Prolonged Bed Rest in the Treatment of the Dilated Heart

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Almost 30 years ago, we began to utilize prolonged bed rest in the treatment of persistent cardiac dilatation and intractable congestive heart failure due to myocardial degeneration. This approach was chosen because of a recognition of the limited efficacy of available therapy. It was applied in selected patients. During subsequent years various theoretic considerations (fig. 1) reinforced our clinical impression that cardiac dilatation is intrinsically pernicious and that prolonged bed rest may be of considerable value in reducing the work of the heart and in reversing this process. So satisfying were the results of treatment that in 1958 a special unit was established at the U.S. Public Health Service Hospital in New Orleans to evaluate more completely this form of therapy. Since that time, approximately 50 patients with idiopathic myocardial disease and persistent cardiac enlargement have been studied.1,2 Most of the clinical material in this presentation is based on this group of patients.

All of these subjects suffered from idiopathic myocardial disease complicated by cardiac dilatation and hypertrophy. The persistence of cardiac enlargement after the initiation of treatment varied considerably although in most instances it was at least of several months' duration. Finally, since this is a continuing investigation, our observations must be considered as incomplete and our conclusions as interim.

**General Principles of Therapy**

For satisfactory management, the program of therapy of patients with cardiomyopathy must include careful and continuing observation and treatment with rest in bed in a relaxing, pleasant, and comfortable environment for a prolonged period. The necessity for such steps is manifest in those patients who have exhibited incomplete response to conventional therapy. It has been our experience, however, that such an approach is equally important to patients with heart disease who appear to have completely recovered from the process. Many who experience an episode of cardiomyopathy have a long-standing history of malnutrition. Whether by choice or more probably because of uncontrollable factors existing in their strata of society, such patients tend to resume a grossly inadequate

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**Figure 1**

These theoretic calculations demonstrate the striking increase in myocardial tension which must be developed in the presence of cardiac dilatation. The lesser demands of hypertension are included for comparison. (From Muscle As a Tissue edited by Rodahl and Horeth; Chapter 12, "The Dilated Heart" by G. E. Burch, p. 233. Reproduced with permission of the publisher, the Blakiston Division of the McGraw-Hill Book Company, Inc., New York, 1962.)

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diet. Unless special emphasis is placed initially on anamnesis and subsequently on corrective measures, a poor dietary pattern will be resumed. In a large percentage of patients who relapse following apparent recovery, malnutrition and alcoholism appear to be of significance. This is particularly true of those patients whose background is one of alcoholism. Those who return to the use of alcohol and to poor nutrition have serious relapses and often die.

Continuation for an indefinite period of maintenance dosages of digitalis preparations has become our standard policy. This decision is based on the resurgence of cardiomegaly, with or without congestive heart failure, following the discontinuation of digitalis in several patients who had previously shown apparently complete recovery. Similarly, because of occasional relapse after resumption of unlimited physical activity, malnutrition, and the use of alcohol, we counsel our patients to avoid situations, habits, and occupations that entail extreme or prolonged physical and emotional stress and metabolic damage.

Although clinical recurrence of heart disease with subsequent pregnancies is not invariable in patients with postpartal heart disease, it recurs with such frequency as to interdict future pregnancies. All of our patients are so advised.

Other factors of apparent etiologic significance in relapse include intercurrent pyelonephritis with associated hypertension and prolonged emotional stress with associated hypertension. In both instances prompt control of the blood pressure elevation, by appropriate antibiotic or antihypertensive therapy, or both, results in subsequent return of heart size to normal and disappearance of symptoms. The avoidance of arrhythmias, particularly as related to digitalis therapy and the prevention of shock and anoxia especially as accompanying surgical procedures, warrants careful attention. Both of these conditions have resulted in the relapse of patients.

The foregoing apply to the patient who has not experienced significant improvement as well as to the patient who has exhibited an excellent response to treatment. In the former group, however, the limitations and admonitions are of a greater degree. Moreover, frequent recourse to limited periods of absolute bed rest, intensive treatment, and hospitalization would be prompted by the complications cited above as well as by any episodes of deterioration, whatever the cause.

