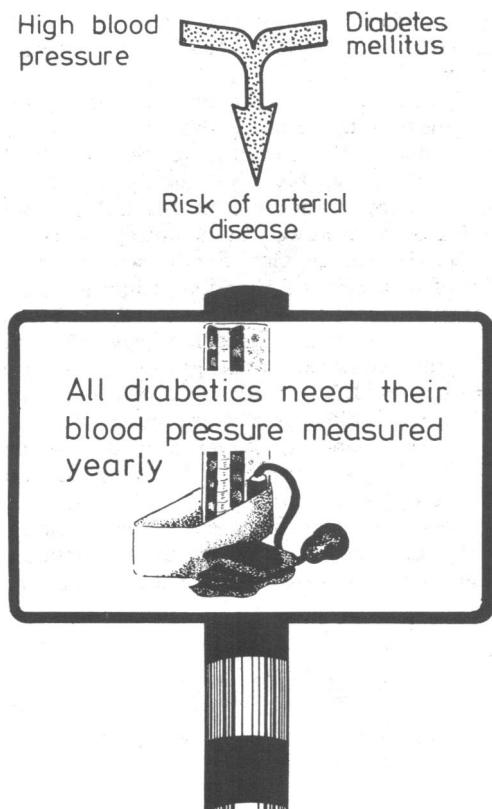


# ABC of Blood Pressure Reduction

LIAM T BANNAN  
D G BEEVERS  
S H D JACKSON  
NOEL WRIGHT

## SPECIAL PROBLEMS

### Diabetes mellitus

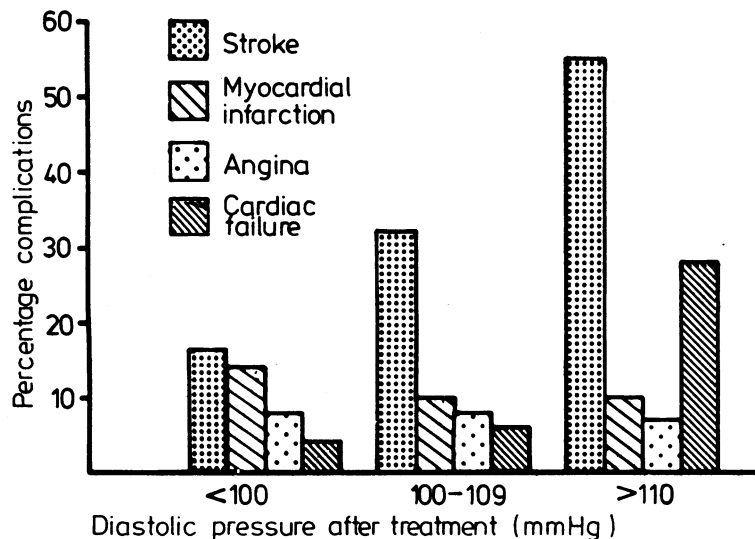


When coexistent with hypertension diabetes mellitus presents a particularly difficult problem because of the side effects of the commonly used antihypertensive agents. Hypertension is common in diabetics and is associated with more severe microangiopathy as well as being an added risk factor for cardiovascular disease. Therefore hypertension in diabetics must be treated adequately.

The thiazide diuretics may be used in insulin-dependent diabetics as their impairment of glucose tolerance may be readily compensated for by increasing insulin dosage. They are not, however, recommended for patients being treated with diet or oral agents. Beta-blockers also affect blood sugar concentrations and interfere with the metabolic response to hypoglycaemia and therefore should be avoided in brittle diabetics, although atenolol and metoprolol may be used.

