ORIGINAL PAPER 3

Management of hypertension—a study of hospital outpatient practice

BARBARA RUSSELL, MFCM J. L. ANDERTON, FRCPE J. J. C. CORMACK, FRCGP
A. DOIG, FRCP MARY FULTON, FRCPE, FFCM R. J. KELLETT, FRCPE
M. B. MATTHEWS, FRCP A. L. MUIR, FRCPE N. J. VETTER, MFCM

SUMMARY. In this third report on the management of hypertension by general practitioners and hospital physicians we review hospital outpatient practice in a representative sample of 90 new patients and 436 returning patients attending the clinics of three Edinburgh hospitals. Seventy-eight per cent of the new patients were seen by a consultant or senior registrar. An unacceptable number of deficiencies was found in clinical assessment and these are discussed. Consultants are shown to be more conservative than junior hospital doctors in their treatment of hypertension.

Introduction

In previous reports of our collaborative study on the management of hypertension in the Lothian Area of Scotland* we presented an analysis of the opinions of general practitioners on patient care (Fulton *et al.*, 1979) and reviewed the management of patients with elevated blood pressure in general practice (Parkin *et al.*, 1979). A high proportion of general practitioners preferred to undertake the entire care of the majority of their patients with hypertension. They performed a certain amount of investigation, made effective use of up-to-date antihypertensive treatment and referred about a third of their patients to hospital. In this report we review the hospital management of hypertension in the outpatient departments of Edinburgh's three largest general hospitals.

Members of the Steering Committee of SAPITAC (Shared Audited Patient Investigation Treatment and Care): J. J. C. Cormack, D. W. Maclean and M. P. Ryan (Royal College of General Practitioners, South-East Scotland Faculty); J. L. Anderton, A. Doig, R. J. Kellett, M. B. Matthews, A. L. Muir, and D. M. Parkin (Royal College of Physicians, Edinburgh); R. Barclay and M. Fulton (Faculty of Community Medicine).

Barbara Russell, Research Fellow, Department of Community Medicine, University of Edinburgh; J. L. Anderton, Consultant Physician, Western General Hospital, Edinburgh; J. J. C. Cormack, General Practitioner, Edinburgh; A. Doig, Consultant Physician, Royal Infirmary, Edinburgh; Mary Fulton, Senior Lecturer, Department of Community Medicine, University of Edinburgh; R. J. Kellett, Consultant Physician, Eastern General Hospital, Edinburgh; M. B. Matthews, Consultant Physician, Western General Hospital, Edinburgh; A. L. Muir, Reader, Department of Medicine, Royal Infirmary, Edinburgh; N. J. Vetter, Senior Registrar in Community Medicine, Lothian Health Board (now Director, Research Team for the Care of the Elderly, Welsh National School of Medicine, Cardiff).

Method

The records were reviewed of all patients who had attended the medical, renal, hypertension and cardiology clinics of the Royal Infirmary and the Western General and Eastern General hospitals, during two representative months in 1975. The total number of patients seen was 2,850 and the case notes of 2,602 were examined (91 per cent); for 248 patients the notes could not be found. The criteria necessary for inclusion in the study were (1) an indication in the referral letter, or the first relevant hospital letter, that hypertension was a principal problem and (2) location of the surgery of the patient's general practitioner within the Lothian Health Board Area.

Clinical and management data were extracted from the case records and were entered on standard forms for analyses. In cases where there was more than one attendance in either study month, only the first visit in that month was recorded. During the two months under review, 90 new and 436 returning hypertensive patients were included in the study. Among the returning patients eight had attended as new patients in the first study month and 67 made return visits during both months; in the latter group the data relating to the second month were excluded from analysis. In cases where the general practitioner provided results of recent radiological investigations or electrocardiography the findings were included in the patient's hospital assessment because it was rarely considered necessary to repeat these tests.

Results

New patients

General practitioners initiated the outpatient appointments in 79 cases (88 per cent), referring two thirds of their patients to general medical clinics and one third to special clinics in cardiology, hypertension and renal

medicine. The seniority of the hospital doctors who saw these patients is shown in Table 1. Forty-four (49 per cent) of the 90 patients were aged between 40 and 59 years, with 16 (18 per cent) aged less than 40, and 30 (33 per cent) aged 60 years or more. Fifty-eight per cent of the patients were women; there was no significant difference in mean age between the sexes. Blood pressure readings were given in 69 referral letters and an analysis of variance showed no significant differences between the general practitioners' and the clinics' diastolic pressure recordings.

