

PSYCHOSOMATIC ASPECTS OF ANGINA PECTORIS

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ABSTRACT. It is known that anginal attacks can be caused by emotional stress. However, studies on the development mechanism of angina pectoris induced through experimental stress have been few. Firstly, a questionnaire study was made on 100 subjects with anginal pain. Some anginal attacks are induced by emotional stress. However, the majority are also induced by physical stress and few by emotional stress alone. Secondly, an experimental study on the anginal attack induced by emotional stress was attempted. Methods used were 1) hypnotic suggestion 2) stress interview 3) taking of life history including incidence of illness. As a method for inducing experimental emotional stress, the interview method in which the patient's life history including past illnesses is taken proves to be most effective as judged by the production of angina.

In order to analyse the development mechanism of the emotionally induced anginal attack, a physiological comparison was attempted between those who developed angina from physical stress and those by emotional stress. Increase in heart rate is significant after physical stress, along with hyperventilation and lactic acidosis. With emotional stress, the rise in blood pressure is more significant.

As a psychological characteristic, the emotional reactions of anxiety and hostility towards the incidence of trauma, disease and problems in human relationship were significant. The auditors will reiterate the importance of psychological aspects of cardiac rehabilitation.

I. INTRODUCTION

The first exact description of Angina Pectoris was made by Heberden who had already mentioned that anginal attacks could be induced by emotional stress.

In general, the relationship between psychosomatic disease and emotional stress is classified into two patient groups, namely, (i) those with physical illness with apparent organic change to which stress is added, (ii) those with illness with no basic organic change but caused purely by emotion.

This could be said also in the case of Angina

Pectoris. (i) Attacks are induced by emotional stress in which there is underlying coronary arteriosclerosis or other anatomical change. (ii) Attacks are induced by emotional stress without any underlying coronary disease.

When considering angina pectoris as a psychosomatic illness, since the two types cannot be easily differentiated in clinical practice in relation to the therapeutic program, the concept of the two types needs clarification.

The authors have named the former emotional angina, in which emotional stress overlaps the organic condition, and the latter as psychogenic angina which is caused by psychological stress alone.

Actually, cases with psychogenic angina are few and the author has encountered only a few cases. From the viewpoint of prognosis, the severity of the illness is greater for those having emotional angina overlapping an organic cause rather than for those cases with psychogenic angina. For this reason, the authors would like to discuss mainly emotional angina (1-5).

II. ANALYSIS OF FACTORS PREDISPOSING TO ANGINA PECTORIS

In order to clarify the actual condition of emotional angina and psychogenic angina, the following study was made.

Subject and Method

A questionnaire relating to anginal pain, psychological tests such as the Y-G test (modified Guilford test) and Cornell Medical Index, etc. were given to a total of 100 patients with chronic ischemic heart disease with angina pectoris, including 44 having old myocardial infarction.

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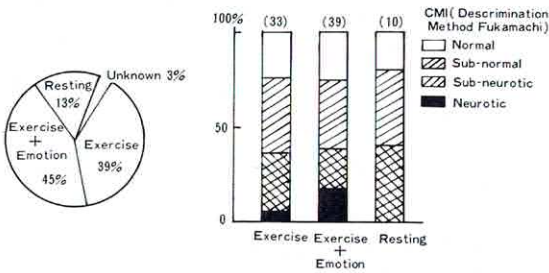


Fig. 1. Provocative causes of anginal attack and classification of CMI.

Results

According to the results of the questionnaire, the predisposing causes of anginal attacks were as follows: (Fig. 1) 45 were induced by exercise and emotional stress, 39 by exercise alone, 13 during rest (the causes are not clear) and 3 by other factors.

According to the results of the questionnaire, no attacks were induced by psychological stress alone, half of the cases occurred having no relation to emotion and half were induced by combined emotional and exercise stress.

As for the results of the psychological tests, according to the Cornell Medical Index, neurotic tendencies were higher in those with emotional angina in which angina was induced by emotion and exercise in comparison to exercise angina which was induced by workload alone (Fig. 1). No specific tendency was observed in the Y-G test.

