THE NATURE AND SIGNIFICANCE OF HEART SYMPTOMS.

BY

SIR JAMES MACKENZIE, M.D., F.R.C.P., F.R.S.

(From the Institute for Clinical Research, St. Andrews.)

III.—HEART FAILURE.

WHEN anything is detected amiss with the heart the essential question for the practice of medicine is, "Does this sign indicate heart failure, or does its presence foreshadow its oncoming?" No examination, however elaborate, can be considered complete, no prognosis of any value can be given, and no rational treatment can be indicated unless these questions are satisfactorily answered. A knowledge of heart failure is therefore essential to the intelligent practice of medicine.

Definition of Heart Failure.

Heart failure may be defined as the condition in which the heart is unable to maintain an efficient circulation when called upon to meet the efforts necessary to the daily life of the individual. This definition is made wide and includes conditions of extreme failure as well as those where the failure is beginning. In the definition it was stated, "when called upon to meet the efforts necessary to the daily life of the individual," and this gives the clue to the symptoms of heart failure. It is a matter of common experience to find a person at rest presenting no physical sign of impairment when examined most carefully, yet on effort or certain kinds of effort symptoms are provoked which are due to the inability of the heart to meet the effort—that is to say, when at rest the heart is quite efficient, and its inefficiency is only found out when effort is made; and from this it is seen that the first signs of heart failure are shown by symptoms being called forth when the individual performs an effort which he was wont to do without any symptoms. The "response to effort" is therefore the sole guide in the detection of the early signs of heart failure.

CLASSIFICATION OF SYMPTOMS.

Most cardiac symptoms can be arranged in four groups, according to the structures which give rise to the symptoms, each group having also a particular significance.

1. *Symptoms due to lesions of the valves.*

The symptoms of this group may show the progressive effects of a disease where the valves are being damaged, as the appearance of a murmur during an acute illness, or the gradual alteration of the murmurs, as in the slow progress of mitral stenosis. The kind of information conveyed by murmurs is that the valve may be the site or focus of an infective disease, or that the damaged valve may present an obstacle to the work of the heart muscle.

2. *Symptoms due to alteration in rate and rhythm.*

The kind of information furnished from this source is of a disturbance of some part of the conducting or reflex system of the heart—that is, of the parts concerned in the regulation of the heart beat and in the production and conduction of the stimulus that causes the contraction of the different chambers of the heart.

3. *Symptoms due to alteration in the size and shape of the heart.*

The kind of information conveyed by these symptoms is that the heart is distended by an increase of its contents (dilatation), or that its walls have become thickened (hypertrophy).

4. *Symptoms due to an inefficient output of blood from the heart—that is, the symptoms due to heart failure.*

THE SIGNIFICANCE OF SYMPTOMS.

It is to be observed that the first three groups of symptoms—that is, the modified sounds, variations in rate and rhythm, and alteration in the size and shape of the heart—do not give evidence of the functional efficiency of the heart. Diseased valves, abnormal rhythms, and increase in the size of the heart are so often associated with heart failure that they have come to be looked upon as evidences of heart failure; but this is a mistake. It may be said that signs revealed by the

physical examination of the heart or by instruments do not give this kind of information. It cannot be insisted too strongly that though information of a useful kind can be obtained from these signs, they do not give the kind of information that is essential for rational practice. This warning is needed, for the attention given to physical signs tends to foster the idea that such signs are capable of revealing the functional inefficiency of the heart. The spectacular nature of this kind of examination makes the more important inquiry into the patient's sensations seem ineffective.

The Two Forces of the Heart Muscle.

As heart failure is first shown by a limitation of the field of the heart's response to effort it is necessary to recognize some of the features of the heart's power to accomplish its work.

As the heart possesses the power, not only of maintaining an efficient circulation when the body is at rest, but of varying its activity according to the bodily requirements, the force inherent in the heart muscle may be considered, for practical purposes, to be composed of two parts—that is to say, a part which is employed to maintain an efficient circulation when the body is at rest, and which therefore may be called the "rest force," and a part which is called into action when effort is made, and which may be termed the "reserve force." The rest force is the minimal force which the heart can exert to maintain the circulation at a level consistent with life. The impairment of this rest force produces those evidences of heart failure which persist when the body is at rest, such as dropsy and dyspnoea, and the continuance of such impairment eventually leads to a fatal issue.

