A CLINICAL STUDY OF TWENTY CASES OF NEURO-CIRCULATORY ASTHENIA IN CIVILIAN PRACTICE

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Introduction

NEURO-CIRCULATORY ASTHENIA (NCA) also known as effort syndrome, disordered action of the heart, the irritable heart of soldiers, and as DaCosta's syndrome, is a condition of abnormal functional irritability and instability of the nervous and circulatory systems. The American terminology, neuro-circulatory asthenia, is to be preferred, since it lays emphasis on the neuro-asthenic as well as the circulatory symptoms which form the chief clinical features of the disorder.

Though more common in soldiers during war time, the syndrome is not rare in civilians. Extreme physical effort may bring about symptoms of circulatory distress such as dyspnoea, palpitation, praecordial pain, weakness, dizziness, faintness and tremor. Further effort is prevented by the earlier onset of fatigue of the neuro-muscular apparatus. Since this group of symptoms is brought about by effort, it has been called effort syndrome. The effort syndrome is more easily brought about in the weakly, physically ill-trained, sick, tired, or nervous subject. In the normal well-trained subject the first symptom to limit further activity is dyspnoea. In poorly built, weakly nervous subjects, these symptoms may become manifest merely on excitement with little or no effort, palpitation and not dyspnoea being the presenting feature. The recognition of this distressing functional disorder is of the greatest importance, since organic heart disease must be excluded before proper treatment can be instituted.

Etiology

Age.—The age incidence in my series of 20 cases was between 20 and 25 years in the majority of the cases. The youngest was 18 and the oldest 32 years.

Sex.—Eighteen males and 2 females were affected. This incidence seems to show that the male is more commonly affected.

Heredity.—Often one of the parents at least is highly strung and nervous.

Strain.—Financial or family worries, emotional conflicts, nervous or physical fatigue, debility from infections may all be contributory causes. Though tea, coffee and tobacco do not by themselves give rise to neuro-circulatory asthenia, there is no doubt that they are made worse by their use.

Social status.—All my patients were fairly well educated and intelligent. The country folk seem to be rarely affected.

Nutrition.—Though the well-nourished subject is not exempt from the condition, the disorder seems to be especially common in the under-nourished. In most of my cases the subject was lean, lanky, under-nourished and rarely inclined to play games.

The cause of the abnormal irritability and undue fatigability of the central nervous system has not yet been explained. Why cerebral symptoms are dominant in some and gastro-intestinal or cardiovascular in others is also unknown. All that can be said is that neuro-circulatory asthenia seems to occur in certain subjects who seem to be constitutionally inferior and endowed with a hypersensitive nervous system, on account of which they find themselves unable to withstand the stresses and strains of modern life. In his Goulstonian lectures, Wood (1941) has adduced evidence to show that the syndrome is the manifestation of emotional stimulation, usually fear. It should therefore be regarded as a psychoneurosis giving rise to somatic phenomena which may be cardiac, respiratory or gastro-intestinal depending upon the different reactive patterns to psychological distress; and so it really comes within the realm of the psychiatrist. Many attempts have been made to explain the somatic disorder by the altered biochemistry of blood. There is no evidence of decreased oxygen tension in the blood. The circulation time also is within normal limits. Soley and Shock (1938) came to the conclusion that the alkalosis resulting from hyperventilation produces the symptoms. The investigations of Guttmann and Jones (1940) do not support this view. Hyperventilation was not a presenting feature in my cases; it was really a rapid shallow breathing and not a true hyperventilation which washes out the carbon dioxide to produce alkalosis. Moreover, palpitation, which is extremely common in neuro-circulatory asthenia, does not seem to be a manifestation of the hyperventilation syndrome. From their investigations on the effect of exercise on soldiers with effort intolerance, Jones and Scarisbrick (1943) concluded that fatigue was not a result of respiratory alkalosis, though the bicarbonate content may become slightly lowered subsequent to the production of lactic acid. In their experiments, the lactic acid showed a response similar to normal persons. The average man becomes exhausted when the lactic acid content of the blood is about 100 mg. per 100 c.cm. In effort syndrome, it was found that most of them desisted from work when the lactic level was still quite low. From these facts it becomes clear that the patient's physiological response to exercise is not different from that of the normal subject, though he stops work earlier than the normal subject. In other words, it is reasonable to conclude that a psychological and not physiological abnormality is the cause of asthenia.
Symptoms

