(9) A Pathological Study

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The "intermediate coronary syndrome" (Vakil), a "variant form of angina pectoris" (Prinzmetal et al.) etc. are all clinically established concepts. It may be, therefore, desired to be disputed, whether these concepts are able to be defined morphologically or not. Accordingly, the author and his co-workers, on the one hand, collected the cases having ischemic myocardial lesions, whether minute scars or large infarcts are concerned, and studied them both clinically and morphologically. They also, on the other hand, examined the autopsies which clinically had ever shown one or repeated cardiac attack which may be corresponding to "intermediate coronary syndrome".

Material and Methods:

1. Routine 342 adult autopsies (217 male and 125 female) at the Branch Hospital of the University of Tokyo during past 5 years (1962-1966) and 106 autopsies (29 male and 77 female) at Yokuhukai Geriatric Hospital during past 13 months (from Jan. 1965 to Jan. 1966) were studied. Thirty-four cases (19 male and 15 female) among the former group and 48 (14 male and 34 female) among the latter came under autopsies with any ischemic myocardial change.

2. Then, among 124 autopsies (69 male and 55 female) originated from 4th Department of Internal Medicine (Director: Prof. Dr. T. Kobayashi) during past 5 years, were selected 2 cases who had ever suffered from cardiac attack resembling "intermediate form", while 15 among 266 (86 male and 180 female) during past 30 months at Yokuhukai Geriatric Hospital in the same manner.

All cases concerned were examined macroscopically as well as histologically, especially regarding their myocardial changes, coronary sclerosis and thrombosis.

Results:

1. Cases with ischemic myocardial changes

According to size and number of ischemic myocardial lesions, 82 cases selected were divided into four groups as follows.

Group Ia—Cases with one or a few minute myocardial scars—24 cases

Group Ib—Cases with scattered minute and/or small myocardial scars—24 cases

Group II—Cases with one or a few small myocardial infarcts—13 cases

Group III—Cases with one or more large myocardial infarcts—21 cases

Number of cases with some electrocardiographic abnormalities among group Ia, Ib, II and III is 16, 19, 10 and 20, respectively, including as a whole 4 having shown

Table 1. Clinical Data of Cases Diagnosed as "Intermediate Coronary Syndrome"

Autopsy No.	Age	Sex	Main diseases	Hyper-tension	Cardiac attack		GOT	GPT	No. of leuco-cyte	Electrocardiogram	
					Freq- uency	Sever- ity				Main changes	Dura- tion
B. 1226	64	F	Malnutrition	—	+	+	19	8	11,000	<i>ST</i> ↑ (<i>V</i> _{1,5,6}), <i>trans. QS</i> (<i>V</i> ₂₋₄)	4 d.
Y. 2875	91	F	Emaciation, purulent cystitis	++	++ (1)	++				<i>Cor. T</i> (II, III, <i>aV_F</i> , <i>V</i> ₃₋₆)	2 m.
Y. 2750	89	F	Senile emacia- tion	+	+	±	35	14	6,100	<i>Neg. T</i> (<i>V</i> ₃₋₆)	4 m.
Y. 2840	81	F	Carcinoma of caecum	++	++ (1)	+	17		6,100	<i>Neg. T</i> (II, III, <i>aV_F</i> , <i>V</i> ₃₋₆), <i>ST</i> ↓ (<i>V</i> ₅)	8 m.
Y. 2923	73	F	R. hemiparaly- sis	++	+	±				<i>Cor. T</i> (<i>V</i> ₂₋₅), <i>ST</i> ↓ (<i>V</i> _{5,6})	45 d.
Y. 2948	77	F	Pneumonia, tbc., cardiac insufficiency	—	+	±				<i>Cor. T</i> (<i>V</i> ₂₋₄)	9 d.
Y. 2720	70	F	Acute fatal hepatitis	++	+	±				<i>Cor. T</i> (<i>aV_L</i> , <i>V</i> ₄₋₆), <i>ST</i> ↓ (<i>V</i> ₅)	38 d.
Y. 2952	76	M	Cerebellar hemorrhage	++	+	±				<i>Cor. T</i> (<i>aV_L</i>), <i>ST</i> ↓ (<i>V</i> ₅)	5 m.
Y. 2946	74	F	Pulmonary emphysema, enteritis	—	+	++	48 25	13 11	10,200 6,250	<i>Giant Cor. T</i> (<i>V</i> ₃₋₅), 4 times	3 d. ~5 m.
Y. 2926	69	F	CVI, myocar- dial damage	+	++ (1)	±	33	14		<i>Cor. T</i> (<i>V</i> ₂₋₅), <i>ST</i> ↓ (<i>V</i> ₄₋₆)	7.5 m.
Y. 2734	91	F	Cerebral infarction, pulmonary thrombosis	++	++ (1)	+	30	10	5,300	<i>Giant Cor. T</i> (I, II, <i>aV_L</i> , <i>V</i> ₂₋₅), <i>ST</i> ↓ (<i>V</i> ₄₋₆)	5 m.
Y. 2737	79	M	R. hemiparesis, gastric cancer	—	++ (1)	++	20	2	4,450	<i>Neg. T</i> (<i>V</i> ₄₋₆)	1 m.
Y. 2849	76	F	Cerebral hemorrhage, pneumonia	+	++ (1)	+				<i>Giant Cor. T</i> (<i>V</i> ₃₋₆)	22 m.
B. 987	72	M	Myocardial infarction	+	++ (fr)	++	19		8,400	<i>ST</i> ↓ (I, II, <i>V</i> ₄₋₆), <i>Neg. T</i> (III, <i>aV_L</i> , <i>aV_F</i> , <i>V</i> ₃)	15'
Y. 2745	78	F	Myocardial in- farction, rup- ture of aortic aneurysm	++	++ (1)	+~++				<i>Cor. T</i> and <i>ST</i> ↓ (II, III, <i>aV_F</i>)	5 m.
Y. 2842	79	F	Myocardial infarction	—	++ (1)	+~++				<i>Cor. T</i> (<i>V</i> ₂₋₄), <i>ST</i> ↓ (<i>V</i> ₃₋₅)	27 m.
Y. 2735	75	F	Myocardial infarction	++	++ (1)	+~++				<i>Neg. T</i> and <i>ST</i> ↓ (<i>V</i> ₂₋₆)	14 d.