The second part of the heart's force is that which is called upon when the body makes some effort. While the body is at rest this potential force is not exercised, but its possession enables us to undertake with ease all forms of effort. Inasmuch as this part of the heart's force is only used when exertion is made, it may appropriately be called the "reserve force" of the heart. Although we recognize what the reserve force is, it is not very easy to define it in words. Physiologists do not seem to have given it that study which its importance demands. Although difficult to define, its existence is proved in every movement of the body, and in every effort which is made, as it is by the possession of this faculty that we are able with ease to undertake all forms of effort.

Symptoms Produced by Failure of the Output of the Heart.

When an organ fails the evidence of its failure cannot usually be perceived by the study of the organ itself, but by the effects of its impaired function upon other organs. Heart failure means an output of blood from the heart insufficient to meet the requirements of the body, and if we possessed the power we might detect evidence of this limited supply in the various organs. All organs or systems may receive an insufficient supply. There are, however, only a few that give rise to perceptible symptoms, especially in the earlier stages. The first sign of heart failure is evoked by the organ or system which gives rise to the most prominent symptoms, and usually that system is the respiratory. Hence the reason that respiratory distress in response to effort is often the earliest sign of heart failure.

Symptoms Produced by Exhaustion of the Heart Muscle.

When the heart muscle itself receives an insufficient supply of blood, as in blocking of the coronary artery, it may give rise to symptoms when it is called upon to make an effort by reacting on the nervous system, and thus we often get pain on effort as the earliest sign of this kind of heart failure. The same kind of symptom arises when the heart muscle is exhausted from overwork or when supplied by impure blood or blood defective in some essential quality.

The Nature of the Symptoms of Heart Failure.

When we come to look into the mechanism of these two symptoms, respiratory distress and pain, we find that they are both due to a supply of blood insufficient for the effective functioning of certain organs. This is the aspect of heart failure which should be kept in view in describing the various features of affections of the heart. We do not yet possess sufficient knowledge to understand all the processes concerned in heart failure, but the more they are studied the more evident does it become that the symptoms of heart failure are to be found in the impaired function of organs that receive an insufficient supply of blood.

Signs in Advanced Disease of the Heart.

It is necessary to keep this simple description of the essentials of heart failure in mind. Obvious symptoms, such as dropsy and enlarged liver, tend to divert attention from the subtler and more instructive signs. These obvious signs are late developments, and the mechanism of their production is fundamentally the same as breathlessness, in that they are due to the inability of the heart to maintain an efficient circulation in certain organs and tissues.

The Varied Symptoms of Heart Failure.

This presentation of the subject may seem so simple that it might be assumed that the recognition of heart failure is an easy matter. While the principle is simple its application is extremely difficult in the present state of knowledge. Seeing that the main symptoms of heart failure are of the nature of sensations of distress experienced by the patient on effort, we must know what questions to put to the patient, and we must be able to interpret his replies. The ability to do this can only be acquired after a long experience. Sensations of distress on effort may arise from many other conditions than a failing heart; those due to the heart must therefore be clearly distinguished from those due to other conditions. The sensations of distress are often brought out in response only to particular kinds of effort. Thus a mechanic with a damaged heart may be able to swing a forehammer all day, but is pulled up on going up a hill. On a warm day a man may walk ten miles, but he may be pulled up on walking a hundred yards on a cold day.

Identical heart symptoms may arise when the heart muscle is diseased or when it is temporarily weakened from some passing infection. It is necessary to differentiate between these conditions. The severity of the distress may bear no relation to the gravity of the condition. In one man a slight pain may be of ominous significance; in another, pain of an agonizing kind may not be a sign of danger.

The signs of heart failure being mainly sensations of distress, it is useless to seek for a knowledge of heart failure from laboratory experiments. No doubt experiments reveal certain features, but they cannot give us the information necessary for the intelligent practice of medicine. Nor can such information be obtained from those who specialize in heart affections. This will at once become evident when it is realized that the symptoms of cardiac inefficiency are to be found, not in the examination of the heart, but by the symptoms produced by organs which do not receive a sufficient blood supply. Moreover, the heart is so often disturbed or weakened by disease in other parts of the body that an examination limited to the heart would of a certainty mislead.

