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Treatment of Angina Pectoris*

By

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The consideration on the treatment of Angina pectoris resolves itself into two parts, consisting of (1) the decreasing the work of myocardium and (2) the giving the nutrition for myocardium.

(1) For the decreasing the work of myocardium, of importance are as follows:

- (a) Rest (mental and physical)
- (b) Administration of sedatives (including morphine)
- (c) Keeping warmth

(2) For the nutrition for myocardium, of importance are as follows:

- (a) Administration of so called coronary vasodilatives (nitrites, theophyllines etc.)
- (b) Oxygen inhalation
- (c) Use of important materials for myocardial metabolism (ATP, B₁ etc.)

The discussion of the practical application on these points that are well known will be omitted in this paper.

At the treatment of Angina pectoris with myocardial infarction, in addition to above mentioned treatment, the allopathy for shock, congestive failure, arrhythmia or thrombo-embolism should be considered.

For shock, of importance are administration of norepinephrin, blood transfusion (30 drops per minute) and g-strophantin (0.075 m.g. per 6-8 hours).

Hauss and others reported that the injection of novocain on both sides carotis sinus is very effective on the treatment of shock. I cannot make a comment on this method before my own experience.

For congestive failure the administration of diuretics and salt restricted diet are important. Digitalis should be used carefully. Venesection is effective especially for the patient with severe congestion on lung.

For arrhythmia, the development of premature

systoles is a definite indication for the use of procain amide or quinidine. On the effect of quinidine a strong coronary dilative effect was noticed recently.

The consideration on the prevention of thrombo-embolism leads us to anticoagulants. The research committee on anticoagulant in U. S. A. reported that administration of anticoagulant had reduced the incidence of death from 23% to 16% and of thrombo-embolic complications from 42% to 13%. But we must recognize that those results were obtained with bleeding complication on 15% of cases and a quarter of the dead cases still had the thrombo-embolic complications. Those situation teaches us that anticoagulants is not almighty on the prevention of thrombo-embolic complications.

In Japan there is no big statistics on thrombo-embolic complications as that in U. S. A., but by my impression thrombo-embolic complication is relatively rare in Japan. In my opinion, the use of anticoagulants is not the first important treatment of acute coronary occlusion. By the way there is a great interest on the survey of the long run application of heparin to the patients with coronary sclerosis for the prevention of thrombogenesis.

At the convalescence of acute coronary occlusion, of importance are (1) low fat diet, (2) low calories diet and (3) active exercise.

My method for active exercise treatment is as follows. Right after the recovery of the change on ST segment in ECG (usually from 4 to 6 weeks after attack), the highest amount of exercise which can not cause the signs of coronary insufficiency in ECG, should be obtained with adjusting the number of ascents and descents of the Master's two steps test. That amount of exercise should be repeated several times a day. The amount of exercise should be changes in each week.

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This active exercise treatment for myocardial infarction, I should call active medical surgery, may be expected to increase the ability of the heart. Effect of this active exercise treatment is not only on the development of coronary collateral circulation but on the increasing of the ability against the reactive change of circulatory dynamics at work and the striking off the neurosomatic elements by teaching the ability of the heart. Thus the patient with myocardial infarction can go back his familial and social life with complete self-confidence that depends upon scientific evidence.

Surgical relief of myocardial infarction, revascularization of the heart is promising but in an experimental state.

It is very important at the treatment of Angina syndrom to consider the underlied diseases.

On my experience for last two years, 401 patients with angina pectoris were diagnosed as table I.

TAB. I UNDERLIED DISEASES* OF ANGINA PECTORIS

Basic Disease	Total No. of Cases	Signs. Angina pect. Case No.	%
Degenerat. Vascular Dis.	295	126	42.7
Essent. Hypertension	521	109	20.9
N. C. A.	292	109	37.3
Valvular Disease	139	28	20.1
Anemia	183	14	7.6
Beri-beri	45	7	15.5
Syphilitic Aortitis	17	4	23.5
Congenital Heart Dis.	35	4	11.4
Obesity	13	4	30.7
Thyroid Disease	60	3	5.0
Essential Hypotension	30	3	10.0
Chr. Glomerulonephritis	60	2	3.3
Others	1327	35	2.6
Total	2990	401	13.3

Out Patients 8,465
Myocard. Infarct. { Fresh 9
Obsolete 40

* Almost all cases of Degenerat. Vascular Dis. in Tab. I are Coronary atherosclerosis.

Coronary atherosclerosis is most important underlied disease of angina pectoris on the point of view of the incidence and prognosis. The incidence of coronary atherosclerosis in Japanese is as Fig. 1.

The etiology of coronary atherosclerosis is not definitely established but the altered cholesterol metabolism and hypertension may have an effect

on the development of atherosclerosis.

When an altered fat or cholesterol metabolism is started by unknown etiology, high fat intake, high calorie intake or decreased calorie consumption at the lack of exercise may cause a load on that altered metabolism and accerelate the changing of that metabolism and gives an effect on the develop-

Fig. 1 Incidence of Coronary Atherosclerosis in Japanese

ment of atherosclerosis. There are many experimental and clinical evidences on the relationships between altered fat metabolism and atherosclerosis. (1) In animal experiment, high cholesterol diet can produce atherosclerosis-like change. (2) There are great differences between different countries in the age-incidence and severity of atherosclerosis and there are some evidences that these differences may depend on fat intake. (3) Almost all patients with coronary atherosclerosis or myocardial infarction show that the concentration of cholesterol or the proportion of lipoprotein in the blood is abnormal. (4) And majority of them has gained body weight relatively rapidly. (5) It is very rare that the patients with cancer dies by coronary occlusion. (6) Autopsy findings shows that the incidence of coronary atherosclerosis in the cases that had lost their body weight rapidly before death were low as parallel as the grade of the decrease of body weight.

