Cardiac risk factor management
Experience of an outpatient hypertension clinic


Objective: To describe the outcome of the management of cardiovascular risk factors in the hypertension clinic of a teaching hospital over a five-year period.

Design: Retrospective analysis of risk factor data (blood pressure, plasma cholesterol level, body weight, smoking and drinking habits) obtained from computerised hypertension clinic progress report forms. Selecting hospital: The Austin Hospital.

Patients: One hundred and thirty-one patients referred to the clinic from both general practice and from within the hospital who attended the clinic regularly during the five-year study period.

Intervention: Long term management of hypertension and coexisting coronary risk factors by dietary, medical and lifestyle intervention.

Results: There was a significant improvement in diastolic blood pressure control in 1990 versus 1986 in both men and women, while systolic blood pressure improved in women only. The number of patients controlled with monotherapy increased from 38% in 1986 to 45% in 1990. Eighty-nine percent of the men and 85% of women remained above their maximum desirable weight. Reported levels of alcohol consumption were low and the proportion of smokers was below that of the general population. A significant decline in plasma total cholesterol levels was observed in the women. Despite dietary advice and a limited use of lipid lowering drugs, 53.2% of the men and 66.1% of the women continued to have total plasma cholesterol levels above 5.5 mmol/L in 1990. High density lipoprotein levels increased significantly in the women only.

Conclusion: A high proportion of our clinic patients have well controlled hypertension, but the clinic program produced little evidence of improvement in risk factors in men stabilised by long term therapy. More intensive methods of achieving lifestyle modification and a wider use of lipid lowering drugs may be needed if we are to achieve satisfactory body weights and lipid profiles in hypertensive patients.


Hypertension affects between 12% and 16% of the Australian population and is recognised as an important risk factor for cardiovascular disease. The recognition of other risk factors for coronary artery disease such as hyperlipidaemia, tobacco smoking and obesity has produced some modifications in the approach to management of the hypertensive patient. Although there have been a wide range of studies attempting to address the problem of multiple risk factors in the community, there are few published data, in terms of the response of risk factors to routine medical care, on the progress of patients attending large hypertension clinics in public hospitals.

As teaching hospital clinics are major referral clinics there is a significant turnover of patients which makes controlled evaluation of the total clinic data impossible. However, most clinics have a group of patients who regularly attend the clinic for continuing care. The detailed results that are available for these patients provide some useful information on the changing pattern of blood pressure treatment and the change in cardiovascular risk factors. The data presently available in the literature have mostly been published before 1985 and have concentrated on blood pressure control alone.

We have previously reported a high incidence of multiple risk factors in hypertensive patients attending our clinic and have now focused attention on the simultaneous control of elevated blood pressure and coexistent cardiac risk factors. A computerised risk factor record system is in use at the Austin Hospital, allowing annual review of patients attending our Hypertension Clinic. In this paper we report the progress of cardiovascular risk factors in patients continuing to attend the Austin Hospital Hypertension Service during 1986–1990.

Patients and methods

Clinic organisation

The Austin Hospital Hypertension Clinic is a referral and follow-up centre for patients both from general practice and from within the hospital. The initial assessment of new patients includes the completion of a one page Hypertension Clinic Progress Report which is updated on subsequent visits (see Box).

Patient information recorded includes name, address, date of birth, weight, plasma total cholesterol (TC) level, high density lipoprotein cholesterol (HDL-C) level, the amount of alcohol consumed per week, blood pressure readings at first presentation to the clinic and whether or not they smoke. Blood pressure readings at the last and second last attendance at the clinic, family history of hypertension, other current medical problems and drug therapy are printed by computer for each follow-up visit. Withdrawal of drugs on account of adverse side effects is also permanently documented on the clinic report. A desirable weight range, based on the...
### Austin Hospital — Hypertension Clinic — Progress Report

| U. R. number |  |  |  
|-------------|---|---|---|
| Name |  |  |  
| Address |  |  |  
| D.O.B. |  |  |  
| Phone |  |  |  

### CURRENT RISK FACTORS
- Smoking (cigs/day): 0
- Alcohol (g/day): 80
- Cholesterol (mmol/L): 5.6
- HDL (mmol/L): 0.93

### MEDICAL PROBLEMS
- Active: ESSENTIAL HYPERTENSION
- Inactive: RETINAL VASCULAR OCCLUSION

### FAMILY HISTORY
- Father: Age at death: 77 years; essential hypertension

### BLOOD PRESSURE / WEIGHT DATA

<table>
<thead>
<tr>
<th>Date</th>
<th>Time 1</th>
<th>Time 2</th>
<th>Time 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>02 FEB 92</td>
<td>09 JAN 91</td>
<td>09 JAN 91</td>
<td></td>
</tr>
<tr>
<td>Dr Smith</td>
<td>12 DEC 90</td>
<td>09 JAN 91</td>
<td></td>
</tr>
<tr>
<td>Dr Smith</td>
<td>164/91</td>
<td>159/91</td>
<td></td>
</tr>
<tr>
<td>170/105</td>
<td>155/93</td>
<td>150/85</td>
<td></td>
</tr>
<tr>
<td>74</td>
<td>70</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>77.6</td>
<td>72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CURRENT THERAPY