At the time of hospital referral 38 patients (42 per cent) were receiving antihypertensive drugs. In the 51 patients who were not receiving treatment the diastolic pressures were <110 mmHg in 16, 110–119 mmHg in 16 and >120 mmHg in 19. Radiographic evidence of cardiomegaly was documented for 17 patients and electrocardiographic features of left ventricular hypertrophy were found in 12 patients. On ophthalmoscopy, grade II hypertensive changes were noted in 15 cases and grade III changes were recorded in one case. In nine patients the plasma urea was greater than 7 mmol/l. Table 2 shows the percentage of patients on whom these examinations were performed; it also contains information on the recording of several other clinical observations and investigations. In patients under 50 years of age, femoral pulse findings were documented for 28 per cent of males and 55 per cent of females. Two thirds of the patients who had an intravenous pyelogram were under 50 years of age and the number of females was twice that of males. A possible cause for hypertension was found in five patients; renal disease was present in four and in one patient a diagnosis of primary aldosteronism was established.

Of the 38 patients receiving hypotensive agents at the time of referral, a recommendation was made to continue treatment in 23 cases and to stop therapy, at least temporarily, in 13. Treatment was advised for 22 of the 51 untreated patients. The drugs most frequently recommended were diuretics, beta-blockers and methyldopa, either alone or in combination.

One year after the initial visit only 20 of the original 90 patients were still attending hospital; there were 61 discharges, seven defaulters, one death and one non-attendance owing to the patient having left the area. In the patients still attending hospital the mean diastolic pressures (±SD) at the initial visit and one year later were respectively 120±16.4 and 92±11.5 mmHg ($P<0.001$); the corresponding values for the patients who had been discharged were 112±11.4 and 95±12.6 mmHg ($P<0.001$).

Table 1. Clinics attended by hypertensive patients and seniority of doctors who saw them.

	General medical clinics	Special clinics*
Number of new patients	58	32
Percentage seen by:		
Consultant	*48*	*63*
Senior registrar	*19*	*34*
Registrar	*26*	*3*
Senior house officer	*7*	*0*
Number of returning patients	184	252
Percentage seen by:		
Consultant	*42*	*33*
Senior registrar	*11*	*31*
Registrar	*24*	*28*
Senior house officer	*23*	*8*

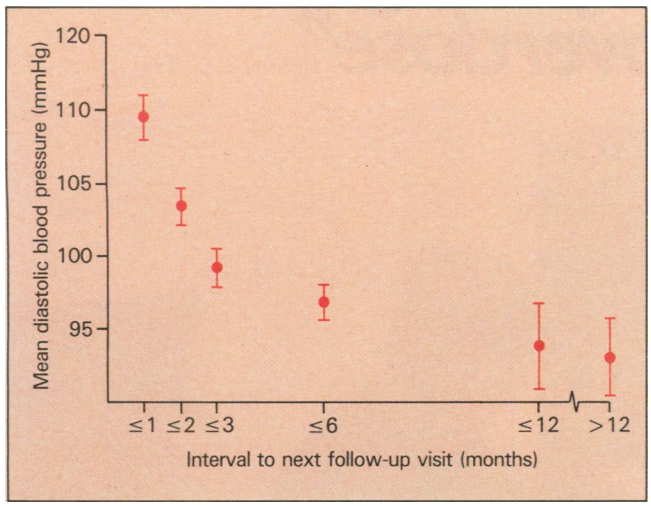
*Hypertension, cardiology and renal clinics.

Table 2. Clinical observations and investigations recorded in 90 new hypertensive patients (selected list).

Clinical observation or investigation	Recorded (percentage of patients)
Weight	*89*
Height	*13*
Femoral pulses	*40*
Ophthalmoscopy	*68*
Chest radiograph	*79*
Electrocardiogram	*79*
Plasma urea and electrolytes	*74*
Urinary protein	*71*
Urine bacteriology	*37*
Intravenous pyelogram	*27*

Returning patients

Fifty-eight per cent of the 436 returning patients attended special clinics. Their number at general medical clinics was three times greater than that of new hypertensive patients, and at special clinics their number was almost eight times as great (Table 1). More than half the patients were seen by a consultant or senior registrar. In 39 per cent of patients the return visit which was under review occurred within 12 months of the initial hospital visit, and in 45 per cent of cases the first attendance had occurred more than one year but less than six years previously. Fifty-three per cent of the 436 patients were aged between 40 and 59 years, with 18 per cent aged less than 40 years and 29 per cent aged 60 years or more. Fifty-one per cent of the patients were men and their mean age did not differ significantly from that of the women. Possible causes of hypertension were present in 17 per cent of cases, there being 71 patients with renal disease and two with coarctation of the aorta. Seventy-nine per cent of patients were receiving antihypertensive drugs; those most frequently prescribed were beta-blockers, methyldopa, diuretics and adrenergic neuronal blockers, either singly or in combination. Diastolic pressures during treatment were: in 64 per cent of



Relation of interval to next follow-up visit to mean diastolic pressure (±SEM) in 367 hypertensive patients.

