The proteinuria of patients with renal tubular disease is qualitatively different from that associated with glomerular disease.[14] The major constituents are low molecular weight α_2 globulins and β globulins normally filtered at the glomerulus and reabsorbed by the proximal tubule. Tubular proteinuria may be recognised by electrophoretic analysis, but a simple method is the measurement of a representative low molecular weight protein such as lysozyme[15] or β_2 microglobulin[16]; the latter may be a more sensitive marker, as there is selectivity in tubular protein handling with preferential reabsorption of cationic molecules such as lysozyme.[17] By arguments analogous to those above, the lysozyme: creatinine clearance ratio (C_L:C_C) may be seen to be related to the proportion of filtered lysozyme escaping proximal reabsorption and is increased some 100-fold in the Fanconi syndrome.[15] As with albumin, the urinary lysozyme: creatinine concentration ratio (U_L:U_C) is sufficiently accurate for most purposes, and is normally less than 1 mg: 1 mmol ($\approx$ 10 μg:1 mg). Renal tubular damage also results in the release of tubular enzymes such as γ-glutamyltranspeptidase and *N*-acetyl-D-glucosaminidase, whose urinary activities may also be related to creatinine concentration.[18]

There are, therefore, considerable advantages in using creatinine as a reference for the concentration of urinary proteins, but the concept of total protein is ill defined, particularly when this is within or near the normal range, and it is preferable to measure one or two individual representative proteins.

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Hypertension and wellbeing

No one now doubts the value of treating moderate to severe hypertension,[1 2] and increasing evidence shows that treatment is also worth while for mild hypertension, when it will prevent stroke and myocardial infarction.[3 4] The benefits of treating these mild hypertensives at relatively low risk must, however, be balanced against the adverse effects of detection and treatment on their wellbeing.

Wellbeing is difficult to define precisely but the state encompasses the ability to perform one's normal occupation, housework, hobbies, and leisure interests. Enjoyment of eating, drinking, personal relations, social contacts, and sex are also powerful contributors. Medical treatment that has an adverse effect on any of these activities can be justified only if it has unmistakable compensatory benefits for the patient. In treating mild hypertension there must be occasions when the benefits are too small for the amount of misery caused.

Hypertension generally causes no symptoms and only those patients with much raised pressures have headaches and other complaints.[5 6] Most studies show that the quality of life in those with undiagnosed hypertension does not differ from that of normal controls.[7] Those who are aware of their condition, however, are by no means always in a state of total wellbeing,[8] suggesting that the act of labelling a patient as hypertensive leads to a change in this state. Certainly absenteeism from work is increased after patients are diagnosed as hypertensive[9]; whether this is due to the patient feeling more justified in taking time off work or to his feeling unwell is not known. By contrast, however, in the Medical Research Council's trial of mild hypertension psychiatric morbidity was no different between hypertensives and normotensives at screening and furthermore was reduced in those labelled hypertensive and followed up.[10]

Antihypertensive treatments all have side effects. Even non-drug treatments such as low salt, high fibre, low fat diets, may be poorly tolerated. Of the drugs, beta blockers produce subjective side effects, including fatigue, cold extremities, bronchospasm, exacerbation of intermittent claudication, and vivid dreams. Thiazides have more biochemical side effects including impairment of glucose tolerance, hypokalaemia, and precipitation of gout. An important finding in the Medical Research Council's trial was that impotence occurred more frequently with bendrofluazide than with propranolol.[11] Drugs used for more severe hypertension—hydralazine, nifedipine, captopril, and minoxidil—cause correspondingly more frequent and more serious side effects. Antihypertensive treatment may also have more subtle effects on the quality of life which are difficult to detect. A symptom questionnaire used by Bulpitt *et al*[12] compared treated patients with a normotensive population. The hypertensive patients complained more of sleepiness, postural hypotension, dry mouth, nocturia, slow walking pace, impotence, and failure of ejaculation. In four fifths of these patients the blood pressure was controlled so that it would be difficult to attribute these symptoms to hypertension; the drugs being used must be the prime suspects.

