

Stress Testing And Cardiac Rehabilitation in East London

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He married in 1954 and moved to East London before going to Cape Town where he qualified in medicine in 1961.

After a house job at Edendale hospital he went into general practice in East London where he has remained.

He has been interested in post-graduate education for GPs and obtained the MFGP in 1976 and the M Prax Med, from Pretoria in 1977.

At present he is a MASA Branch Councillor, a Rotarian, Chairman Border Branch of Heart Foundation and part time Medical Officer at Frere Hospital.

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Summary

A cardiac rehabilitation centre in East London is run by general practitioners with the assistance of physicians. Their programme for prevention, treatment and rehabilitation, as well as their general guidelines are discussed.

INTRODUCTION

ALTHOUGH Stress Testing is not really a general practice subject, I am presenting this article to indicate to interested GPs how easy it is to organise and run a centre in a smaller city where physicians are not too plentiful. Cardiac Rehabilitation is a GP's subject and I feel that every concerned GP who does not confine his practice to dermatology or paediatrics, should become involved in it.

In the larger cities, suburban rehabilitation centres are needed and in the smaller centres, even if your patients have to travel for formal stress testing, the rehabilitation must be done close to his home.

East London is at present the only non-university town in the Republic with a cardiac rehabilitation programme. The idea is not new. I originally heard about Terry Kavannah's programme in Toronto when he was invited to South Africa and spoke at a Coronary Heart Disease Congress at Wits in 1973.

The East London programme began some four years ago when our full-time hospital physician, Peter Mitchell, who knew I was interested in such a programme, started doing a feasibility study at the Frere Hospital. We decided that the programme was needed. We contacted the experts in Cape Town and were greatly encouraged by Tim Noakes, Tom Mabin and Pat Commerford and found that we could get started with about R10 000.

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I also called on Dr Gilmer at Wentworth and was shown their stress testing department. We went to Rotary, looking for assistance and through this service organisation, found that Johnson and Johnson (J&J) was wanting to give East London a present to celebrate J&J's 50th Anniversary in South Africa.

It is indeed possible for GPs to run a cardiac rehabilitation centre in a smaller city.

We managed to persuade Mr Richard Cook, the MD that ours would be the best gift to the people of East London. By the time we had received the quotations for the equipment that was necessary, the price had increased to R20 000, but J&J agreed to go with us and the equipment was ordered.

Problems then arose as to who was to own the equipment. The Frere Hospital was not permitted to receive a gift from a private company, so a local branch of the National Heart Foundation (NHF) had to be formed, and the money was given to them. The equipment then belonged to the NHF but is housed at the Frere Hospital and maintained by the CPA.

THE MEDICAL APPROACH TO CORONARY HEART DISEASE

1. To prevent.
2. To treat.
3. To rehabilitate.

1. Prevention

This is a primary health care education problem. It is being tackled by the NHF, by every thinking GP and is the subject of ongoing research.

A contribution by Lester Breslow are the seven rules for good health:

- (a) exercise regularly;
- (b) no cigarette smoking;
- (c) seven hours sleep at night;
- (d) eat moderately;
- (e) eat breakfast;
- (f) eat regularly with no snacks;
- (g) moderate or no use of alcohol.

Our contribution to this programme is in education; at a monthly meeting of our participants we show films, give talks and hold discussions on risk factors, and we encourage middle age people to be tested and participate in our exercise sessions. We encourage our CHD patients to have their families and especially their children screened for the known risk factors.

2. Treatment

The treatment of CHD has taken astronomic leaps forward in the past few years and the subject can be handled by someone better qualified.

Our contribution is trying to encourage the GP to get to the patient as soon as possible. An infarct must be a terrifying experience and the presence of the patient's own well-known GP should be psychological therapy even before he administers the necessary pain relief, etc.

In the Intensive Care Unit (ICU) this psychological support should be maintained by the physician, the GP, nursing staff and family. This could be reinforced by members of the rehabilitation programme once he is out of ICU.

3. Rehabilitation

This programme starts as soon as the patient is out of the ICU and is divided into two phases:

- (i) Inpatient
- (ii) Outpatient

Our programme is geared to help the **uncomplicated**, simple myocardial infarction; we are not able to help the patient in cardiac failure.

(i) Inpatient rehabilitation

The machinery exists for the doctor to refer his patient to the cardiac rehabilitation team, comprising:

- a physiotherapist,
- a dietitian,
- a social worker,
- the rehabilitation sister, and
- lay members of the rehabilitation programme.

Every thinking GP should be involved in a prevention programme for coronary disease.

At present only the physiotherapist is being used, but the rest are available should the doctor require their help.

