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Current Status of Coronary Artery Surgery in Japan*

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Abstract

The incidence of coronary artery disease in Japan is relatively low compared to that in western countries.

The epidemiologic status of coronary artery diseases in our country was discussed.

The selective cine coronary arteriography in 230 patients with chest pain, as well as clinical diagnosis and electrocardiographic findings were reviewed in order to study the surgical pictures of coronary artery disease among Japanese.

A current review of aortocoronary bypass in Japan is introduced together with our own experiences.

In western countries coronary artery surgery has rapidly become one of the most common heart operations. In Japan, on the contrary, our survey indicates that coronary artery surgery is less than 1%.¹⁾ Therefore, we would like to speculate the present status of coronary artery surgery in Japan in order to compare the situation between these countries.

I. Epidemiologic Status of Ischemic Heart Disease in Japan

World Health Organization (WHO)²⁾ reported international comparison of mortality rate of the ischemic heart diseases in 1970, among the persons aged ranging from 45 to 54 years in eleven countries. Death per 100,000 of ischemic heart disease in American men was 346.3, English 259.1, Swedish 136.5, Italian 106.2 and Japanese 34.2. Thus mortality rate in Japan is the lowest among the countries and is about one-tenth of that in the United States.

Dr. Keys³⁾ has extensively studied the relationship between the incidence of coronary heart disease and the so-called risk factors in seven countries. The intake of saturated fatty acids in the diet was lowest in Japan among these countries as was incidence of coronary heart disease. The incidence of coronary heart disease is closely related to dietary saturated fatty acids as to serum cholesterol but is not significantly related to either blood pressure, body weight, or smoking habits. Thus it seems evident that dietary habits play a major role in the incidence of the coronary heart disease.

Department of Health and Welfare of Japanese Government⁴⁾ reports the annual mortality rate of ischemic heart disease was 16.5 per 100,000 in 1958 and was 30.5 in

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1967 in Japan. It is apparent that the incidence of coronary heart disease has approximately doubled during the past ten years. The contributing factors are general trends towards westernized dietary habits and availability of better diagnostic methods.⁵⁾

II. Coronary Arteriographic Studies

We have studied the selective cine coronary arteriography using Amplatz technique in 230 patients with chest pain. The age of these patients ranged from 7 to 70. Most of the patients, 74.9%, were in 40–69 years old groups. There were 164 men and 66 women. The degree of arterial obstruction determined by arteriography in relation to the age and sex of the patients is summarized in Fig. 1.

The youngest patient who had a significant arterial obstruction, that is, a 30 to 100% obstruction of the major coronary vessels was 39 years old male. Significant arterial obstructions were demonstrated predominantly in men, especially 50 to 59 years of age. In 71 out of 230 patients, 30.9%, there was evidence of stenosis of greater than 60% of one or more major vessels. Forty six of these patients 25 had a clinical diagnosis of angina pectoris, and 25 had a clinical diagnosis of myocardial infarction.

One hundred and ninety six out of 230 patients, 85.2% had abnormal electrocardiographic findings such as Q & QS pattern in 28 patients, 14.3%, ST junction & segment depression in 101 patients, 51.5%, T wave abnormality in 88 patients, 44.9%, ST segment elevation in 102 patients, 52.4%, QRS axis deviation in 13 patients, 6.6%, ventricular hypertrophy in 133 patients, 67.9%, A–V conduction defect in 9 patients, 4.6%, ventricular conduction defect in 12 patients, 6.1%, arrhythmia in 41 patients, 20.9%, and low-amplitude QRS in 6 patients, 3.1%. The correlation between resting electrocardiographic and angiographic findings is summarized in Table 1. A hundred and twenty four out of 196 patients, 63.3%, had abnormal angiographic findings, that is, stenosis of greater than 30% of a vessel lumen.

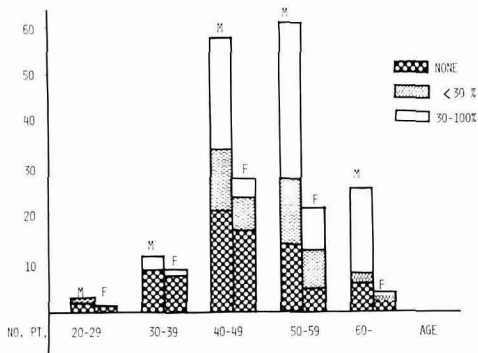


Fig. 1 The degree of arterial obstruction determined by arteriography in relation to the age and sex of the patients.

Table 1 The correlation between resting electrocardiographic and angiographic findings in 230 patients

ECG Findings	No. of patients	Arteriographic Findings	
		Abnormal	Normal
Abnormal	196 (85.2%)	124 (63.3%)	72 (36.7%)
Normal	34 (14.9%)	17 (50%)	17 (50%)
Total	230	141 (61.3%)	89 (38.7%)

Thirty four patients had normal ECG findings, but half of these patients had abnormal angiographic findings.