The organ which receives a diminished supply of blood will give rise to symptoms peculiar to its function. We thus get a diversity of symptoms depending on the organs which are most affected, or rather whose symptoms are most in evidence. Therefore, to understand the symptoms of heart failure it is necessary to understand the symptoms produced by other organs. This kind of knowledge will never be acquired until we have a better understanding of the principles concerned in the production of symptoms. I have repeatedly called attention to the fact that so long as symptoms are incoordinated the study of disease clinically will merely result in an addition to a mass of chaotic details. When it is recognized that though symptoms are infinite in variety and in number the vital processes concerned in their production are few in number, it will be seen that with the recognition of these vital processes the chaotic mass of symptoms will be capable of classification according to their affinity in nature. This has already been demonstrated in describing the reflex process concerned in the movements of the heart. In heart failure the process concerned is an insufficient supply of blood, and each organ which receives an insufficient supply will show symptoms peculiar to its impaired function.

SUMMARY.

1. Heart failure occurs when the heart muscle fails to supply the organs of the body with blood sufficient for the efficient performance of their functions.

2. The symptoms of heart failure are therefore to be found in the symptoms produced by the impaired function of those organs that do not receive sufficient blood.

3. In the first instance this will occur only when the heart is called upon to exercise its full powers; the early symptoms of heart failure will only be produced during some physical effort.

4. This limitation of the field of response to effort is revealed by sensations of distress.

5. When symptoms of heart failure persist when the patient is at rest (dropsy, enlarged liver, orthopnoea) the reserve force of the heart is exhausted and the rest force is being encroached upon.

6. The symptoms of heart failure are not to be found by the examination of the heart.

DRAINAGE IN ABDOMINAL EMERGENCIES.

BY

A. CHURCHILL, M.B., B.S.LOND.,

LATE SENIOR HOUSE-SURGEON, BOLTON INFIRMARY.

VALUABLE papers have appeared from time to time in the *British Medical Journal* and *Lancet* emphasizing the importance of early diagnosis in acute abdominal crises. The responsibility for the heavy death rate of these conditions is in this way laid at the door of the medical attendant who is first called in to see the case.

It is an undoubted fact that the mortality amongst these patients increases in direct ratio to the time which has elapsed between the onset of symptoms and admission to hospital. Too often we have cases sent to the surgical wards which are more fit for the *post-mortem* room than for the operating table. Yet although so much depends on diagnosis, it is no use being blind to the fact that treatment in most of these cases is by no means a matter of universal agreement. Almost every step in our way of dealing with the commonest of abdominal emergencies is still open to controversy: the proper time for intervention, the site of incision, the mode of drainage.

Some surgeons advocate immediate operation as soon as a case of acute appendicitis is diagnosed; others prefer to wait until the crisis is over and operate *à froid*. McBurney's gridiron incision, Battle's incision, a paramedian incision with retraction of the rectus outwards, has each in turn been recommended as the incision *par excellence*. Last, but not least, drainage in the presence of free fluid in the abdominal cavity is a subject on which few agree. Swabbing the fluid out, flushing the peritoneal cavity with lotions, the use of tubes, have all been advocated by eminent authorities. On the other hand, a school of surgeons teaches that the peritoneum is well able to look after itself, and that the less it is interfered with the better. No more swabbing, no more flushing, no tubes, or only one where two or three were deemed necessary.

The 75 cases which form the basis of this paper seem to me to be of interest as having been treated on the lines of strictly limited interference. All the patients came from the working-class practice of a large industrial town, and the majority were not sent to hospital until several days after the onset of symptoms. They are thus anything but "picked" cases. I have purposely omitted four cases of general peritonitis who arrived moribund and died within twenty-four hours of their admission to hospital.

Technique.

The following rules were observed with regard to drainage:

- Drainage was only carried out in the presence of free pus or thick purulent fluid.
- The fluid was not swabbed.
- The peritoneal cavity was not irrigated.
- Not more than one tube was ever used, this in the great majority of cases being placed in Douglas's pouch.

As soon as the patients had recovered from the effects of anaesthesia they were put in the full Fowler's position, the upper end of the bed being raised on blocks three feet high.

Among those treated are included cases of general peritonitis and of perforation of the stomach or duodenum. At the present day in many teaching schools the routine methods of drainage for such cases are three tubes in the renal, right iliac, and pelvic pouches.

Incision.

The incision varies with the condition present. In doubtful cases a right paramedian incision with retraction of the rectus outwards. In perforations of the stomach or duodenum a paramedian incision above the umbilicus with retraction of the right rectus outwards. In cases of general peritonitis a similar incision below the umbilicus. In the majority of cases of acute appendicitis, McBurney's gridiron incision; this was used in forty-eight out of seventy cases. Battle's incision was only used twice. In a few cases an oblique incision going right through the thickness of the abdominal parietes; this gives excellent access, but doubtless the risks of hernia formation are increased.