Case Report

Psychic Origin of a Concave RS-T Elevation in a Patient with Actual Neurosis

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On the basis of clinical experiences, psychic origin of a concave RS-T elevation was previously indicated by the author. In one of the preceding reports, an appearance of a concave RS-T elevation was demonstrated in a 30-year-old male and its disappearance in a 31-year-old female. This paper demonstrates the processes of appearance and disappearance of the concave RS-T elevation in one 36-year-old male. The patient had to live for some 40 days with his cousin suffering from postoperative gastric cancer in the same hospital. Until the entry into the hospital the patient had affiliated himself with the structure-improving committee. He resigned his post because of his annoying subjective symptoms such as precordial discomfort, insomnia, anorexia and so on. The electrocardiogram which was normal on admission showed a concave RS-T elevation in left precordial leads with a tapering, heightened T wave when his cousin was most serious. The concave RS-T elevation returned to normal some 70 days after the death of his cousin when the patient regained self-confidence and was completely asymptomatic.

A concave RS-T elevation was observed not only in Negroes, Africans and Indians but also in Caucasians. Grusin\(^5\) considered this pattern to be abnormal and probably of nutritional origin, but Srikantia, Padmavati and Gopalan\(^6\) denied it. Goldman\(^7\) and Fenichel\(^7\) considered this pattern to be a normal variant and ascribed it to an early onset of repolarization. The author indicated the possibility of psychic origin of this pattern\(^1,2\) and studied its psychosomatic significance by the Cornell Medical Index\(^3\). Experimentally, Raab et al\(^5\) induced a marked concave RS-T elevation with a heightened, tapering T wave by sympathetic stimulation in animals with coronary restriction. Takayasu and his associates\(^6\) also observed an ST segment elevation, a T wave tapering and a U wave disappearance in dogs with coronary restriction. With decreases in the ST elevation and the T wave tapering, they observed a negative, biphasic or positive U wave.

It is well known and generally accepted that long-continued stress can produce a variety of adaptive responses such as have been discussed especially by Selve. It is also empirically accepted that anxiety or other strong emotion can produce an increase in heart rate, cardiac output and an elevation of blood pressure. Therefore, anxiety or stress may be accompanied by electrocardiographic changes in the absence of demonstrable heart diseases. Certain undetermined physiologic concomitants of anxiety or stress may be responsible for this

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disturbances in the electrical activity of the heart. Similarly, stresses of a magnitude incompatible with a normal life can influence the electrocardiogram of a person whose autonomic nervous system is already impaired by stresses. Then, one can trace the sequence from the onset of emotional tension to the development of electrocardiographic changes. The purpose of this paper is to show evidence that anxiety or other emotional stress is related to the genesis of the concave RS–T elevation in clinically normal hearts.

CASE REPORT

The patient, N. I., a 36-year-old married male, was first seen at the Mitoyo General Hospital on June 5, 1965. He was a farmer, smoked 10 to 20 cigarettes daily and had no habit of drinking alcoholic beverages. About 7 months prior to his first visit, he was affiliated himself with the structure-improving committee which investigates the ways and means of agriculture and forestry. He was a treasurer of the committee. His complaints included paroxysmal precordial oppression, sudden onset of rapid heart action, shortness of breath, weakness, insomnia, anorexia, excessive sweating, nightmare, gastrointestinal disturbances and so on. He had a morbid fear of developing cancer of the stomach because his cousin was operated on for gastric cancer at the age of 36. From 1962 he was told that he had a borderline hypertension, although he had no acute cardiovascular symptoms until the present illness. The first attack of precordial oppression came midnight on May 15, 1965 after the meeting of the structure-improving committee. On May 17, 1965 he had again the same attack, which was severer than the preceding one, after he met a member of the structure-improving committee. The attacks occurred intermittently with a progressive increase in frequency and depressive, neurasthenic mood. He entered the hospital on June 6, i.e., 1 day after the first visit. Family and past histories were noncontributory.

