the evaluation criteria according to the severity or degree of hypertension and arteriosclerosis.

A survey on the need for management of hypertension and arteriosclerosis will be made and then a practical form of group management will be enforced. In some districts, the statistics are being compiled concerning the effect of such management. “Study of sudden cardiac death” is being approached from both clinical and epidemiological viewpoints. Our largest project is on studying preventive measures for cerebral strokes caused by hypertension and also on ischemic heart disease which is on the increase. These are serious problems we must cope in Japan.

Table I: Serum Cholesterol Level (Average) by Sex, Age and Regions

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<th>Akita 2</th>
<th>Gumma</th>
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