The chief manifestations are fatigue (90 per cent), nervousness (75 per cent), palpitation (95 per cent), dizziness (60 per cent), fainting (15 per cent), headache (40 per cent), breathlessness (90 per cent), hyperhidrosis (75 per cent), tremor (60 per cent), precordial pain (75 per cent), xerostomia (20 per cent), insomnia (30 per cent), anorexia (25 per cent), frequent micturition (20 per cent), and unexplained phobias (20 per cent). These symptoms are usually brought about by effort or excitement in young hypersensitive nervous subjects, and in bad cases they may become manifest with little or no provocation. They are made worse by nervous strain and infection.

Signs

The physical build is often poor, the chest being long and narrow. A nervous manner is easily observed. Tachycardia is the rule. The pulse rate which ranges between 90 and 100 per minute at rest may even go up to 120 or 130 on slight provocation. The sleeping pulse rate is within normal limits (65 to 75). The hands are cold and moist with sweat, and this hyperhidrosis is sometimes very distressing. Visible axillary sweating is not uncommon. Overaction of the great vessels may be evident at first sight. Tremor is common. The knee jerks are very brisk.

Cardiovascular system.—The apex beat is normally situated. It may be forcible, and there may be a wavy impulse over the precordium. A systolic murmur is not uncommon, but it does not possess the usual characteristics attributed to organic murmurs. Apart from overaction of the heart, there is no evidence of any organic disease.

Blood pressure.—The systolic blood pressure is higher than the normal average and it is often very labile. I have seen the blood pressure going up to 160 and coming down to 130 in a few minutes. It may rise quickly from 120 to 160 with little or no cause. The diastolic pressure is not much elevated. The coldpressor test which was done in ten cases revealed an average rise of 18 units of mercury for the systolic and 8 units for the diastolic pressure.

Fundus oculi.—On ophthalmoscopic examination, there may be visible pulsation of the vessels. The arteries were visibly pulsatile in 5 cases.

Electrocardiogram.—The electrocardiogram was normal in most of the cases. The only abnormalities detected were as follows:

1. Low voltage in lead I—3 cases.
2. Slurring of R wave in lead I—2 cases.
3. Inversion of T wave in lead II—2 cases.
4. Inversion of T wave in lead III—4 cases.
5. Right axis deviation—3 cases.

Apart from these changes, there were no other abnormalities except tachycardia (90 to 120 per minute). The abnormalities detected do not seem to indicate any organic cardiac lesion. Low voltage in lead I is by itself of no consequence. Slurring of the R wave in lead I was associated with a low voltage; therefore, it cannot be considered as indicative of damage. The inversion of T wave in lead II was not associated with any significant changes in the Q wave. Inversion of T wave in lead II has been observed in excited subjects before anesthesia. Inversion of T wave in lead III is often physiological. Right axis deviation seems to have been a manifestation of a vertically disposed heart; for on radiological examination the appearance of the heart was that of the ‘dropped’ type.

Electrocardiograms taken in five cases after exercise did not reveal any changes suggestive of insufficient coronary circulation. Apart from tachycardia, there was no other abnormality as compared with the electrocardiogram taken before exercise.

Vital capacity and B.M.R.—The vital capacity was measured in ten cases. It was found to be diminished as a rule. The average was 2,200 c.cm. The B.M.R. (Benedict-Roth apparatus) was carried out in five cases and found to be within normal limits in all of them. It is very difficult to measure the B.M.R. in these patients, since their breathing is extremely irregular and the tracings obtained practically useless for interpretation. A tendency to sighing respirations is also common. The ability to hold the breath is impaired, many of the patients being unable to hold their breath for even 10 seconds.

Blood.—The haemoglobin, red cell count, erythrocyte sedimentation rate, fasting blood sugar and glucose tolerance tests were within normal limits. The W.R. was negative in all cases.

Urinary findings.—The only abnormal urinary findings were benign albuminuria (three cases) and oxaluria (four cases). Transient glycosuria was observed in two cases. The efficiency of the kidneys as judged from concentration tests in eight cases was normal.