Physical examination revealed a thick, muscular young man of apoplectic habitus. The thyroid, lung and heart were normal. The heart rate ranged from 150/90 to 120/80 mmHg. Neurological examinations revealed a slight tremor of the hands and normal tendon reflexes. Laboratory examinations revealed red cell count 4.40 million, hemoglobin 92.5 per cent, hematocrit 45.5 per cent, leukocyte count 5,500, sedimentation rate 1 mm per hour, serum cholesterol 295 mg per cent, serum total protein 7.7 g per cent, A/G ratio 1.8, icterus index 3, CRP negative, Co R, Cd R, GOT 24 units, fasting blood sugar 85 mg per cent, serum alkaline phosphatase 3 units and serologic tests for syphilis all negative. Urinalysis and feces examination were unremarkable and duodenal drainage disclosed a normal B bile. The basal metabolic rate was normal, and radiographic examination of the gastrointestinal tract noncontributory. Cholecystography disclosed biliary dyskinesia, and the cold pressor test was markedly positive.

COURSE AND TREATMENT

After admission, the patient remained afebrile except for a few occasions of subfebrile period when he complained of a feeling of oppression in his chest, weakness, anorexia, insomnia, and nausea. By persuasion and administration of tranquilizers, the subjective symptoms gradually subsided and he became bright. However, on June 18, 1965 his cousin with postoperative gastric cancer entered the hospital and wished to take to his bed next to him in the same room. A relative of them slept in the intervening space. That night all the symptoms which had been subsided developed again, and the blood pressure rose to 150/100 mmHg. The following day the patient was removed to the room opposite to the room in which his cousin was accommodated. However, there was no marked improvement in his subjective symptoms. Therefore, his cousin was removed to a room of another ward. Even by these cares his subjective symptoms were not improved. His cousin, 36 years of age, gradually became serious and died on July 30, 1965. Few days after funeral of his cousin, his subjective symptoms began to improve again. He was encouraged to leave his bed in the daytime and to have a mild exercise or take a walk to a neighboring park at a seaside. He improved
Fig. 1. Appearance and Disappearance of a Concave RS-T Elevation in a Patient with Actual Neurosis
N. I., a 36-year-old man


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rapidly, gained weight and became bright. On August 10, 1965 he had again the paroxysmal precordial discomfort after he visited a patient who had been operated on for gastric ulcer. Psychotherapy including persuasion and explanation of physiologic nature of the symptoms were carried out repeatedly when the attendant physician visited the patient. He regained self-confidence and was to leave the hospital at the middle of September. Unfortunately, on September 6, 1965, a patient with bronchial asthma in a state of status asthmaticus entered his room as an urgent case and took to his bed next to him. His subjective symptoms developed once again that night, but few days later they were subsided as the urgent patient was improved. The author made the most of this event to make him realize the relation between the environmental factors and his annoying subjective symptoms. After this event he improved steadily and became able to overcome his mental uneasiness concerning his body and life. He left the hospital on September 24, 1965 with some simple pamphlets on neurosis. One week after discharge he visited the out-patient department to tell that he was well without medication. On October 15, 1965, the author phoned him to come to the hospital for the electrocardiographic follow-up. The electrocardiogram taken on that day was almost equal to that taken on admission on June 5, 1965.