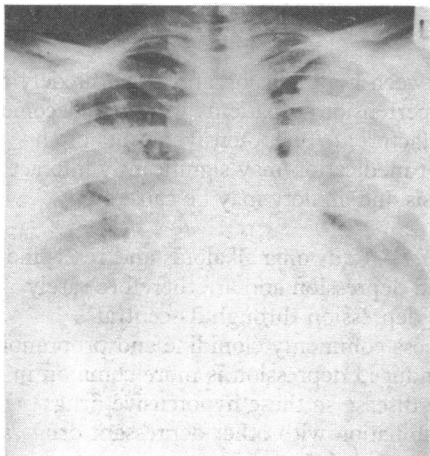
Methyldopa and the vasodilators may be used safely in all groups of diabetics. They are probably the drugs of first choice in hypertensive diabetics.

### Hypertension after a stroke



In patients under 65 years who have had a stroke and whose diastolic pressure is greater than 105 mm Hg antihypertensive treatment definitely helps to prevent a second stroke. Nevertheless, because cerebral autoregulation of blood flow is disturbed immediately after a stroke, treatment should be started only during the recovery phase or when the patient is attending an outpatient follow-up clinic. Sudden drops in blood pressure should be avoided, so that drugs that cause postural hypotension should not be used.

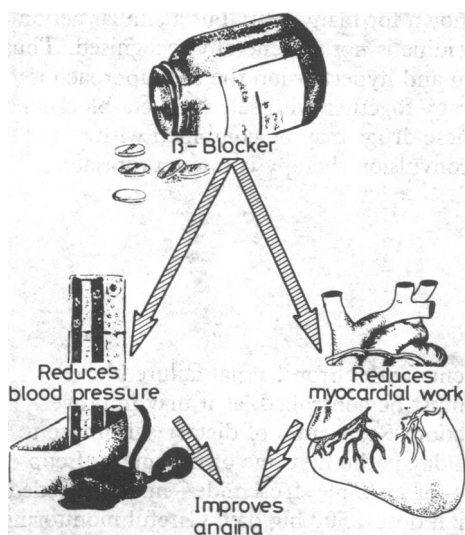
## Hypertension and heart failure



Heart failure may be caused directly by hypertension or be a consequence of ischaemic or rheumatic heart disease. By reducing cardiac output beta-receptor blockers may provoke or aggravate heart failure. For this reason first-line treatment should be with diuretics, and occasionally more potent diuretics such as frusemide will be necessary. If further blood pressure reduction is necessary, methyldopa is the drug of next choice. The vasodilators hydralazine and prazosin have special advantages, as they reduce after-load.

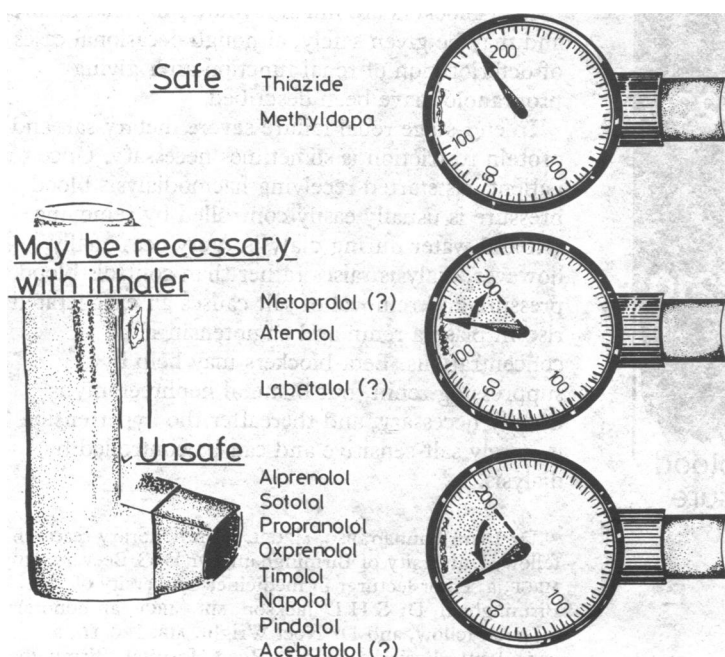
If heart failure is directly due to hypertension then early and effective reduction of blood pressure is necessary and the need for diuretics is reduced once pressure is controlled. Once clinical evidence of heart failure has regressed and if beta-blockers are necessary they must be given in conjunction with a diuretic or digitalis.

