Therapy of Heart Failure of Hypertensive Heart Disease

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The target organs of possibly fatal complications of hypertension are the brain, heart and kidneys, of which the latter two produce a most characteristic clinical picture.

Death from cardiac complication in hypertensive patients may occur due to one of three types of disorder, i.e. left heart failure, congestive heart failure and myocardial infarction; signs of heart failure, needless to say, are related quantitatively to the severity and duration of hypertension.

However, it cannot be denied that a potentiating effect of coronary or arteriolar sclerosis as precipitated by hypertension also plays a role.

Speciality of Heart Failure of Hypertensive Heart Disease

Apart from particular cases, for example, with a complication of myocardial infarction, heart failure due to hypertension, because of its pathogenesis, usually begins as left heart failure, secondary to which right heart failure occurs to complete the condition of so-called congestive heart failure.

In treating heart failure of hypertensive heart disease it is necessary therefore to take an adequate therapeutic step separately against the initial state of left heart failure alone and against the subsequent stage of the supervision of right heart failure.

We carried out a clinical study of 25 patients with heart failure of hypertensive heart disease chosen from a series of 104 such patients admitted recently to our hospital. In this paper we should like to describe the therapeutic speciality of this clinical condition as exemplified by some successfully treated cases and thereby to bring out a subject for discussion at this meeting.

Basic principles in the treatment of heart failure of hypertensive cardiac disease, as well-known to us all, are to lighten the burden on the heart (rest, comfortable position and unstressful environment), to prescribe a dietary regimen (a low-sodium, high-protein diet) and to administer drug therapy with cardiac diuretics, hypotensives and myocardial metabolic stimulants together with oxygen supply. As matters to be modified relating to these basic principles we should like to mention the method of administration of cardiac glycosides, the necessity of concomitant use of diuretics, the significance of use of myocardial metabolic stimulants as well as measures to be taken for the prevention of heart failure or of its recurrence.

Case Report

Case 1:

In this case the patient was a 58-year-old man with a chief complaint of attacks of dyspnea. History of previous illness: About 6 years previously he was noticed of having hypertension, which he left untreated; he has had 4 episodes of paroxysmal dyspnea inclusive of the present one since 1968, each having required hospital treatment. History of present illness: In the middle of December last year he developed initial signs of mild left heart failure; then paroxysmal nocturnal dyspnea occurred in January of this year. Initially, attacks were over within a few hours of sitting up and rest, but his condition worsened progressively to the point of mere sitting up and rest no longer proving of help, with which condition he was rehospitalized. Findings on admission: pulse rate 108/min., pulse regular and full; orthopneic;

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relative cardiac dullness enlarged to both sides, especially to left; apical systolic murmur and aortic second sound at base, loud; moist rales heard over both lung fields; hepatomegaly and edema of lower extremities were absent.

Findings of examination on admission:

The blood pressure was 162/100 mmHg; signs of left ventricular hypertrophy and left atrial overload were prominent on ECG; chest x-ray disclosed pulmonary congestion and marked enlargement of heart to left.

These findings led us to consider the patient to be in a state of acute left heart failure (not severe enough to cause pulmonary edema but of such a relatively slight degree as is associated with cardiac asthma) after repeated episodes of mild acute left heart failure due to hypertension. Relatively rapid digitalization seemed thus to be indicated. With 2 i.v. doses (0.4 mg and 0.2 mg) of rapidacting lanatoside C given on the day of hospitalization, followed by 2 additional doses (0.2 mg each given in the morning and afternoon of the following day) his pulse rate was reduced and he now was relieved of his dyspnea. Thus, complete freedom from paroxysmal nocturnal dyspnea of acute left heart failure could be achieved with a digitalis preparation conjoined with vitamin B complex (used as myocardial metabolic stimulant) without having recourse to diuretics. During these periods of clinical evaluation the urinary output was maintained at around 1300 to 1500 cc without showing any significant changes (though some minor increase of a transient duration seen) similarly as did the venous pressure. This fact may be interpreted as indicating that the patient remained in a state of left heart failure since he did not exhibit any signs of right heart failure throughout the period of examination.

It seems thus that in cases of acute left heart failure without clinical evidence of right heart failure, except for those with severe cardiac asthma or with pulmonary edema, rapid digitalization with a rapid-acting digitalis preparation, without a concomitantly used diuretic, is adequate to produce satisfactory result.

Case 2:

The patient was a 50-year-old man with a chief complaint of dyspnea and edema. According to him, he was noticed of his hypertension at the age of 30 or so, for which he received no continuous treatment. In December of the last year he experienced a spell of dyspnea when he was suffering form common cold and was feverish. Since then, he had dyspnea on bodily movements, which would later come on even at rest, with edema of legs and a sense of fullness in the abdomen supervening. With these symptoms he was admitted to our hospital.

Examination on admission revealed: his pulse rate, 112/min.; pulse regular and full; relative cardiac dullness enlarged to left and right; significant auscultatory findings were loud systolic murmurs and an accentuated second sound heard at apex and base respectively and moist rales audible over both lungs; the liver palpable 3 finger-widths below the costal margin; edema of legs, marked. Other significant findings included; an elevation of venous pressure; marked cardiac enlargement, pulmonary congestion and pleural effusion on chest x-ray; left ventricular hypertrophy and bilateral atrial overload on ECG.