Patients with localized lesions of the coronary with good left ventricular function, below the age of 70, and angina pectoris or acute myocardial infarction with shock are considered good candidates for surgery. Forty six (20%) out of 230 patients with chest pain are judged as candidate for aortocoronary bypass.

III. Coronary Artery Surgery

The present statistics of surgeries for ischemic heart disease until the end of July, 1976, in Japan were surveyed by Dr. Asada⁶⁾ of Kobe, Japan.

Five hundreds and twenty three aortocoronary bypasses with 423 survival (80.9%), 84 early death (16.1%) and 16 late death (3.1%), 164 operations for myocardial infarction and its complications with 115 survival (70.1%) 39 early death (23.8%) and 10 late death (6.1%) and 71 combined procedures with 47 survival (66.2%), 18 early death (25.4%) and 6 late death (8.5%) had been performed for a total of a 758 cases. The average mortality for single bypass is 11.6%, that is, 38 death out of 329 cases with 12 late death (3.6%), for double bypass is 23.8%, that is, 40 death out of 168 cases with 3 late death (1.8%), for triple bypass is 24.0%, that is 6 death out of 25 cases with one late death (4.0%).

This collective review indicates the coronary surgery has been increasing recently which is well reflected in our study as shown in Fig. 2.

Between January 1974 and September 1976, at Sapporo Medical College, 35 aortocoronary bypasses, 6 combined procedures, such as 3 aneurysmectomies with 2 single and and one double bypass, one aortic valve replacement with single bypass, and 2 mitral valve replacements with single bypass and 3 aneurysmectomies alone for a total of 44 cases were performed. The average mortality for single bypass was one early death out of 29 patients and for double bypass was 3 early death out of 6 patients with an average over all mortality of 11.4%. There was one late death in single bypass group. There were 3 early death without late mortality in combined procedure group. There was neither early late death in aneurysmectomy alone group.

During the period, emergency myocardial revascularizations for acute myocardial

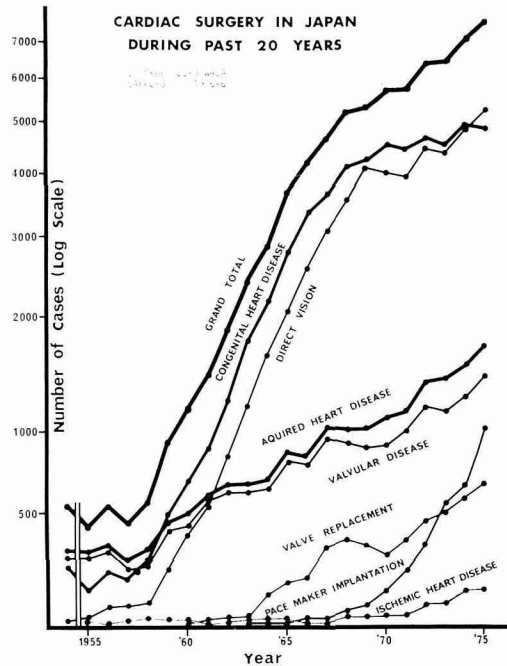


Fig. 2 Cardiac surgery in Japan during the past 20 years.

Table 2 Results of emergency bypass operation for early acute myocardial infarction at Sapporo Medical College

Case No.	Age	Sex	Site of MI	Time Interval from onset to op.	Op. performed	Results
1.	56	M	inferior shock (+)	6	SVG/RCA	PO2Y8M, alive
2.	72	F	inferior shock (+)	4½	SVG/RCA, LAD	PO2Y, alive
3.	59	M	anterior shock (+)	20	SVG/RCA, LAD	Died op day Hemorrhagic Infarct
4.	42	M	anterior shock (+)	5	SVG/RCA, LAD	PO1Y, alive
5.	47	M	anterior	5	SVG/LAD	PO5M, alive
6.	44	M	posterior	6	SVG/LCX, LAD	PO2M, alive

infarction which developed outside of the hospital were performed in six patients as shown in Table 2. Two patients received a single graft, and four patients received double grafts. One patient died after surgery and rest of the patients survived. This experience suggests that emergency graft procedure can be done with reasonable risk, if it is performed within six hours after the onset of acute myocardial infarction.^{7),8)}

SUMMARY

1) The incidence of coronary artery diseases in Japan is relatively low compared to that in western countries, although there is a clear trends of progressive increase probably due to westernization of dietary habits.

2) Coronary arterial disease for surgery has also been increasing with the introduction of the coronary care unit and the selective cine coronary arteriogram in clinical practice.

3) Emergency coronary bypass surgery during acute myocardial infarction carries reasonable risk with rewarding clinical results if it is performed within six hours after the onset of acute infarction.

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