TREATMENT OF ANGINA OF EFFORT*

BY

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Cardiac pain may be founded on organic disease of the coronary vessels or it may be of a functional variety described variously under labels such as angina innocens, pseudo-angina, and left submammary pain. There are also certain well-known non-cardiac causes of chest pain which simulate cardiac pain fairly closely: fibrositis of the pectoral muscles, brachial neuritis, cholecystitis, pneumothorax, and diaphragmatic hernia are examples of this.

The first essential step is to distinguish clearly angina of effort. This is a pain generally felt centrally in the chest, but occasionally more on the left side. In a few individuals its first and chief manifestation may be in one or the other arm. Classically it is central and radiates most commonly to the left arm or to both arms. It is a quantitative pain, being exactly proportional to the amount of exercise the patient is taking. With slow walking or at rest there is no pain, but with any increase in the amount of exercise above a definite level a sensation of pressure, discomfort, or even pain arises. Should the exercise be increased the pain is quantitatively increased, and if the exercise ceases the pain immediately begins to subside. This symptom is so exact and so striking, and is supported so strongly by evidence on the point obtained electrographically and by post-mortem examination, that there can be no doubt that it results from some interference with the adequate flow of blood through a branch of the coronary arteries during exercise.

Grouping of Cases

For purposes of treatment angina of effort can be divided into two groups—the slight or moderate and the severe. Slight angina of effort need not be treated by rest in bed. There is only one real indication for putting such a patient to bed, and that is where the angina of effort is the only symptom of a small coronary thrombosis. This is a somewhat rare occurrence, but very definite in its symptoms, and suspicion of it should arise whenever angina of effort suddenly starts in a hitherto healthy person. In such cases the severity of the pain is greatest at the beginning and slowly subsides as time goes on. In the ordinary case the onset of the pain is gradual and is at first not taken great notice of by the patient, who ascribes it to flatulence or dyspepsia. Here the patient should be encouraged to take as much exercise as is comfortable, provided that it does not bring on pain. Where the pain only occurs at the starting of exercise, after which it can be walked off so that subsequent exercise produces no pain, the patient should be encouraged to do this, if necessary with the help of a tablet of nitroglycerin, which should be taken before the first pain is due to arise. The reason for encouraging such patients to take as much exercise as possible is that this measure is most likely to stimulate the development of a collateral circulation in the heart.

Patients with symptoms of angina of effort may also be subjects of adiposity. These patients may be helped considerably by a reduction in their weight. This reduction should not be made too rapidly, and if possible it

should not be accelerated by the use of thyroid extract, for hyperthyroidism appears to be a factor in the sensitivity of the nervous system to cardiac pain. Another general measure to be considered is that of posture. The individual who carries most of his weight in his abdomen tends to assume automatically a position of lordosis. It has been claimed that correction of this posture by a properly fitting abdominal belt helps the thoracic movements and thus the mechanical position and function of the heart.

Prognosis

Perhaps the most necessary step in the treatment of patients with cardiac pain is an absolutely full and sympathetic physical examination. The patient should be first convinced that his cardiac condition has been made quite clear by the examination, and this examination should entail a complete history, physical examination, and investigation by electrocardiograph and screening apparatus. The next step is to explain to the patient, to an extent compatible with his understanding, that his symptoms are due to some loss of elasticity in a blood vessel, the result of which is that the heart is not receiving its full amount of blood during exertion, and to indicate to him that gradual and careful exertion is likely to help the organ to readjust itself to the new situation. The label "angina" should be omitted, for its application will only add a quite unnecessary factor of apprehension. The second point that should be stressed is that the pain is not dangerous, and that patients do not die during such attacks of pain. In an investigation into 112 successive cases of angina of effort Dr. Bodley Scott and I found only one example of death during an attack. It should also be borne in mind that patients with true angina of effort may live from ten to fifteen years after the start of the symptoms, and that although a certain proportion of them subsequently die of coronary thrombosis, yet many succumb to some quite different disease.

The above reasonably good prognosis will have to be modified and the modification explained to the patient's most responsible relative in certain circumstances; these are the presence of severe shortness of breath during exercise, of Cheyne-Stokes respiration, or of paroxysmal nocturnal dyspnoea, and electrocardiographic evidence of some serious myocardial disease, such as shown by a bundle-branch lesion, inversion of the T wave in Leads I and II, or a deep Q wave in Lead III. Another point suggesting a bad prognosis is a family history of sudden cardiac deaths during the 50's or early 60's. In one such family two brothers of the patient had died of coronary thrombosis and one had recovered from an attack, while the patient himself had suffered from coronary thrombosis two years previously and his tracing now showed evidence of gross myocardial disease.

In addition to reassuring the patient to the fullest possible extent, it should be explained that life must be lived physically and mentally in as leisurely a manner as possible. Hurry, tension, and strain should be avoided, and an attempt to cram into the day just one or two more activities than it would comfortably hold should be prohibited.