Note. (): Number of attacks diagnosed as "intermediate form"

fr: frequent, d.: days, m.: months, ': minutes

Autopsy No. underlined: cases diagnosed as typical "Intermediate coronary syndrome"

Table 2. Pathological Data of Cases Diagnosed as "Intermediate Coronary Syndrome"

Autopsy No.	Heart weight	Coronary sclerosis			Coronary thrombosis	Main myocardial changes	Remarks
		l. des	l. cir	r.			
B 1226	210	±	±	+	—	Diffuse chronic <i>degeneration of muscle fiber</i> with partial <i>fibrosis</i>	Myocardosis?
Y 2875	190	##	##	++	—	<i>Diffuse fibrosis</i> (+)	Fibrosis?
Y 2750	255	+	+	+	—	A few <i>small scars</i> (ant.), <i>diffuse fibrosis</i>	Fibrosis?
Y 2840	335	+	+	++	—	Small or large <i>degenerative foci</i> , scattered <i>fibrosis</i> (+)	Fibrosis?
Y 2923	300	+	—	+	—	A few <i>minute scars</i> , <i>local. fibrosis</i> , Scattered <i>minute necrotic foci</i> (post.)	Minute scars?
Y 2948	370	+	+	++	—	Multiple <i>small scars</i> , <i>diffuse fibrosis</i> (ant., post., apical), scattered <i>necrotic foci</i>	Necrotic foci?
Y 2720	390	##	##	##	—	Scattered <i>minute scars</i> , <i>diff. fibrosis</i>	Minute scars?
Y 2952	350	##	##	##	+(l. circ. des.)	Scattered <i>small scars</i> , <i>diffuse fibrosis</i> , <i>necrotic foci</i> (lat., post., ant.)	Small scars?
Y 2946	330	##	##	##	—	<i>Diffuse fibrosis</i> , scattered <i>small scars</i> , a few <i>necrotic foci</i>	Small scars?
Y 2926	230	##	##	##	+(l. circ.)	A few <i>minute scars</i> or <i>fibrosis</i> , scattered <i>necrotic foci</i> (post.)	Minute scars?
Y 2734	290	++	++	##	—	Scattered <i>minute scars</i> , <i>necrotic foci</i> , <i>diffuse fibrosis</i>	Minute scars?
Y 2737	305	##	—	##	—	A few <i>small scars</i>	Small scars?
Y 2849	265	++	+	++	—	A few <i>minute scars</i> , scattered <i>necrotic foci</i>	Minute scars?
B 987	410	##	##	##	+(r.)	<i>Old and recent infarcts</i> (post.), scattered <i>scars</i> (ant.)	Scars and necrosis?
Y 2745	240	##	++	+	—	<i>Large old infarct</i> (post.), scattered <i>necrotic foci</i> (post., ant.), <i>small scars</i> , <i>diffuse fibrosis</i> (ant.)	Small scars?
Y 2842	340	##	##	##	+(r.)	<i>Large old infarct</i> (lat., post., ant.)	Preceded by infarct?
Y 2735	290	##	##	##	—	<i>Large old infarct</i> (post.), wide <i>recent deg. or necrosis</i> (ant.), <i>diff. fibrosis</i> , scattered <i>minute scars</i> (ant.)	Minute scars?