Thus, clinical signs and symptoms in this patient were apparently those of chronic congestive heart failure associated with left cardiac failure due to long-standing hypertension and with secondary right cardiac failure.

In those cases of hypertensive heart failure, such as the present one, where the patient has fallen into a state of cardiac failure, left and right combined, after experiencing repeated episodes of left cardiac failure due to long-lasting hypertension we make it a rule to give treatment first with not rapid but slow digitalization and, recently, also to administer diuretic therapy concomitantly as a means of coping with an augmentation of circulating blood volume due to reduced urinary output and of aiding digitalis in exerting its action to increase the force of contraction of the myocardium and consequently cardiac output.

In the present case, since the patient already received oral lanatoside C, 0.75 mg daily, for 5 days previous to his hospitalization, a reduced digitalis dosage of 0.3 mg daily, given in 2 divided doses morning and evening intravenously, was used concomitantly with diuretics for hospital treatment. As myocardial metabolic stimulant vitamins B were used concurrently.

After hospitalization his urine volume increased, the pulse rate was reduced to 70 to 80 per minute at the 7th day of hospitalization, the venous pressure returned to normal, and dyspnea, hepatomegaly and edema were ameliorated. The blood pressure, urine volume and cardiac output became well stabilized on lanatoside C, 0.25 mg per day, for which was substituted oral digitoxin, 0.1 mg daily, and then
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diuretic therapy was discontinued. During these periods of treatment the patient's condition progressed favorably and there no longer was evidence of right atrial overload on ECG with marked improvement noted on chest x-ray.

In cases where there are signs of right cardiac failure superimposed on those of preceding left cardiac failure as exemplified by the one presented here we make a practice of digitalizing the patient rather slowly in the course of 5 to 7 days and using a concomitant diuretic to help reduce cardiac load due to a reduced circulating blood volume particularly when there are marked symptoms of right cardiac failure e.g. edema, hepatomegaly and pleural effusion.

Diuretic drug therapy given in such an instance should be of a transient duration and never be continued carelessly except when a high degree of impairment of myocardial metabolism or of organic disorder of the myocardium, e.g. fibrosis, is suspected or is very much likely to exist, we believe.

How to Best Use Cardiac Glycosides, Diuretics & Myocardial Metabolic Stimulants

In the treatment of cardiac failure of low efficiency type due to insufficient contraction of the myocardium, as the above-mentioned cases indicate, digitalis preparations principally are of pivotal importance as they used to be in the past. In hypertensive cardiac failure, however, it seems that they have to be used in a somewhat different, even individualized way since repercussion on hemodynamics may vary significantly between cases representing relatively acute exacerbation of left cardiac failure and those with chronic secondary righ cardiac involvement.

Concomitant diuretic drug therapy used in such circumstances may be primary (as in cardiac asthma and pulmonary edema) or subordinate. Improved diuretics recently available, with which the hazard of accident from electrolyte depletion is virtually unlikely, may be used as an adjunct to help restore the force of contraction of the myocardium and thereby to increase the urinary output and decrease the circulating blood volume, but the duration of their use should, of course, be transient and minimum necessary.

For the purpose of enhancing the clinical effectiveness of digitalis and, moreover, in view of the fact that heart failure is associated with increased aerobic utilization of sugar as well as with depressed biosynthetic mechanism of actomyosin and related proteins we have used actively some members of the vitamin B group as myocardial metabolic stimulant thus far with good results.

Prevention of Heart Failure

Lastly, as for the prophylaxis of heart failure of hypertensive cardiac disease, we think the basic approach to this problem must be to initiate adequate control of the blood pressure and the amount of work, and appropriate dietary regimen and therapeutic measures to correct impaired myocardial metabolism early in that stage which corresponds to Class II in the New York Heart Association's system for the classification of cardiac failure, not to speak of the time-honored principle of eliminating cardiac load directly by the control of blood pressure.

Once established, cardiac failure tends to become worsened in repeated episodes of cardiac insufficiency. Preventing or forestalling this is a matter that depends for its attainment upon how successfully the patient is managed and rehabilitated after his condition has been ameliorated, among other factors.

We in our hospital pay due attention to dietary therapy as a means of preventing the progress of arteriosclerosis and the problem of collateral circulation, in addition to the basically important control of the blood pressure, in view of the fact that hypertensive heart disease and ischemic heart disease may coexist quite often and there is an intimate causal relationship between them.

A study of cases of our own showed that the precipitating cause of cardiac failure in this small series (25 cases) was upper respiratory infection in 9 cases (or 36%) and trip and overstrain in 4 (16%) each, these factors accounting thus for 70% of the entire 25 cases. Nearly the same can be said of recurrent cases, where the most frequent precipitating cause was upper respiratory tract infection, followed by overstrain and cessation of digitalis therapy (as many as 4 cases) in that descending order. This finding asks us to reconsider the problem of failure to continue digitalis therapy for a desired period of time, which by no means is of infrequent occurrence in our daily clinical practice.

In this paper our retrospective study of treatment of heart failure due to hypertensive cardiac disease in 25 clinical patients chosen from a series of 104 such patients dealt with recently by us was presented with reference being made of its main point.

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