## Hypertension and angina



Patients with hypertension and angina may obtain relief of their symptoms if blood pressure is reduced by any drug. Beta-blockers, however, with their special anti-anginal effects, convey added advantages and are the drugs of first choice. They may need to be given more often than once a day to provide 24-hours cover against chest pain. It is dangerous to withdraw beta-blockers abruptly in patients with ischaemic heart disease because this may provoke severe angina. There is, however, no evidence that beta-blocker withdrawal causes rebound hypertension.

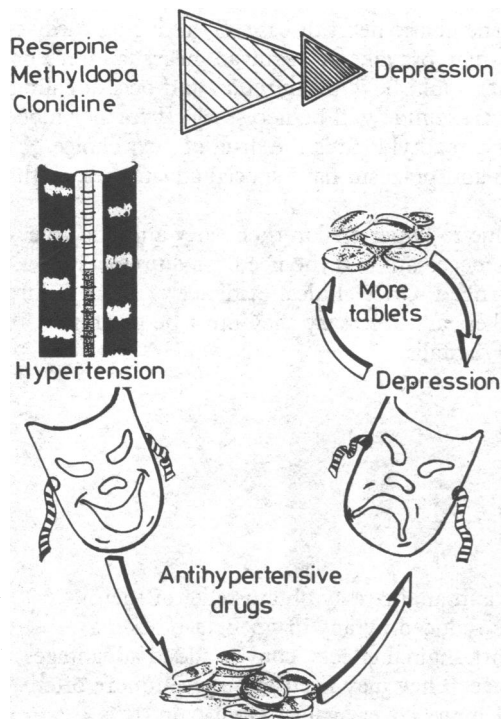
## Hypertension in obstructive airways disease



Conventionally beta-blockers are not used to manage hypertension in patients with obstructive airways disease. When a thiazide diuretic alone is ineffective a centrally acting agent should be added.

When a thiazide and centrally acting agent together are ineffective it would be reasonable to use atenolol. The reluctance to use beta-blockers is based on the worsening in the forced expiratory volume in one second (FEV<sub>1</sub>) after the use of these drugs. Nevertheless, the relatively cardioselective beta-blocker atenolol causes a much less pronounced fall in FEV<sub>1</sub>, and the therapeutic response to inhaled bronchodilators like salbutamol is not blocked, so these drugs are best given together. All patients taking atenolol should be closely monitored early on and be well instructed on the use of a beta-stimulator aerosol. Recent studies suggest that labetalol may be safe in asthmatics with hypertension because of the beneficial effects of alpha-blockade. In patients with severe asthma, however, beta-blockade should be avoided or introduced only in inpatients.