X-ray examination was done as a routine in all cases. In no case was the heart enlarged. In fact, the heart often looked smaller than normal and sometimes vertically disposed. The overaction of the heart was easily observed on screening.

Differential diagnosis.—Neuro-circulatory asthenia is often confused with organic heart disease, thyrotoxicosis and pulmonary tuberculosis. In organic heart disease the type of the murmur is different and cardiac enlargement may be demonstrable. Electrocardiography and x-ray examination may give valuable information. In case of doubt it is best to watch the patient for a few months before diagnosing organic heart disease. In thyrotoxicosis, patients often deny that they are ill and are eager to go back to work; their manner is alert and aggressive; their hands are warm and moist and the
sleeping pulse rate and B.M.R. are both increased. On the other hand, in neuro-circulatory asthenia the patients have numerous complaints and welcome restriction of their activities; their attitude suggests despondency and inactivity; their hands are cold and moist and the sleeping pulse rate and B.M.R. are normal. Pulmonary tuberculosis must be ruled out after a careful examination of the lungs, including radioscopy.

Course and prognosis

The course of neuro-circulatory asthenia is very variable. There are several grades in the severity of the condition. Though complete recovery is possible there is always a probability of recurrence after infection, worry and emotional stress. Neuro-circulatory asthenia does not cut short life though it may cause the patients to lead crippled lives. There is no evidence that neuro-circulatory asthenia is a precursor of organic heart disease.

Some of my patients have been watched for more than four years, and there is no evidence of hypertension having supervened in any of them.

Treatment

It is essential to reassure the patient and win his confidence by dispelling all his fears of cardiac disease. The cause of the malady should be explained to him. A thorough examination of the patient including electrocardiography and radiography should be done. It is unwise to start treating these patients with drugs. They seem to be particularly sensitive to digitalis and strychnine. Digitalis increases the irritability of the heart; tonics containing strychnine increase the irritability of the nervous system. To allay nervousness, sedatives like bromides and luminal may be helpful. Some cases are best dealt with by a competent psychiatrist. There is no doubt that in many cases the syndrome should be considered as a neuro-psychiatric and not a cardiovascular problem.

Attempts have been made to cure the condition by surgical treatment such as denervation of the adrenals (Crile, 1934). There is no doubt that emotions increase adrenaline secretion, and many of the symptoms may be due to it. An injection of ½ c.c.m. of adrenalin to these patients brings on the symptoms of neuro-circulatory asthenia. But denervation of the adrenals is a serious operation. It is much easier to irradiate the adrenals. At the suggestion of Dr. A. C. Devaraj, Radiologist of the Krishnarajendra Hospital, five of the fairly severe cases were subjected to irradiation. All of them improved. One had a mild relapse after a year. It may be necessary to irradiate again such a case. This method of treatment is simple and worth a trial. Further observation is necessary before assessing its full value.

The general management of these cases is of the greatest importance. They must attune their lives to a low key and avoid emotional upsets and excess of tobacco, coffee and tea.

A daily injection of 5 to 10 units of insulin (with glucose by mouth) for 6 to 8 weeks increases the appetite and helps to improve their physical build. Five of my patients improved by this line of treatment. Insulin should be cautiously given since some of them are sensitive to it. Sodium chloride and eucortone, which are so useful in the treatment of the myasthenia of Addison's disease, do not seem to be of much value in neuro-circulatory asthenia.

Summary

A study of twenty cases of neuro-circulatory asthenia is given. It is not a rare condition in civilian practice. The symptoms, differential diagnosis and treatment are briefly discussed. The cause of the undue excitability and fatigability of the neuro-muscular apparatus is not known. There is no evidence of any altered physiology in these patients. The clinical, radiological and laboratory findings are suggestive neither of the presence nor of the subsequent supervention of any organic lesion. In many cases it is better to consider the syndrome as a neuro-psychiatric rather than as a cardiovascular problem. Irradiation of the adrenals is a simple procedure worth trying in these cases.

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*SOMATIC TÆNIASIS (SOLIUM CYSTICERCOSIS)*

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Several cases of somatic tæniasis have been reported in India as well as among British