**Program of Treatment**

**Strict Bed Rest**

It is our policy to place these patients at absolute bed rest; the patient uses a bedside commode and is permitted to feed himself, but he is allowed no other activity. Such a program requires considerable nursing assistance. Only after several months, and specifically after there is objective diminution in cardiac size, is the patient permitted even the lightest form of occupational therapy. Because of the rigors of such an approach, great reliance is placed on television, reading, social service, and the other ancillary services.

**Climate Control**

Because of the demonstrated increase in cardiac work and the obvious deleterious effects of a hot and humid environment, the patient’s area is air conditioned. If for some reason this is not possible with a specific patient, an oxygen tent is freely used for its beneficial effects on temperature and humidity rather than for the oxygen therapy itself.

**Dietary Modifications**

These basically consist in the institution of a nourishing diet as tolerated and salt restriction to the level of 200 mg daily. Of course the latter is determined by the fluid-electrolyte-diuresis relationships of the individual patient and varied with changing circumstances, although the patients are advised to avoid salty food even after they are fully compensated.

**Digitalis**

This drug is used in all patients in congestive heart failure, almost invariably orally and in the leaf form. The details of digitalis therapy in this group of patients are described elsewhere in this symposium.
Potassium

In view of the cited difficulties with digitalis, supplementary potassium is used as indicated but not routinely. Such use of potassium is guided by previous therapy with thiazide diuretics, salt restriction, the clinical state, the electrocardiogram, and serum electrolyte levels. Because of the great variability in absorption of the average institutional tablet of potassium chloride, we prefer the liquid preparation usually in a dosage range of 4 to 8 Gm. per day. Enteric-coated tablets should not be used. The question of diminution in the cardiotonic effect of digitalis by the simultaneous administration of potassium requires careful clinical evaluation to reach proper decisions in therapy.

Diuretics

Based on our own experience and in view of the above, we have made it a practice to use only mercurial diuretics in these patients. These compounds are used as indicated, generally in 1-ml. doses or less initially, with the size of the next dose to be determined by the response to the previous one and by the clinical state of the patient.

Steroids

Since on occasion clinical idiopathic myocardial disease ultimately has been demonstrated to be due to various inflammatory processes, sarcoidosis and the like, the use of adrenocortical hormones would seem to have sound theoretical basis and has been tried when the patients seem to become worse in the face of adequate therapy. For these reasons we have used steroids. Our dosage range has been limited to the moderate, i.e., 25 to 40 mg. of prednisone daily. In no patient, however, have we noted a beneficial effect from such therapy; with careful use, however, no harm should occur.

Anticoagulants

Because of the generally high frequency of thromboembolic phenomena in patients with idiopathic myocardial disease and the overwhelming incidence of such complications in fatal cases, it is our practice to treat all patients who suffer thromboembolic complications with anticoagulants. This usually consists of heparin and Coumadin. After a priming dose of Coumadin, 1 mg. per Kg. (not to exceed 60 mg.), the maintenance dose is determined by prothrombin time. The desired therapeutic range of prothrombin of 10 to 20 per cent, in our experience, is more consistently maintained by daily rather than by intermittent administration. The usual maintenance dose of Coumadin varies and must suit the particular patient. Liver disease originating from alcoholism and intercurrent pyelonephritis in women have been the common causes for increased sensitivity to anticoagulant drugs. During the first 24 hours, heparin is given intravenously in doses of 50 to 75 mg. every 6 hours, as determined by the clotting time, the desired therapeutic level being two and one half times the control. Response to intramuscular crystalline heparin or to depot heparin has been less satisfactory.

No patient has had thromboembolic phenomena of recognizably peripheral origin after the institution of prolonged bed rest. In several patients whose course was prolonged and eventually terminal, the possibility of intractable heart failure due to recurrent pulmonary embolization arising from intracardiac mural thrombosis prompted the use of anticoagulants. In no instance was there apparent significant benefit although recent or old pulmonary emboli were noted at autopsy in several but not all of this small group.