Note. l. des: left anterior descending coronary artery

l. cir: left circumflex coronary artery

r.: right coronary artery

electrocardiogram of "intermediate form" during or after cardiac attacks. It was noteworthy that two of these cases proved large myocardial infarcts. Each of remainder belongs to group Ia and Ib, respectively.

2. Cases having experienced cardiac attacks resembling "intermediate coronary syndrome"

Both main clinical and pathological data of 17 autopsies who had ever suffered from cardiac attacks resembling "intermediate form" are shown in the Table 1 and 2, respectively. Two cases at the top of these tables proved no ischemic myocardial lesions, while 2 cases which come next showed changes corresponding to the group Ia mentioned above and following 9 to the group Ib. Four cases at the bottom of tables fell under the group III. Therefore, in 11 of 17 cases were encountered only minute or small myocardial scars and/or necrotic foci.

Four of 17 autopsies, that is Y2750, Y2946, Y2735 and B 987, had experienced cardiac attacks diagnosed as typical "intermediate form" after examining thoroughly, and 2 of them proved large myocardial infarcts. Some cases including 3 of them are briefly described as follows.

Case 1. Y 2946. A 74-yr-old woman. Her main diseases were pulmonary emphysema and acute enteritis. She experienced four times of cardiac attacks diagnosed as typical "intermediate form". She expired one year and half after the last attack. Necropsy revealed somewhat diffuse fibrosis, scattered small scars and a few small necrotic foci in the myocardium of left ventricle. The small scars may be changes resulting from the above mentioned attacks.

Case 2. Y 2735. A 75-yr-old woman was repeatedly attacked by angina pectoris during past several years and then by a posterior myocardial infarction. The electrocardiogram obtained at this time revealed some changes corresponding to "the intermediate form" in the anterior wall of left ventricle. Two weeks later these changes disappeared, and 14 months thereafter she died from an attack of anterior infarction. Necropsy revealed both wide-spread old posterior and recent anterior infarcts, and several small scars which may be consequent on the intermediate coronary attack.

Case 3. B 987. A 72-yr-old man suffered from repeated intermediate coronary attacks which usually recurred within approximately 15 minutes. These attacks were pursued by the telemeter. He died from suspicious myocardial infarction. Necropsy revealed a wide-spread scarred posterior infarct and scattered many small recent as well as old necrotic foci. These small lesions may have resulted from repeated intermediate attacks, while the infarct was probably widened by repeated intermediate attacks.

Case 4. Y 2842. A 79-yr-old woman was repeatedly attacked by angina pectoris during past 5 years. Approximately 3 years before her death there was a suspicion of an antero-lateral infarction by the vectorcardiography. Necropsy revealed a wide-spread old infarct, the center of which was the lateral wall of left ventricle. This infarct may already be formed prior to the possible intermediate attack.

Case 5. Y 2948. A 77-yr-old woman had a possible intermediate coronary attack 20 days before her death. Necropsy revealed a few small organizing necrotic foci, which may be changes resulting from the above mentioned cardiac attack, while there were several scattered small scars and recent necrotic foci in the anterior wall of left ventricle.

There were also a few cases which showed some interesting findings. A 73-yr-

old woman (Y 2923) had a few small scars possibly corresponding to an intermediate coronary attack 4 months prior to her death, while there were also found several necrotic foci caused by the thrombosis of intramyocardial coronary branches. A 91-yr-old woman (Y 2875) had no significant myocardial change except for a diffuse fibrosis of slight degree, and another 64-yr-old woman (B 1226) had only myocardosis-like changes which were presumably caused by malnutrition.

Comment:

According to facts mentioned above, the myocardial changes of patients who had undergone typical or possible intermediate coronary attacks were usually similar to ones due to angina pectoris or myocardial infarction. Therefore, there are no morphological changes specific to the intermediate coronary attacks. Nevertheless, there were frequently encountered minute or small scars and/or necrotic foci in the myocardium of these patients, while a few cases had no pathologic lesions possibly correspondent to the attacks. Several cases had myocardial infarcts, all of which were old except for one of a patient (Y 2735) who died from a recent myocardial infarction. It is noticeable that in some cases myocardial infarcts were presumably formed prior to the intermediate coronary attacks. As mentioned above, however, only a minority of cases showing ischemic myocardial changes, if recent or old, went through intermediate attacks.

These facts may indicate, on one hand, that there are few patients, whose coronary attacks are observed under the condition that the attacks can be sufficiently compared with criteria of "the intermediate form" of coronary attacks, and on the other hand, that "the intermediate form" is hardly characterized by morphological findings.

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