The assessment of wellbeing in patients is biased in that it is usually based on observations made by the clinician. One exception was a study by Jachuck *et al*[13] in general practice; they questioned the doctors, patients, and the close relatives about the patients' wellbeing after treatment. While the doctors thought that symptoms were improved in all the patients, only half of the patients said that they were improved and 8% felt worse—and almost all the relatives thought that the patient had deteriorated after receiving antihypertensive treatment.

The old question, "Will it make me live longer, doctor?" may produce the candid reply, "Yes, maybe, but it will certainly seem longer." In the Australian National Blood Pressure Study a grand total of 1721 patients had to be treated for four years to prevent only 10 deaths.[4] As increasing numbers of people with mild hypertension are now being treated we should give careful thought to the adverse effect of treatment on their quality of life before we assume we are doing good.

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Chest pain in patients with normal coronary arteriograms

Studies of patients with persistent chest pain but normal coronary arteries have consistently shown that the risk of subsequent myocardial infarction is low.[1-7] As a corollary, no demonstrable abnormality of the coronary arteries is found in 1-12% of patients who do sustain a myocardial infarction.[8 9]

Up to a third of patients with chest pain who undergo coronary arteriography have no arterial abnormalities,[10-12] yet half[5] to three quarters[6] of them remain appreciably disabled after the investigation. In a recent study (p 1505) Bass *et al* showed that one year after normal coronary arteriography 41% of patients still complained of chest pain, 46% had morbid fears, and 24% were unable to work. A previous study reported persistent symptoms in 94% of patients,[4] while in another 73% improved; most studies report an overall improvement in about half of the cases, although some 22%[5] to 51%[2] of patients were unable to return to work. Faxon *et al* argue that arteriography is justified by an improvement in physical activity and a decline in the consultation rate after normal coronary arteriography,[13] but the residual disability which follows this investigation offers no grounds for complacency.

Given these facts, understandably the management of these patients may be difficult. Most studies have shown a low subsequent cardiac mortality in patients with normal coronary arteriograms, who have been told that they are not suffering from structural heart disease and that there is no need to limit their physical activity. At the same time a warning should be sounded. Fox believes that these patients need to be followed up carefully and that subsequent episodes of chest pain must be treated promptly.[14]

So how may these contrasting approaches be reconciled? A stressful event which threatens personal survival or disrupts an individual's close attachments—for example, the loss of a spouse, a treasured object, or a valued status—may be associated with both emotional disturbance and increased mortality even in stable people.[15] Some evidence suggests that the broken heart is a reality,[16] and it is not too speculative to suggest that some of these deaths result from spasm in otherwise normal coronary arteries. "Spoiling" an individual's home through flood or burglary is also associated with a significant increase in morbidity and mortality.[17]

Intimations of mortality, whether through participation in an accident which might have been fatal,[18] witnessing the death of comrades,[19] or actually experiencing a sudden pain in the chest, are all associated with acute anxiety, which may persist and become disabling. Common features of such anxiety are disordered breathing, chest pain, or oppression and an impending sense of doom. In the American civil war Da Costa described "the irritable heart of the soldier," and "disorderly action of the heart" in the first world war and "effort syndrome" in the second world war were commonplace. The characteristic symptoms of these syndromes were left sided chest pain, breathlessness, palpitations, and fatigue.[20]

Psychogenic disorders may thus simulate heart disease, and psychological factors may precipitate myocardial infarction in the absence of coronary artery disease.[21 22]

Fit patients without coronary artery disease should be told firmly that they need not restrict their physical activity and that their subjective experiences do not presage death. Anyone who consults a doctor should be advised to give up smoking, avoid obesity, and undertake regular exercise. It is probably best for patients not to know that they have had a "mild heart attack," for subsequent anxiety may well outweigh any benefits which may accrue from accepting medical advice.[23]

Extensive cardiac investigations should be avoided when possible, for patients with angina and normal coronary arteries can often be distinguished clinically[1]; indeed, according to Todd,[23] the history is the most important pointer to the cause of recurrent chest pain. Patients without cardiac abnormalities must be identified and if an emotional disturbance is suspected it is necessary to make a specific diagnosis so that effective treatment may be given.

Depression is frequently associated with pain and may be accompanied by a sense of precordial oppression. Treatment with non-cardiotoxic tricyclic antidepressants such as mianserin should result in a complete recovery. Grief may simulate heart disease and patients should be asked about recent bereavement, particularly through heart disease or sudden