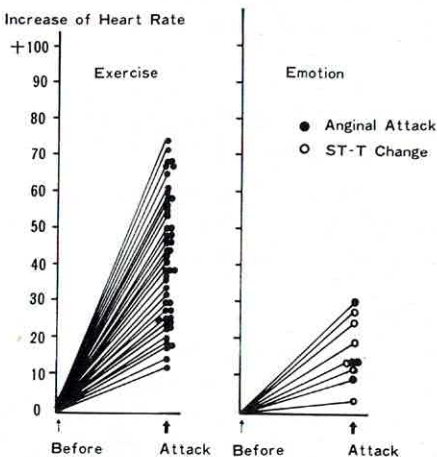


Fig. 2. Increase of heart rate at the beginning of anginal attacks.

III. COMPARISON OF EXERCISE AND EMOTION IN ANGINA PECTORIS

For 60 cases with angina induced by exercise or emotion, measurements of blood pressure, ECG, blood P_{O_2} , P_{CO_2} , pH, base excess (Astrup method), lactic acid, pyruvic acid (enzyme method, UV test), urine catecholamine excretion rate (modified Lund method) were taken before and after the exercise or emotional stress tests.

Result

In exercise angina, the increase in heart rate is significant at the beginning of the attack in comparison to that of emotional angina (Fig. 2).

For blood pressure, in emotional angina, the systolic and diastolic pressure have a tendency to rise, whereas in exercise angina, only the systolic pressure tends to rise with no specific tendency in the diastolic (Fig. 3).

Also, after the exercise, an increase of P_{O_2} , decrease of pH, P_{CO_2} , base excess and also an increase of blood lactic acid, L/P ratio, excess of lactic acid (XL) were observed.

In other words, exercise induces lactic acidosis and hyperventilation. On the other hand, emotion produces decrease of P_{O_2} increase of P_{CO_2} and base excess and no change in blood lactic acid (Figs. 4, 5).

It could be said that on exercise, there is energy expenditure, accompanying production of lactic acid, then increased cardiac output, with hyperventilation. Under emotional stress, no metabolic change is observed, though changes in circulatory function, such as increase in blood pressure and heart rate, are observed through the autonomic nervous system.

The developmental process thus differs under exercise and emotional stress, though the final mechanism by which angina pectoris is induced remains the same. With the increase in heart rate and/or blood pressure, myocardial O_2 consumption increases and anginal attacks are evoked. This mechanism is true in both types of angina. In exercise, the increase of heart rate plays the major role and the increase of blood pressure and heart rate in the emotional type (Fig. 6). For urine catecholamine, nor-epinephrine increased during exercise in all cases, and epinephrine increased only in induced anginal cases, though no significant difference was observed (6-12) (Fig. 7).

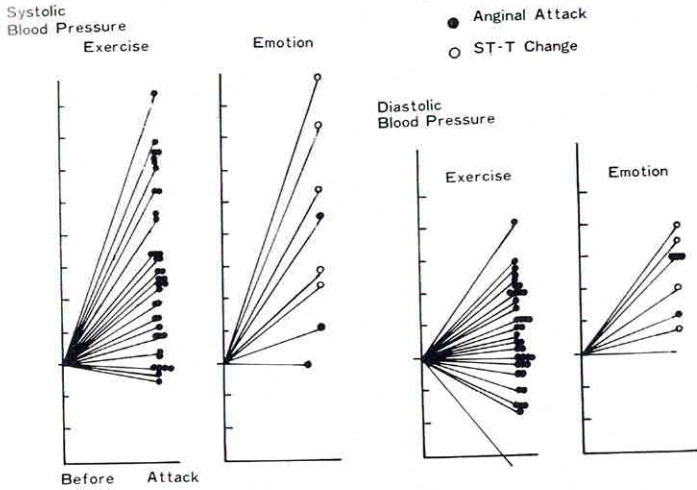


Fig. 3. Changes of blood pressure at the beginning of anginal attacks.