## Hypertension and depression

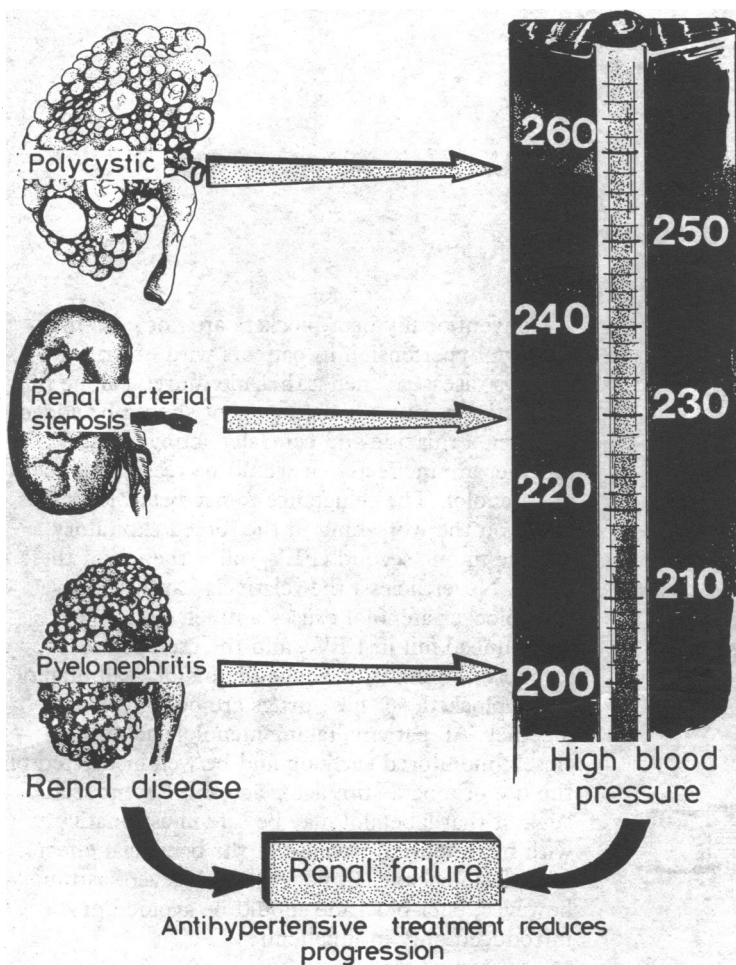


While there is no association between hypertension and either anxiety or depression, the management of hypertension in patients who may become depressed is complicated by three factors: (a) hypotensive agents often cause depression, (b) antidepressant medication may significantly interact with hypotensive agents, (c) neurosis and anxiety may be caused by frequent attendance at clinics.

*Hypotensive drugs causing depression*—Rauwolfia alkaloids and reserpine are the archetypes for drug-induced depression and are therefore rarely used. Methyldopa probably causes depression through its central catecholamine-depleting activity. Less commonly clonidine and propranolol may also cause depression. Drug-induced depression is more common in those patients with a history of the disease so these hypotensive drugs should if possible be avoided. Combination with other depressant drugs, such as barbiturates, should also be avoided.

*Antidepressant drugs exacerbating hypertension*—Antagonism between tricyclic antidepressant drugs and adrenergic neurone blocking substances such as guanethidine has been known for many years but a similar action for methyldopa and possibly clonidine is not as generally recognised. Thus in patients with severe depression and hypertension the best approach is probably electric convulsion therapy together with selected beta-blockers, alpha-blockers, and diuretics. These drugs may be combined with tricyclic preparations if electric convulsion therapy is not appropriate.

## Hypertension and renal failure



In patients with chronic renal failure blood pressure must be controlled, as it may improve renal function. Restriction of dietary salt intake to 100 mmol/day is the first line of treatment. Loop diuretics—for example, frusemide—may be needed in very high doses, 500 mg/day. Careful monitoring of serum electrolyte and urea concentrations is essential. Potassium supplements are occasionally necessary but should be given only if there is hypokalaemia.

Beta-blockers are much favoured in renal failure, and may be given safely, although occasional cases of deterioration of renal function after giving propranolol have been described.

In end-stage renal failure severe dietary salt and protein restriction is sometimes necessary. Once the patient has started receiving haemodialysis blood pressure is usually easily controlled by removing salt and water during dialysis. Very occasionally, however, dialysis raises rather than controls blood pressure and removal of salt causes an exaggerated rise in plasma renin and angiotensin II concentrations. Beta-blockers may help by suppressing renin, but bilateral nephrectomy is usually necessary, and thereafter the hypertension is purely salt-sensitive and can be controlled by dialysis.

Dr Liam Bannan, BSC, MRCPI, is an honorary research fellow, University of Birmingham, Dr D G Beavers, MD, MRCP, a senior lecturer in medicine, University of Birmingham, Dr S H D Jackson, MB, MRCP, an honorary research fellow, and Dr Noel Wright, MB, FRCPED, a consultant physician, Dudley Road Hospital, Birmingham.