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CONTROL OF RISK FACTORS OF
ISCHAEMIC HEART DISEASE

by

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RISK FACTORS

Epidemiological research has identified some of the attributes
and circumstances associated with individuals who develop IHD. These
attributes are called risk factors and are defined as detectable attri-
butes or circumstances of an individual which are known to be associated
with an increased risk of developing overt morbidity. Risk factors may
be aetiological factors but are not necessarily so, often they indicate
individuals who are at special risk without actually determining that
risk.

To be of use a risk factor must be readily detectable in the
individuals involved, must be specifically associated with a distinctly
increased risk of morbidity and must permit the possibility of an
effectively earlier intervention than would have been possible without
knowing of it. An important question is which diseases are worth con-
sideration in respect of risk factors screening and risk factor treat-
ment.

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It is generally agreed that the diseases most suitable for investigating risk factors must be reasonably common, serious and amenable to early interventive action. IHD is common and serious but is it amenable to interventive action?

Unless the subsequent course of the individual's health can be improved, the indentification of high risk individuals is pointless or even harmful. There is little evidence so far that intervention in IHD is successful. The reason may be that IHD is an example of the effects of post-reproductive senile changes which set biological limits to the duration of performance and survival.

Many important risk factors for developing IHD are impossible to remove e.g. age, sex, previous occupation, heredity, but there are three factors which have been found to predict IHD among middle-aged men in many prospective population studies and in which are possible to intervene. These are smoking, high blood pressure and high blood lipids.

STOPPING SMOKING

We do not know the effects on health when middle-aged men stop smoking. The aetiological role of smoking in relation to IHD is unknown. Smoking can affect the atherosclerotic process in the arteries on the thrombotic mechanisms.

If it affects the atherosclerotic process it could be too late when patients stop smoking after 30 years of exposure. If it influences the thrombotic process, the benefit might be more immediate.

Indirect evidence of the benefit of stopping smoking is that excess IHD mortality of current cigarette smokers greatly decreases after cessation, and after 5 to 10 years it completely disappears.

Another indication comes from a recent analysis of the experience of British doctors. During the last 15 years most British doctors who smoked cigarettes have stopped.

Fifteen years ago they had a reported IHD-mortality which was higher than that of U.K. population as a whole. It is now below the national level.

From these observations, it is possible to conclude that the evidence is good enough to justify an abandonment of smoking in order to reduce the risk of developing IHD. To see the benefits and the costs we need controlled trials.

PLAN OF ACTION

One way of stopping smoking is the method used in Göteoorg, Sweden. In a preventive trial we asked 10 000 middle-aged men to change three risk factors, hypertension, high cholesterol and smoking and used 20 000 men as controls.

Our anti-smoking programme has been based on a scheme presented in table 1. The first time we invited about 40 persons to an informative meeting at which also individual information on results of the earlier examinations was given. A short talk on the health consequences of smoking and the smoking mechanisms introduced a discussion after which the participants were invited to group meetings (7-10 men) with one week's interval for further information about the recommended anti-smoking programme and supply of chewing gum with nicotine. The meetings were conducted by a doctor and one psychologist.

The results were promising. Follow-up has shown that forty per cent stopped smoking in half a year.

HYPERTENSION

It is known that general education, as well as social and emotional factors, influence a patient's ability to adhere to antihypertensive treatment. Thus, it has been found that drop outs from treatment have known about their disease for a shorter period, have less education and a lower income than those who adhere to treatment. As in all preventive

measures, it is necessary to stress the necessity for health education. One way is to use a specially designed audiovisual programme including a tape-recorded talk and slides. In the preventive trial in Goteborg, such an approach has been used. After the information and when the systolic blood pressure at a second visit is still 175 or higher or the diastolic blood pressure 115 or higher, drug treatment is instituted.

A follow-up after two years showed that 20 per cent of the subjects were not in need of drug treatment, 20 per cent had still high blood pressure ($\geq$ 175/$\geq$115), 30 per cent had a moderate reduction of the blood pressure and 30 per cent were well regulated. In Göteborg, a systematic method for calling patients to follow-up visits is used. In this way patients who might otherwise terminate treatment with adverse consequences can be called in for a return appointment at a time when preventive measures are still possible. As far as possible each patient is assigned always to the same doctor. As basal treatment salurities on beta-blocking agents are used.

DIAGNOSTIC WORK-UP AND TREATMENT IN THE HYPERTENSION CLINIC, GOTEBORG

The diagnostic work-up and treatment of hypertension is a heavy burden which often requires a special clinic separated from the screening procedure. In Göteborg, the hypertension Clinic takes care of the screened hypertensives. The routine diagnostic work-up in the clinic is presented in table 2.

The diagnostic work-up starts with a visit to a nurse. Blood pressure in supine and in standing positions are recorded, blood samples and ECG are taken and appointments for chest X-ray and renography are given. At the second visit, the patient is examined by a trained physician. This includes examination of the eyegrounds. At this visit the physician decides about further diagnositic examinations, if necessary prescribes drugs and outlines plans for further management. If the blood pressure is easily controlled and there are no signs of other severe

illnesses, he is told to visit a nurse at the clinic for blood pressure recordings every second month. He is, however, seen by a doctor at six or twelve month interval. The blood pressure readings taken by the nurse in the interval are continuously reviewed by the physician who decides on changes of dosages and drugs.