IV. PSYCHOLOGICAL STRESS AND ANGINAL ATTACKS

From the above study, the difference in the developmental process of anginal attacks was clarified for exercise and emotion, and the following experimental study was therefore made to establish which type of emotional stress evokes an anginal attack.

Subject and Method (Table I)

Fifteen subjects with emotional angina, in which changes in ECG (bipolar chest lead) were monitored continuously by the telemetering method; measurements of blood pressure were omitted for technical reason. Three types of stress were used: (1) hypnotic suggestion, (2) stress interview, (3)

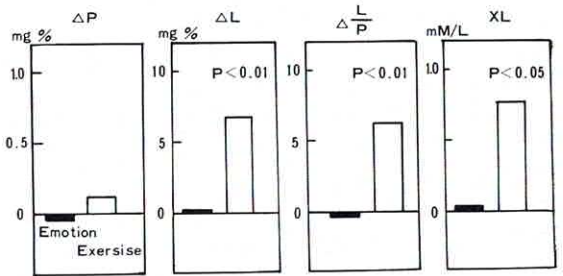


Fig. 5. Variation of pyruvic acid, lactic acid, $\Delta L/P$ and excess lactate in blood.

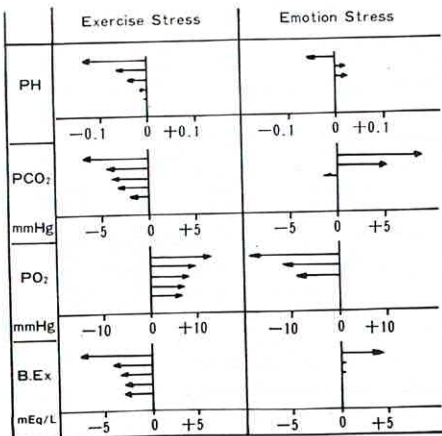


Fig. 4. Variation of arterial gas and acid-base balance.

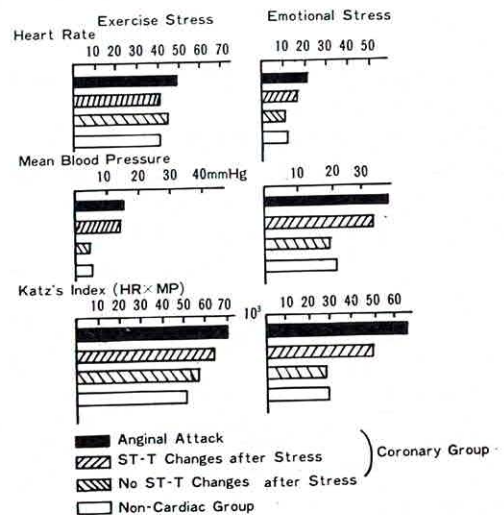


Fig. 6. Heart rate and mean blood pressure before and after stress.

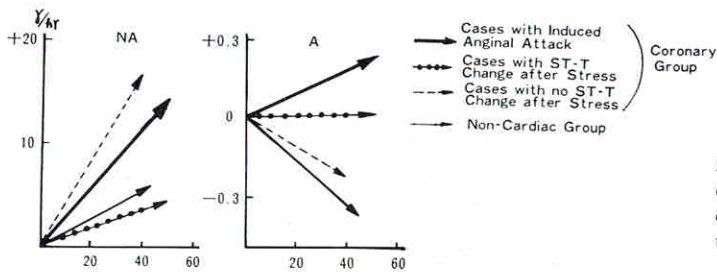


Fig. 7. Variation of urine catecholamine excretion during exercise. 1% increase of heart rate during exercise (per minute).

annotation of life history at interview. For hypnotic suggestion, the inducing factor and the condition in which anginal attack occurred in each patient was used. For stress interview, questions concerning the patient's condition and symptoms at the time of the attack, medical explanation concerning the pathology and prognosis of angina pectoris were used as topics with the speculation that such would be stressful. For the method of annotation of the patient's life history, the intention was not to put special stress on the patient, but rather to listen naturally to the medical and life history of the patient with an attentive attitude.

Among the 4 subjects studied under hypnotic suggestion, only 1 case showed change in heart rate, though no ST-T change nor anginal pain was observed.