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>P TIMOLOL</td>
<td>60mg</td>
<td>Twice daily into the left eye</td>
</tr>
<tr>
<td>P NAPHAZINE</td>
<td>15mg</td>
<td>Four times at night</td>
</tr>
<tr>
<td>P ENALAPRIL</td>
<td>20mg</td>
<td>1/4 level morning</td>
</tr>
<tr>
<td>P AIOPRORETIC</td>
<td>30mg</td>
<td>1/4 level morning</td>
</tr>
</tbody>
</table>

### DRUG WARNINGS
-  

### GENERAL NOTES

1959 Metropolitan Life Insurance Company mortality tables, is calculated for each patient at the first clinic visit and is recorded in the progress report with weight at entry to the clinic.

Data from progress reports is entered into a McDonnell Douglas Series 18 Minicomputer, located in the Information Systems Department of the hospital. This ensures a reliable storage of data and easy access to information for retrospective analysis.

The policy of the clinic is that patients with well controlled blood pressures and cardiovascular risk profiles either return to their local practitioner or are reviewed at the clinic every three months.

The decision is made after discussion with the patient. On average approximately 50 patients per year choose to leave the clinic to attend their local doctor and we see a similar number of new patients. The most common reason given by patients opting to leave the clinic is that their local practitioner is more conveniently located. More frequent appointments are scheduled for patients with labile blood pressure readings and for those with other coronary risk factors requiring dietary, medical or lifestyle intervention.

The decision to commence antihypertensive treatment and the choice of agent is made at the discretion of individual physicians. Clinic policy is to introduce antihypertensive treatment in patients with repeated casual supine blood pressure readings above 150 mmHg systolic and 90 mmHg diastolic. The diagnosis of hypertension is commonly confirmed by 24-hour blood pressure monitoring. The decision to commence antihypertensive therapy is also influenced by the presence or absence of hereditary factors, hypertensive organ manifestations or other risk factors for cardiovascular disease. Current first-line drugs of choice are angiotensin converting enzyme (ACE) inhibitors or β-adrenoceptor blocking agents. If the response to these is inadequate a calcium channel blocker or diuretic is added to the regimen.

A major aim of our hypertension clinic is to identify patients with elevated plasma cholesterol levels and to modify these levels by dietary means. Over the past two years we have introduced an intensive dietary counselling program run by two paramedical staff, who attend the clinic each week. Suitable patients are referred by medical staff, and receive dietary counselling either on a one to one basis or in the presence of family members.

At entry to the program each patient’s dietary history is documented in detail and individualised recommendations for dietary modification are made in accordance with the National Heart Foundation guidelines. Emphasis is placed on the reduction to total fat and dietary cholesterol intake and on the substitution of polyunsaturated and monounsaturated fatty acids for saturated fat. Further dietary modifications which may lead to additional reductions in plasma cholesterol such as increasing soluble fibre intake, and the beneficial effect of lifestyle factors (regular exercise, stopping smoking, loss of weight, relief of stress) on plasma lipid levels are also discussed.

Patients are advised to limit salt intake by not adding salt to the cooking or at the table. Information pamphlets on coronary risk factors are provided to patients and we are currently evaluating the usefulness of a novel “risk factor diary” which patients are requested to complete on a daily basis.

When patients enter the program they are counselled every three weeks for a period of three months. If their plasma cholesterol level is well controlled at the end of this period (TC level <5.0 mmol/L and LDL-C to HDL-C ratio <4.0) they are reviewed by the counsellors every three months. Patients who do not respond to this dietary intervention are recommended for pharmacological management of hypercholesterolaemia.

### Data Collection

The level of patient turnover makes it difficult to provide definitive data on the effects of management on individual risk factors. Our clinic was attended by 246 patients in 1990. In this paper we provide information on the continuing incidence and severity of cardiovascular risk factors in 101 patients (mean age in 1986 59, age range 27–81) for whom follow-up data were available over the five-year period 1986–1990.

The cardiac risk factors of patients attending the clinic were analysed at the end of October each year. All data were obtained from individual Hypertension Clinic Progress Reports, completed at clinic visits nearest to the study period, which in approximately two-thirds of cases was within three months of the end of October.

Supine blood pressure measurements after 5–10 minutes of supine rest were performed by medical staff using manual sphygmomanometers (phase V Korotkoff sounds). Systolic and diastolic blood pressure were measured three times and the results were recorded as the mean of the last two readings.

Blood lipid concentrations were measured by serum cholesterol, HDL-C and triglyceride concentrations were measured by enzymatic methods using the Technicon Autoanalyzer. Plasma total cholesterol, LDL-C and triglyceride concentrations were measured using the Technicon Autoanalyzer.