According to these evidences it seems that (1) low fat diet, (2) low calorie diet and (3) active exercise are very important at the treatment of

coronary atherosclerosis.

On the cases with coronary atherosclerosis combined with hypertension that is another factor which accelerates the development of atherosclerosis, it is very important to consider on the control of blood pressure. Many text books talk us that it is dangerous to control the blood pressure of the patient with severe grade of coronary atherosclerosis but it is not true. There is no accident when the blood pressure is controlled gradually.

The coronary flow will decrease temporally when the blood pressure is depressed. The recovery from the state with high blood pressure causes to decrease the work of heart and blood volume which the myocardium needs. And the decrease of tension in myocardium causes to decrease the coronary circulation resistance and increase the coronary flow.

Thus the abnormal high blood pressure should be control gradually by using hypotensive drugs with or without so called coronary vasodilatives combined with low salt diet.

Following cases show the practical details on these idea on the treatment of coronary atherosclerosis.

Case I K. T. 54 year-old female. (Fig. 2a & 2b)

Diagnosis of coronary sclerosis was given, depending on the typical attacks, the elevated value of total cholesterol (278 m.g./dl) and the increase of β/α of lipoprotein (6.55). She got 66 k.g. of body weight that had increased rapidly and 40 m.m. of skin fold thickness on her abdomen.

Theophylline-Cholin 0.3g. per day was given under 1500 Cal. of low calorie diet.

After two weeks the attack disappeared completely and after 40 days she lost 11 k.g. in her body weight and total cholesterol dropped to 198 m.g./dl and β/α became 4.25.

The improvement on the pathological coronary change, atherosclerosis, may happen under this situation, rapid decrease of fat deposite.

Fig. 2 a

Fig. 2 b

M.K. 47. ♀ Essential Hypertension, Coronary Sclerosis
 Chief compl. Substernal constriction

Fig. 3 a

Fig. 3 b

Case II. M. K. 47-year-old female (Fig 3a & 3b)

Diagnosis of essential hypertension and coronary sclerosis were given on the typical attacks, the elevated total cholesterol (400 m.g./dl), left coronary insufficiency in ECG. and the elevated blood pressure

(238/134, 130 m.m. Hg). She gained 5 k.g. of body weight in last two years.

Rauwolfia alkaloid and ethyl papaverin were given under 2 gr. salt and 2000 Cal. diet.

After 10 days, the attacks disappeared completely.

After 2 weeks, active exercise treatment was

M. M. 60. ♂ Essential Hypertension
 Myocardial Infarction
 Chief compl. Substernal constriction and pain

Fig. 4 a

Fig. 4 b

added.

After 6 weeks, the total cholesterol dropped to 284m.g./dl and after 8 weeks, the body weight decreased 4 kg to 50k.g.

In this case the decrease of body weight was not so successful that the skinfold thickness was still 40m.m. on abdomen.

Case III M. M. 60 year-old male. (Fig. 4a & 4b)

He came in our hospital complaining the mild attack of substernal constriction and got myocardial infarction in the hospital. The total cholesterol was 324m.g./dl and β/α was 3.98.

Even after the attack of acute coronary occlusion he did not show big depression on the blood pressure. Rauwolfia alkaloid, ATP and vitamin B₁ were given under absolute rest and 3gm. salt and 1700 Cal. diet.

After a while we were noticed that he was taking two eggs a day as extra diet.

At four weeks after the attack of coronary occlusion the elevation of ST segment disappeared. Then we gave him a modified Master's two steps test that was the decreased number of ascents and descents to one half of standard methode in $1\frac{1}{2}$ minutes. It was acertained that this exercise did not cause the elevation or depression of ST segment and then the same amount of exercise was given one time each in morning and afternoon for two days, two times for next two days and three times for next three days. Then another modified Master's test that was two third of standard numbers of ascents and descents in $1\frac{1}{2}$ minutes was given and so on.

At two weeks after the start of active exercise treatment, we gave him double of standard numbers of ascents and descents in 3 minutes and found this exercise caused a small elevation of ST segment. This amount of exercise was an overload for him and very dangerous, but fortunately no trouble happened. It is very important that the amount of exercise

H. T. 50.8 Essential Hypertension, Myocardial Infarction

Chief compl. Substernal constriction and pain

Blood press. 114/50 mmHg.
 Eye ground Arteriosclerosis retinae
 Urine normal
 Serum Lipoprotein, Cholesterol
 α 16.3 T.C. 225
 β 83.7 E.C. 156
 β/α 5.13 E.R. 69.3
 T.L. 34.9

X-ray

E.C.G.

V.C.G.

Fig. 5 a

Fig. 5 b

should increase step by step.

Any way we did not get the successful results on the decrease of body weight, total cholesterol and β/α in this case.

Case IV H. T. 50 year-old male. (Fig. 5a & 5b)

He had a severe attack with shock. He had gained 13 k.g. of body weight in last ten years. The total cholesterol was 225 m.g./dl and β/α was 5.13.

Kallikrein was given under absolute rest.

When the elevation of ST segment recovered, the modified Master's two steps test that was decreased the number of ascehts and decents to one half of that of standard methode for $1\frac{1}{2}$ minutes was given. After acertaining that that amount of exercise did not cause the change of level of ST segment, the active exercise treatment was given. At the biginning of the exercise treatment ATP was given.

He went back his original job, practical doctor, after exercise treatment for six monthes.

Discussion was done on the treatment of coronary atherosclerosis which is most important underlied disease of Angina pectoris. For long time Angina-patient with coronary atherosclerosis has been treated only conservatively, but the basic treatment of coronary atherosclerosis, (1) low fat diet (2) low calorie diet and (3) active exercise

treatment are very effective and important.

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