**Electrocardiographic Follow-up**

The electrocardiogram was not taken at regular intervals but taken roughly twice a month. All electrocardiograms were taken in a recumbent position with 1 mV being 10 mm. As shown in Fig. 1, the most marked changes were observed in the electrocardiogram taken on July 22 (Fig. 1–c) when the patient’s cousin was seriously ill. The height of the R was increased especially in V4, V5 and V6. The concave RS–T elevation was most marked in V4. On July 22 (Fig. 1–c), a junctional ST segment became a concave RS–T elevation in mid- and left precordial leads, the T wave was not only heightened but also became more tapering, and the U wave merged in the downstroke of the T wave and the (Q–aU)/QQ ratio, which was 0.61 on June 5 (Fig. 1–a), became 0.45. The electrocardiogram taken several days before September 28 was once nearly equal to that taken on October 15 (Fig. 1–f). However, for an undetected reason the ST segment was elevated again on September 28 (Fig. 1–e). The electrocardiogram taken on October 15 (Fig. 1–f) was nearly equal to that taken on admission (Fig. 1–a). The height of the R was lowered but still higher than that taken on June 5 (Fig. 1–a). The concave RS–T elevation on July 22 (Fig. 1–c) became a normal junctional ST segment, and the T wave was lowered and less peaked on October 15 (Fig. 1–f). The T wave in V4 on June 5 (Fig. 1–a) was higher than that on October 15 (Fig. 1–f). The U wave was separated from the downstroke of the T wave, and the (Q–aU)/QQ ratio which was normally 0.55 became 0.57 on October 15. Slightly accented U waves in V4 and V5 may be due to a borderline hypertension.

**Discussion**

It seems to be natural that concave RS–T elevation was first noted by physicians who examine Negroes, Africans, Indians or Jews when we admit the psychic origin of the concave RS–T elevation. The psychic origin, however, requires the universal validity of the concave RS–T elevation in all nations and races because man must struggle for life regardless of his nationality and race. What makes the difference is that the life is bitter for some and sweet for others. SRIKANTIA, PADMAVATI and COPLAN found the concave RS–T elevation about 2 times more frequently in the low-income group than in high-income group and 5 times less frequently in the army officers than in other ranks. The occurrence of the concave RS–T elevation was most frequent in the 3rd and 4th decades (74%) and related most frequently to occupations in males (73%). In females, it was most frequent in the 5th and 6th decades and related most frequently to domestic affairs (82%). When we consider the facts that a concave RS–T elevation with a tapering T wave can be induced...
by sympathetic stimulation in animals with coronary restriction and that a patient with a concave RS-T elevation frequently suffers from precordial oppression or tightness in the chest, it can safely be stated that the concave RS-T elevation may be related to changes in rapidity and completeness of cardiac contraction and relaxation due to changes in the vegetative regulation. These changes in cardiac actions may affect periodic changes in coronary blood flow which is normally largest in diastole. If a shift in this periodic change in coronary blood flow occurs, an ST elevation may appear when otherwise a normal ST segment or an ST depression is to occur. So far as the autonomic nervous system is concerned, the concave RS-T elevation is physiologic and therefore reversible. In fact, psychosomatic interpretation of the concave RS-T elevation gives, not infrequently, an important clue to the resolution of many of biologically inexplicable cases.

SUMMARY

An appearance and a disappearance of a concave RS-T elevation which was intimately related to the severity of stress were observed in one 36-year-old male. The patient entered the hospital on account of annoying subjective symptoms such as precordial oppression, tachycardia, nausea, anorexia, insomnia, weakness and so on which appeared 4 months after he affiliated himself with the structure-improving committee as a treasurer. The electrocardiogram taken on admission was almost normal. Two weeks after admission, his cousin with postoperative gastric cancer, 36 years of age, entered the hospital and took to his bed next to him. That night all the symptoms which had been subsided after admission developed again. The patient lived with his cousin in the same hospital for some 40 days with these subjective symptoms. The electrocardiogram of the patient taken one week before cousin’s death, when the subjective symptoms of the patient were most marked, showed a marked concave RS-T elevation and a heightened, tapering T wave. About 70 days after cousin’s death, when the patient was completely asymptomatic, the electrocardiogram showed a pattern nearly equal to that taken on admission. There were signs of neither infarction nor pericarditis.

REFERENCES


ADDENDUM

Recently, Seriki and Smith reported “an S-T segment elevation in excess of 2 mm. with a concave form ending in a tall positive T wave” occurring in 34 per cent of male medical students in Nigeria and discussed as follows: “It seems to be unlikely that it is related to cardiac diseases, since all of our subjects were healthy and gave no history of previous illness”.


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