The programme is geared towards giving the patient hope for the future and to encourage him to modify his lifestyle where this is necessary. He might need to be encouraged to exercise, or might have to be restrained from progressing too fast.

Before being discharged, the patient is given an appointment for a stress test to be done at three weeks after his infarct. The appointment is made and the patient is given a note indicating what the problem is e.g. "uncomplicated anterior myocardial infarct on January 2nd, 1984", and what the doctor would like us to do, e.g. "please to stress test only" or "do test and admit to the rehabilitation programme". We would also like to know what drugs he is on and if he has any other relevant problems.

Unfortunately too many patients arrive at the clinic without a note and are surprised that we do not know that they have had a heart attack – the most important and devastating thing that has ever happened to them!

Many patients come for other reasons –

- Diagnosis of chest pain
- Post coronary artery bypass surgery
- Seeing whether they are fit enough to exercise
- Assessment of degree of incapacity because of claudication or valvular disease, etc.

They must not have eaten for 2 hours before this and should let us know specifically if they are not feeling well. Unless they are being tested for a diagnosis of chest pain, they should be

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on all their drugs as prescribed and bring a list of these drugs with them.

We think it better if they bring a companion with them for reassurance 'hand holding'.

CHD patients should bring their families and especially their children to be screened for the known risk factors.

We explain to the patients that they will be on a moving belt called a treadmill and that they will walk on this belt slowly at first and gradually increasing speed until they reach a predetermined pulse rate, or until they decide that they have had enough. We also explain to them that this is a very safe test.

In order that the patient may know what to do for the two weeks before this test, they are given a copy of *Taking Care of Yourself after a Coronary*. This is a detailed booklet which originated at Groote Schuur and answers a lot of questions for the patient.

(ii) Outpatient rehabilitation

Stress Testing

The test is done to find out what the patient can do by way of exercise and to watch the heart performance under controlled conditions.

As most people can walk, know how to walk, and use large muscles doing it, the treadmill has been selected as our method of exercise. We have a Quinton Treadmill which can go up to 4.2 mph (6.7 km/ph) and can be elevated to a 20% grade.

In order to standardise our test, we use the Bruce Protocol. This test starts with the treadmill running at 1.7 mph (2.7 km/ph) at a 10% grade and at 3 minute intervals we increase the speed and grade until we reach an end point to the exercise.

For the old and frail or at the doctor's request, we might start with the Modified Bruce Protocol which starts at 1.5 mph (2.4 km/ph) on the level. The speed and grade is increased at 2 minute intervals until the Bruce proper figures are reached.

Not every person is suitable for exercise testing and our list of contra-indications are:

- (i) unstable angina;
- (ii) resting systolic BP greater than 200 or diastolic greater than 120;
- (iii) recent significant (20 mm +) drop in resting systolic BP which cannot be explained by medication;
- (iv) moderate to severe aortic stenosis;
- (v) acute systemic illness or fever;
- (vi) uncontrolled atrial or ventricular arrhythmias;
- (vii) uncontrolled tachycardias;
- (viii) CCF;

- (ix) advanced heart block;
- (x) active pericarditis or myocarditis;
- (xi) recent embolism;
- (xii) thrombophlebitis;
- (xiii) resting ST displacement greater than 3 mm;
- (xiv) uncontrolled diabetes;
- (xv) dissecting aneurysm;
- (xvi) symptomatic ventricular aneurysm;
- (xvii) orthopaedic problems prohibiting exercise.

In order to monitor the patient's progress, we determine the patient's maximal heart rate (HRM) from tables. (The figure is roughly 220 minus age in years). The three week test is done to 70% HRM, other tests are done to 90% HRM.

Other end points to the test are:

- (i) fatigue;
- (ii) failure of monitoring equipment;
- (iii) lightheadedness, confusion, ataxia, pallor, cyanosis, dyspnoea, nausea or any peripheral circulatory insufficiency;
- (iv) onset of angina with exercise; angina pain together with any degree of ST displacement;
- (v) symptomatic supraventricular tachycardia;
- (vi) ST displacement greater than 3 mm horizontal or downsloping;
- (vii) ventricular tachycardia;
- (viii) exercise induced L or R Bundle Branch Block;
- (x) onset of 2nd or 3rd degree heart block;
- (x) R on T premature ventricular contractions (PVC);
- (xi) frequent unifocal or multifocal PVC (greater than 10/min);
- (xii) failure of systolic BP to rise;
- (xiii) excess BP rise: Systolic greater than 220, diastolic greater than 120 mm Hg;
- (xiv) inappropriate bradycardias.

After an infarct, the presence of your own GP is psychological therapy.

In order to help us monitor these end points, the patient is connected up to the Marquette Mac 1 computer augmented 3 channel ECG m/c. and through this to a MG Model 936/S Cardiopak ECG scope/defibrillator.