Coexisting Conditions

Certain other conditions may be present in a patient suffering from angina of effort. Disease of the stomach is particularly apt to accentuate cardiac symptoms, and the possibility of gastric ulcer, hyperchlorhydria, or even carcinoma must be considered, and, if present, they must be treated. A man who had been attending St. Bartholomew's out-patient department with a classical angina of

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effort was found also to be suffering from dyspepsia and loss of weight. He had a carcinoma of the stomach, which was removed surgically, after which his cardiac pain subsided. The effect of rest in bed as such could be considered here as a factor, but rest in bed alone is not usually followed by the disappearance of the symptoms of angina of effort. Disease of the thyroid gland where hyperthyroidism or hypothyroidism is present should also be kept in mind. Two cases of myxoedema with angina of effort in our follow-up clinic have been treated with thyroid extract, and both patients have lost their cardiac pain. Diabetes mellitus is often complicated by arteriosclerosis of the coronary arteries, resulting in angina of effort. Careful treatment of the diabetes generally helps these patients, but it should be remembered that the heart muscle needs a free supply of glycogen, and therefore, if it is not possible to balance the diabetes with less than 120 grammes of carbohydrate per day, it is advisable to give a freer supply of this with a proper quantity of insulin.

Drug Treatment

The drug treatment of angina of effort is somewhat disappointing except for the effect of nitroglycerin. Phenobarbitone, 1/4 grain t.d.s., p.c., is probably the most useful drug; but it can be given in combination with theobromine or diuretin in some such preparation as theogardinal, 5 grains t.d.s., p.c. In a few cases theobromine alone, 3 grains t.d.s., p.c., or theobromine sodium salicylate, 10 grains t.d.s., p.c., is effective. Nitroglycerin tablets can be taken by the patient as often as they may be required for the prevention or the treatment of pain. They are generally put up in chocolate, so that the patient may be reminded to crush them in the mouth and hold them there for a few minutes before swallowing. If they are swallowed direct, pharmacological action is delayed and is sometimes less efficient.

Type of Person Affected

It has long been known that patients with angina of any kind tend to be of the highly strung, easily reacting type, and this is borne out by the fact that the symptom is said to be rare among the negroes and the Chinese, whose threshold for pain seems to be higher. A scientific basis for this observation is suggested by the work done by Dr. Wittkower and myself on the psychological make-up of patients suffering from heart disease with and without cardiac pain. The proportion of patients with some psychological abnormality is higher in the cardiac pain group. This increase is present both in angina of effort and in the functional group, but is higher in those patients with a functional type of pain. Following upon this a series of twelve cases has been treated by Dr. Wittkower psychologically, and the results seem to indicate that where a definite psychological abnormality exists the treatment of this is likely to help to diminish or to banish the cardiac pain.

Three Organic Diseases influencing Treatment

There are three organic diseases which interfere with the coronary circulation and which must be remembered in planning a course of treatment in angina of effort. These are coronary thrombosis manifested by angina of effort, angina of effort due to syphilitic aortitis, and angina of effort due to anaemia, whether pernicious or microcytic. Where angina of effort follows directly after a coronary thrombosis there is a very good chance of its disappearing completely during the subsequent twelve months or so,

and the patient should be so informed. In the case of syphilitic aortitis manifesting itself by angina of effort the cardiac pain can often be cured by thorough anti-syphilitic treatment. This should consist of a six-weeks course of full doses of potassium iodide, 90 to 150 grains daily, a subsequent course of bismuth injections, and a final course of intravenous injections of neosalvarsan. This programme should be repeated, with intervals of two to three months' rest, until the Wassermann reaction becomes and remains negative. When angina of effort is due to anaemia, the pain nearly always completely disappears with the improvement of the blood count.

Thyroidectomy

The vast majority of all cases of angina of effort respond successfully to treatment on the lines described, but there remains a small group in which the cardiac pain is extremely severe and no improvement follows persistent treatment. In these cases some operative procedure may be justifiable. From a total of about 400 cases of angina of effort I have picked out fourteen as being suitable for thyroidectomy. In nearly every one of these the relief from pain has been striking, and this relief has lasted in the least successful case for a period of six months. The more successful cases have had periods of up to three years, during which time the pain has either vanished or has become so slight as to cause no serious inconvenience. The details of this procedure have been published elsewhere, but it should be remembered that so radical a measure should not be embarked upon without very serious consideration.

The chief indications for thyroidectomy would seem to be that the pain is extremely severe, that previous treatment has failed, that the pain shows no sign of decreasing, that the pain is not the result of a recent coronary thrombosis, that the patient is not adipose, and that there are no signs, clinically or electrographically, of grave disease of the heart muscle. It is possible that in the future omentopexy could be a means of successfully treating these patients, but the evidence available to date has not proved without doubt the usefulness of the measure as a method of general application.

Summary

The origin and symptoms of angina of effort are described.

Cases are classified into two groups and treatment in these is detailed, the necessity for a complete and sympathetic physical examination being stressed.

Points suggesting a good or a bad prognosis are discussed.

Concomitant conditions that accentuate the symptoms of angina of effort are subjects of survey, together with three organic diseases that influence treatment.

The indications for thyroidectomy are given.

Calcium Deficiency.—A diminished calcium content of the blood may be accompanied by normal, excessive, or diminished excretion of calcium in the urine. Treatment by calcium salts orally is rarely efficient. Injections of calcium have a transient effect only, but are useful in tetany and in similar manifestations. Treatment by irradiated ergosterol—8,000 to 10,000 rat units a day for about a month—gives good results in rickets and osteomalacia, and in tetany with calcium deficiency. A.T.10 is less valuable because it mobilizes the calcium at the expense of the bones.—Calcium Deficiency. J. Decourt.—*Ann. Méd.*, May, 1939, 45, 362.