Table 3. Relationship between recommended treatment and mean diastolic pressure (± SD) in 414 hypertensive patients.

Recommended treatment	Number of patients	Diastolic pressure (mmHg)
a) None	59	98 ± 11.8
b) Start drug therapy	23	107 ± 12.1
c) No change in drug therapy	210	96 ± 11.5
d) Change drug therapy	122	112 ± 15.6

P values of mean diastolic pressure comparisons:
a) versus b) = <0.001; c) versus d) = <0.005.

patients, <110 mmHg; in 22 per cent, 110–119 mmHg; and in 14 per cent, >120 mmHg. Table 3 shows the relation between treatment recommendations and mean diastolic blood pressure; the analysis is based on 414 patients, 22 cases having been excluded because of missing information in the case notes. Consultants were more conservative in their recommendations than junior hospital doctors. At diastolic pressures of <110 mmHg the recommendations of both groups were similar, but at levels >110 mmHg consultants advised that treatment be started or changed in 52 per cent of patients, whereas junior doctors did so in 81 per cent of patients ($P<0.001$). There were no significant differences in the recommendations made by different grades of junior doctors.

The interval to the next follow-up visit was governed principally by the patient's diastolic pressure (Figure); 82 per cent of patients with a diastolic pressure >110 mmHg were asked to return within three months compared with 60 per cent of those with pressures <110 mmHg ($P<0.05$). Forty-four patients (10 per cent) were discharged; their mean period of follow-up was 22 months. Age influenced discharge only at diastolic levels <110 mmHg; of those patients aged 50 years or more, 16 per cent were discharged compared with 7 per cent of those below this age ($P<0.05$). The mean diastolic pressure (±SD) for men on discharge was 105±16.2 mmHg in comparison with 92±11.0 mmHg for women ($P<0.01$).

Discussion

In a previous study (Parkin *et al.*, 1979) we observed that general practitioners in the Lothian Area referred approximately one third of their hypertensive patients to hospital and that their decision to refer was influenced by a number of factors including the initial blood pressure, the sex of the patient and the known duration of hypertension. The greater the initial diastolic pressure and the longer the interval since diagnosis the more likely was referral to hospital. Men were referred more often than women but there was no association between hospital referral and age. In this review of the hospital management of hypertension, 88 per cent of clinic referrals were made by general practitioners, two thirds of the patients being sent to general medical clinics and one third to special clinics (hypertension, renal medicine and cardiology). More than three quarters of the new patients were seen by a consultant or senior registrar. At the first clinic visit 42 per cent of the patients were already on antihypertensive drugs; among the untreated patients more than two thirds had evidence of moderate or severe hypertension. An analysis of variance showed no significant difference between diastolic blood pressure recordings made by general practitioners and those made by hospital staff.

In the clinical assessment of new patients (Table 2) body weight was recorded in 89 per cent of cases but height was noted in only 13 per cent thus making it impossible, in the majority, to obtain an objective assessment of any deviation from ideal weight. Since the control of obesity is an intrinsic part of any antihypertensive regime (Reisin *et al.*, 1978; Messerli, 1982) and the possibility of phaeochromocytoma requires special consideration in hypertensive patients who are underweight (Manger and Gifford, 1977), it is recommended that height and weight should be recorded in all cases. Observations on the femoral pulses were recorded in less than half the new cases. Although this omission could be justified in some of the older patients and may have resulted in other cases from the practice of not recording normal findings, we suggest that a note on the femoral pulses should form part of the routine documentation of hypertensive patients in order to reduce the risk of overlooking a rare but surgically treatable cause of hypertension. Simple methods of assessing the effects of hypertension on the cardiovascular system by means of ophthalmoscopy, radiography of the chest and electrocardiography are of proven value in patient

management. The absence of evidence of these investigations having been performed in 20–30 per cent of cases is unacceptably high. The need to screen hypertensive patients for electrolyte disturbances and disorders of renal function is also well established, and the absence of plasma urea and electrolyte estimations and any form of urine analysis in about 30 per cent of cases is unsatisfactory. Most of these inadequacies in the examination and investigation of hypertensive outpatients have also been reported in respect of hospital inpatients with high blood pressure (Frohlich *et al.*, 1971). A lesser incidence of the same deficiencies was found by Dollery *et al.* (1977) in a study of clinical records in three specialist hypertension clinics and was smallest when a specially structured questionnaire record was used.