At any time a tracing can be made either at the conventional 25/min or at a slower 5/min to monitor irregularities. V5 is the lead most likely to show changes and is monitored continually on the screen, but we can also select SI, AVR, V1 or V4 as alternatives. The patient is also fitted with a BP cuff for monitoring the BP.

The patient is examined for possible triple rhythm and basal creps and his BP and pulse rate are noted. He is introduced to the treadmill and the exercise begins at one and a half minutes and every 3 minutes thereafter his BP is recorded. His pulse rate is recorded every one and a half minutes and the ECG is recorded every 3 minutes. The ECG is recorded and pulse rate noted immediately before stopping the treadmill. The ECG

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is recorded at 3 and 6 minutes after exercise as is the BP and pulse rates.

After the test done at 3 weeks after an infarct, an exercise prescription is worked out. If the patient reaches his 70% HRM without undue symptoms or significant ECG changes, (a negative test) his pulse rate for exercise is taken as 85% of this figure or 60% HRM. If he has a positive test, his exercise rate is taken as 75% of the figure at which symptoms or signs develop. This pulse rate is given to the patient as measured over 10 second for his convenience. A copy of the report is sent to the doctor requesting the test and to his GP if referred by a physician. The tracings are kept in the Medical Office and can be seen if the doctor requests it.

At the doctor's request, the patient will be admitted to the rehabilitation classes.

J&J REHABILITATION SESSIONS

These sessions are held at Selborne College, a local high school, on Mondays, Wednesdays and Fridays from 6 to 7 am. After 15 minutes of warming up calisthenics designed to stretch the muscles, the participants go out from the gymnasium on to the field where they start off walking and possibly later running for 30 minutes. This is finally followed by a 15 minutes cooling down session spent playing volley ball.

The sessions are controlled by a volunteer doctor on a roster of 15, the Heart Foundation Sister, and we have a volunteer PT instructor.

Our programme is geared towards giving the patient hope for the future.

We emphasise always the difference between isometric (the bad) and isotonic (the good) exercises and ask the doctors to point out to the PT instructor which exercises might be harmful. After vigorous exercises the session stops while participants check their pulse rates.

Broadly speaking, there are two types of muscular activity. Isotonic or dynamic exercise primarily causes changes in muscle length with little change in muscle tension e.g. running, swimming, cycling and rhythmic calisthenics. With a large mass of skeletal muscle involved, a great demand for oxygen is generated. This is met by large increases in stroke volume and heart rate with a marked reduction in peripheral vascular resistance, thereby ensuring high cardiac output and relatively little alteration in mean arterial pressure.

Isometric or static exercise primarily involves changes in muscle tension with no change in muscle length. An example is heavy weight lifting and pressups. Even with a small mass of skeletal muscle involved, marked increase occurs in mean, systolic and diastolic arterial pressures.

On the field the new participants are urged to keep their speed down so that they can complete the 30 minutes of continuous walking/jogging without having tired and sore muscles the next day and without exceeding their 'prescription pulse rate'. They must eventually get their pulse rate up to their prescrip-

tion figure and keep it at that rate for the full 30 minutes for maximum cardiovascular benefit.

The role of the doctor is purely as a safety officer, but those who participate in the exercises and jogging have a better rating among the participants than those who sit in their cars reading the newspaper.

We have a full set of resuscitation equipment including a defibrillator, suction apparatus, tubes, an AmbuTag, and a hospital emergency drug box.

Risk Rate

These patients are high-risk individuals, but recent studies done at 73 medical centres covering 170 000 exercise tests, found one episode per quarter million man exercise hours.

There was a mortality rate of 0,01% and a morbidity rate requiring hospital admission of 0,2%.

Relating this to the East London testing at our present rate, we can expect to admit one patient as a result of our testing every fourteen months, and we can expect one fatality every twenty years.

Cost

The exercise testing is done at the usual Outpatient fee of R12,00 at the maximal rate.

The exercise sessions have to cover the cost of the nursing sister's salary and the price of this is R3,00 per session for the first three months and then R1,00 per session thereafter. If the patient or his doctor feels that this is excessive for him, they must contact the National Heart Foundation secretary, nursing sister or the testing doctor who will make an adjustment.

Further testing

Patients having had an infarct, need to have a further test 8-9 weeks after the infarct, where they are tested to 90% HRM with all the contraindications and limits as enumerated above.

This serves to modify the prescription, or might help us determine which patients need further investigation and possible coronary artery bypass surgery (CABS).

Additional education

Monthly meetings are held on the last Monday of the month at which we have talks and discussions to reinforce the modifications that the patient might need to make to his lifestyle, or to re-establish what we are trying to get out of our rehabilitation effort.

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