Among the 7 subjects under stress interview, 2 cases showed increase in heart rate and ST-T change in ECG when the topic of conversation was on angina pectoris or abnormal findings in the ECG. No anginal pains were induced.

Annotation of life history was performed for 5 subjects. In 4 cases, when the topic involved individual traumatic experience such as injury (leg amputation), traffic accident, positive Wasserman reaction etc., increase in heart rate and change in ST-T in ECG were observed and in 3 cases anginal pain were induced (13-15) (Fig. 8).

Table I. Comparison of different types of emotional stress

Types of emotional stress	No. of cases	ECG changes	Anginal attack
Hypnotic suggestion	4	0	0
Stress interview	7	2	0
Annotation of life history	5	4	3

V. REHABILITATION OF EMOTIONAL ANGINA

For the 4 cases in which angina pectoris was provoked during annotation of life history, with repetition of such an interview at regular intervals (average 1 week), reactions such as increase in heart rate and change in ST-T diminished and the occurrence of anginal pain became less.

This method applies to the de-sensitization therapy (Wolpe) in behavior therapy. The occurrence of emotional angina which is conditionally induced by emotional stress is de-conditioned through this method. This suggests a method for preventing emotional angina and by the combined use of propranolol or other β -blockers, the effect of re-conditioning will be enhanced. (Figs. 9, 10)

VI. CONCLUSION

When studying the psychosomatic aspects of angina pectoris, the questionnaire method, the experimental method and case studies were used. It was concluded that emotional stress plays an important role in inducing anginal attacks as was

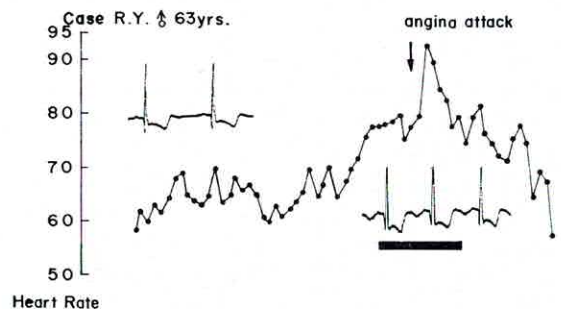


Fig. 8. Change in heart rate and ECG during interview concerning life history. "I had an accident while working in a factory and had a leg amputation. There was a great amount of bleeding."

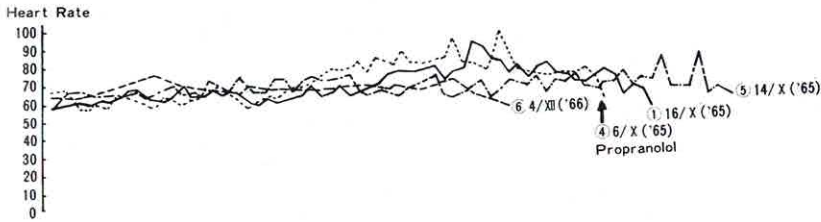


Fig. 9. Variation of heart rate during interview.

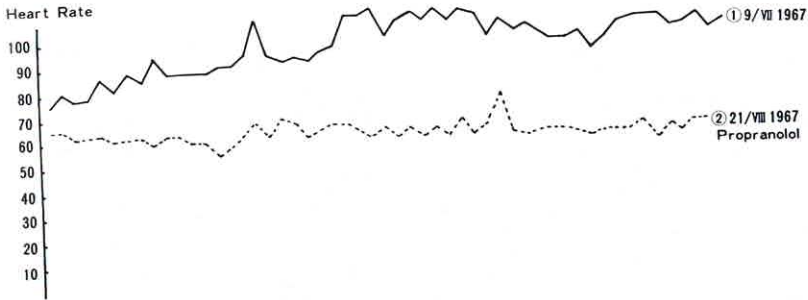


Fig. 10. Variation of heart rate during interview.

observed through changes in heart rate, blood pressure and other physiological factors.

For the rehabilitation of patients with angina pectoris, if the psychosomatic approach is used, emotional over-reaction can be controlled and thus prevent the patho-physiological reaction.

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