Intravenous pyelograms were performed on 27 per cent of patients, two thirds of whom were under 50 years of age. The increased incidence of a history of urinary symptoms in women in this age group is reflected in pyelography having been requested for twice as many women as men; largely for the same reason, bacteriological examination of the urine was performed in over a third of cases.

Only five of the 90 new patients were admitted to hospital for investigation and/or treatment of hypertension, indicating the relatively small number of back-up beds required for hypertensive outpatients. It is noteworthy that the case-record information suggested that two of these patients could have been managed adequately on an outpatient basis. There was an unsatisfactory default rate of 8 per cent per annum in outpatient follow-up. Within a year of their initial hospital visit, two thirds of the patients had been discharged. Although blood pressure had been significantly reduced, it often remained in a range associated with an increased risk of cardiovascular disease. Suboptimal control of blood pressure is a major problem in hospital hypertension clinics (Beilin *et al.*, 1980) and emphasizes the need for more effective and more acceptable forms of treatment.

Although the majority of new patients with hypertension (64 per cent) were referred to general medical clinics, most of the returning patients (58 per cent) were seen at special clinics. This difference cannot be explained by the transfer of patients from general to special clinics since the number of such transfers was small. Part of the difference is attributable to the greater incidence of renal disease in the returning patients which necessitated follow-up in its own right and closer supervision of antihypertensive therapy. Consultants and junior hospital doctors made similar recommendations on treatment when diastolic pressures were less than 110 mmHg; however, a significantly higher proportion of junior hospital doctors recommended that antihypertensive treatment be started or changed when diastolic levels in excess of 110 mmHg were recorded.

References

Beilin, L. J., Bulpitt, C. J., Coles, E. C. *et al.* (1980). Long-term anti-hypertensive drug treatment and blood pressure control in three hospital hypertension clinics. *British Heart Journal,* **43,** 74-79.

Dollery, C. T., Beilin, L. J., Bulpitt, C. J. *et al.* (1977). Initial care of hypertensive patients. Influence of different types of clinical records. *British Heart Journal,* **39,** 181-185.

Fulton, M., Kellett, R. J., MacLean, D. W. *et al.* (1979). The management of hypertension—a survey of opinions among general practitioners. *Journal of the Royal College of General Practitioners,* **29,** 583-587.

Frohlich, E. D., Emmott, C., Hammarsten, J. E. *et al.* (1971). Evaluation of the initial care of hypertensive patients. *Journal of the American Medical Association,* **218,** 1036-1038.

Manger, W. M. & Gifford, R. W. (1977). *Pheochromocytoma.* p 91. New York & Berlin: Springer-Verlag.

Messerli, F. H. (1982). Cardiovascular effects of obesity and hypertension. *Lancet,* **1,** 1165-1168.

Parkin, D. M., Kellett, R. J., MacLean, D. W. *et al.* (1979). The management of hypertension—a study of records in general practice. *Journal of the Royal College of General Practitioners,* **29,** 590-594.

Reisin, E., Abel, R., Modan, M. *et al.* (1978). Effect of weight loss without salt restriction on the reduction in blood pressure in overweight hypertensive patients. *New England Journal of Medicine,* **298,** 1-6.

Acknowledgements

We are grateful to our physician colleagues who allowed us to examine their patients' case records. We thank the staff of the Medical Computing and Statistics Unit of Edinburgh University for statistical and data processing assistance, in particular Mr W. Adams and Mrs L. Chalmers. Mrs Sarah Vetter has given invaluable help in completing the study. The Lothian Health Board provided financial support.

Address for reprints

Dr A. Doig, Department of Medicine, The Royal Infirmary, Lauriston Place, Edinburgh EH3 9YW.

Computer tomography scanning in epilepsy

Abnormal computer tomography scans were found mainly in epileptic patients who had focal signs or a delta focus on the electroencephalograph. The authors recommend that CT scans in epilepsy should be reserved for those patients with focal features and that careful clinical assessment remains of paramount importance in the management of epilepsy.

Source: Young, A. C., Mohr, P. D., Costanzi, J. B. *et al.* (1982). Is routine computerized axial tomography in epilepsy worthwhile? *Lancet* **2,** 1446-1447.