SERUM CHOLESTEROL

One of the most important measures in prevention of IHD is reduction of the serum lipids, either by dietary means or by drugs.

DIET

Numerous experimental studies have demonstrated that the cholesterol level can be influenced by dietary manipulation. Kinsch (1952) and Groven (1952) first observed the cholesterol reducing effect of vegetable oils rich in poly unsaturated acids, especially linolic acid.

Control of saturated fat and cholesterol intake requires simultaneous attention to meat, dairy products, commercial baked goods, butter, margarine and egg yolks. J. Stamler has pointed out that it is not necessary to "go on a diet" in order to protect one's health. Instead the aim should be to learn a new set of eating habits.

Lean meats and poultry, fish and sea food, skim milk, cottage cheese, beans, peas, fruits and vegetables are all recommended. Stamler also emphasizes that it is a matter of taking to heart the lessons implicit in the more natural eating habits such as those followed in southern Italy, Greece, Dalmatia, China etc.

DRUGS

Many drugs are at the moment available for preventive treatment e.g. thyroid hormones, clofibrate, nicotinic acid and resins. These drugs act by different mechanisms and on different sites of the organism.

When the purpose is to reduce blood lipids in healthy asymptomatic men clofibrate is the drug of choice. It reduces hypercholesterolaemia and hypertriglyceridaemia in the majority of cases. There are, so far, no significant toxic effects and it has minimal side effects. It removes lipid accumulation from tissues. It increases excretion of neutral steroids in the faeces. In addition to these effects on lipid metabolism, clofibrate lowers plasma fibrinogen, increases fibrinolysis and decreases platelet adhesiveness.

DIFFICULTIES IN THE TREATMENT OF ASYMPTOMATIC SUBJECTS

1. How are people to be made aware of their health problems so that treatment is facilitated?

    In conventional medicine people who feel sick and wish to be treated are those who visit a doctor. In a preventive trial, most of the invited subjects feel well when they come for examination. They wish to be reassured that they are healthy and want to continue living as usual. Some have complaints but these seldom have any obvious connection with what we have designed as risk factors: high blood pressure, high cholesterol, or tobacco smoking. In order to motivate the participants to actively stop smoking, change diet, or take pills, it is necessary to make them aware of the presence of a health problem. This is a very difficult task. We have to break the medical law: "primum est non nocere" in order to make an attempt to prevent a serious disease. Besides the psychological influences that might follow efficient treatment, drugs have side effects. This could also be said of changing diet and cessation of smoking (e.g., weight increase and mental disturbances).

    The effect of being aware of something being wrong has not been previously studied. We have found that untreated hypertensive subjects have very few symptoms, but treated hypertensives have

considerably more. This difference does not seem to be due to the
severity of disease but rather to other unrelated factors. One of
our forthcoming projects within this study is to evaluate the
effect on a subject of being informed that he is a high-risk man.

2. How can risk factors be changed?

This problem is by no means solved. Treatment of illness may
have a prompt effect on the patient's perception of the disease
process. With treatment of risk factors the risk may decrease
but the subject himself will not notice any particular change in
his condition. This absence of a natural feedback mechanism has
to be compensated in some way in order to ensure the best coopera-
tion from the subject.

The motivation can be increased by health education in the form
of talks, various audiovisual aids, information booklets and group
discussions. One way of getting feedback is to supply details on
the change in risk factors brought about by treatment. Blood
pressures can be measured by the subjects themselves, cholesterol
values can be revealed routinely, and the blood concentration of
carbon monoxide shown as reflecting the inhaling of tobacco smoke.

Table 1

ANTI-SMOKING SCHEDULE IN THE PRLVENTIVE STUDY, GOTEBORG

Meeting	Time	Programme	No. of particip.	Doctor	Pyscho-logist
1	0	Inform. about health (consequences and cessation methods)	40	+	+
2	1 week	Cessation method (chewing gum distr.)	7 - 10	-	+
3	2 weeks	Discuss. of probl. (weight increas., depression etc.)	7 - 10	+	+
4	6 weeks	Encouraging	7 - 10	±	+
5	6 months	Encouraging (weight reduction)	7 - 10	+	+

Table 2

THE ROUTINE DIAGNOSTIC WORK-UP AT THE
HYPERTENSION CLINIC, GOTEBORG

1. Routine medical history and physical examination

2. Haemoglobin
    Platelets
    Sedimentation rate
    Cholesterol
    Triglycerides
    Uric acid
    Plasma electrolytes
    Plasma bilirubin, alkaline fosfatases, GOT, GPT
    Albustix^R
    Clinistix^R
    Urinary sediment
    Plasma creatinine
    Urinary osmolality (after 13 hours of thirst)

3. ECG
    X-ray of the heart
    Isotope renography