In general, the management of these patients with idiopathic myocardial degeneration is essentially the conventional management of severe chronic congestive heart failure with meticulous attention to rest, both physical and mental. Prolonged bed rest, though expensive, can be obtained in these patients if they are approached correctly and perseverance is maintained.

Prognosis

Evaluation of the efficacy of prolonged bed rest is complicated by the inability of some patients to continue this regimen as long as recommended and by the death of some patients a week or two after entering the hospital and before rest has had an opportunity to
produce any benefit. To the present time approximately one half of all patients who have remained at bed rest for the prescribed period obtain a return of heart size to normal, one quarter have definite but incomplete resolution of cardiomegaly, and the remaining 25 per cent show no change in heart size. Practically every patient experiences marked symptomatic and clinical improvement although this is of a degree and duration in proportion to the decrease in heart size.

Figure 2 portrays the time course of cumulative decrease in cardiac size beyond the predicted value, as experienced by the first 36 patients treated in our unit. The calculations were based on serial teleroentgenographic measurement of heart size and are expressed as percentage decreases in that portion of the transverse cardiac diameter beyond the predicted normal value. It will be seen that the response is a quantitative phenomenon extending, for the group, over a period of 1 year. In general, little or no further response has occurred if improvement does not develop by 12 to 15 months of prolonged bed rest, although rest should be continued anyway, if clinically indicated.

The over-all prognosis of patients with idiopathic myocardial disease is largely determined by the duration and severity of illness at the time of initial observation, by the presence or absence of previous episodes of this nature, and by the patient's attention to proper continued therapy after he returns home. The patient's ability to cooperate with the physician is of primary importance, particularly as related to willingness to remain hospitalized for prolonged periods, limitation of activity, adherence to diet and medication, and, when indicated, abstinence from alcohol and follow-up care at home.

It has been our experience that patients with postpartal heart disease of undetermined etiology have a poor prognosis if followed for a sufficiently long period of time. Our mortality rate has exceeded 50 per cent. Moreover, an additional portion of these women (approximately 25 per cent) are left with a chronically enlarged heart and little or no cardiac reserve. Fatal cases have lived on the average of about 2½ years following onset of symptoms. The nonfatal cases still under observation have lived approximately twice as long. A fair portion of these, however, give evidence of increasing disability and likely termination in the not too distant future. Thus, although the data are still incomplete, it would appear that possibly three fourths of the patients with postpartal heart disease will eventually succumb to the disease.

In the case of idiopathic myocardial disease unrelated to the puerperal period, the prognosis is much better. As a rule in those patients with an alcoholic background, the degree and rapidity of response to therapy are excellent. Relapse is common, however, and invariably is associated with resumption of former drinking habits and poor eating. Subsequent episodes are less notable for their response to therapy. The importance of future damage by use of alcohol and malnutrition cannot be overemphasized.

Of continuing interest is the apparent irreversibility of the abnormal electrocardiogram.
present at the time of admission to our study group. Generally, patients are found to have alterations consistent with or diagnostic of left ventricular hypertrophy. There is little change in this pattern even in patients whose hearts have returned to normal, as judged by other criteria. The significance of this phenomenon needs study.

Summary
In addition to the clinical disadvantages of progressive congestive heart failure, thromboembolic phenomena, and rhythm disturbances there are hemodynamic effects of considerable magnitude that arise from cardiac dilatation. While fully cognizant of all these factors, we are also aware of the limitations of conventional therapy in effecting return of heart size to normal. Prolonged complete bed rest in conjunction with conventional forms of therapy is being utilized in patients with idiopathic myocardial disease and cardiac dilatation in an effort to unload the heart. It is thought that the minimization of cardiac work, a good diet, and avoidance of alcohol, pregnancy, infection, and the like have permitted recovery and return of heart size to normal in approximately half of the patients treated thus far. Continuation of therapy and close observation by the physician after ambulation and discharge from the hospital cannot be overemphasized.

References
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