### Calculation of Multiple Risk Factor Intervention Trial scores and risk percentiles

Overall cardiovascular risk was assessed for...
each patient by calculation of (a) a "risk factor score" and (b) a "risk percentile" using the method of McNeil et al. The risk factor score is derived from logistic regression coefficients obtained in the Multiple Risk Factor Intervention Trial (MRFIT). The score represents the fractional (six-year) probability of death from coronary heart disease and is calculated from the formula:

\[
\text{Risk factor score} = 1.0 \times \exp(-CHD)
\]

where \( CHD = -14.6955 + 0.0129 \times \text{age} + (0.0228 \times \text{diastolic blood pressure}) + (0.3090 \times \text{cholesterol level (mmol/L)}) + (0.2227 \times \text{number of cigarettes per day}).
\]

(b) McNeil et al. have used data from the 1983 National Heart Foundation of Australia Risk Factor Prevalence Study to stratify the Australian population (aged between 25 and 64 years) into age and sex specific percentiles in accordance with their risk factor scores. Risk factor coefficients from the MRFIT study were only available for men, but in the absence of similar data for women they have been applied to both the male and female specific data from the Risk Factor Prevalence Study to calculate these percentiles. This would be inappropriate if it was intended to predict survival, but for the purpose of this exercise they were used only to weight the impact of various risk factors according to their influence at various ages. Thus, the percentile position represents the individual's risk value among a peer group made up of persons of the same age and sex.

Risk factor scores and risk percentiles were analysed for 59 patients during the period 1986–1990. Twelve patients were omitted from analysis because of incomplete risk factor data, and 60 were excluded since their ages were outside the range 25–64 years, upon which the 1983 Australian Risk Factor Prevalence Study was based.

Data analysis

Data analysis was performed with the statistical program CLR ANOVA. Repeated measurements obtained from patients over five consecutive years were analysed by two-way repeated measures analysis of variance for time-related and sex-related differences and by the Newman–Keuls test for post hoc comparisons.

Results

Blood pressure

The Figure presents the distribution of diastolic blood pressure (DBP) for the 131 patients treated in the period 1986–1990 and Table 1 summarises mean systolic blood pressure (SBP) and DBP data for the same period. At their first visit to the clinic the mean (± SD) SBP and DBP of these 131 patients were 168.2 ± 27.1 and 101.6 ± 16.9 mmHg respectively. A significant improvement in DBP control was observed in both men and women during 1989–1990 when compared with the previous three years. The mean supine DBP of patients fell from 87.3 ± 8.2 mmHg in 1986 to 81.7 ± 10.4 mmHg in 1990 (P < 0.0001, see Table 1). Significant improvement in SBP, however, was only seen in the women in whom mean SBP fell from 153.6 ± 17.0 mmHg in 1986 to 146.6 ± 18.6 mmHg in 1990 (P < 0.02). The proportion of patients with DBP above 90 mmHg decreased from 28% in 1986 to 17% in 1990 while the proportion with DBP above 95 mmHg decreased from 13% in 1986 to 7% in 1990 (Table 2).

| TABLE 1: Coronary risk factor data (mean ± SD) during the period 1986–1990 from patients in whom consecutive measurements were available |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Supine SBP (mmHg) |            |             |             |             |             |             |                                         |
| (SBP in brackets) |            |             |             |             |             |             |                                         |
| All patients    | 131         | 87.3 ± 8.2  | 87.5 ± 6.6  | 87.0 ± 8.3  | 82.4 ± 9.6  | 81.7 ± 10.4 | <0.0001 [1986 v. 1987, 1988, 1989 v. 1986, 1987, 1988] |
|                 |             | (150.7 ± 16.9) | (152.8 ± 16.1) | (153.4 ± 20.2) | (150.3 ± 20.0) | (146.8 ± 19.1) |                                         |
| Men             | 63          | 86.7 ± 7.6  | 88.6 ± 8.2  | 87.6 ± 9.4  | 83.9 ± 9.3  | 83.1 ± 10.7 | 0.001 [1986 v. 1987, 1989 v. 1987] |
|                 |             | (147.6 ± 15.6) | (155.3 ± 18.3) | (151.5 ± 18.0) | (150.3 ± 20.0) | (151.1 ± 19.5) |                                         |
| Women           | 68          | 87.8 ± 8.7  | 86.6 ± 8.9  | 87.2 ± 8.3  | 81.1 ± 9.8  | 80.4 ± 10.0 | NS |
|                 |             | (153.6 ± 17.0) | (150.5 ± 17.8) | (155.1 ± 22.0) | (150.3 ± 20.2) | (146.6 ± 18.6) |                                         |
| Plasma TC (mmol/L) |            |             |             |             |             |             |                                         |
| All patients    | 103         | 6.1 ± 1.1   | 6.0 ± 1.1   | 5.9 ± 1.1   | 6.1 ± 1.0   | 5.9 ± 0.9   | NS |
|                 |             | 47.8 ± 8.0  | 5.8 ± 0.9   | 5.7 ± 1.0   | 5.9 ± 0.9   | 5.7 ± 0.9   | NS |
| Women           | 56          | 6.4 ± 1.1   | 6.2 ± 1.2   | 6.1 ± 1.1   | 6.2 ± 1.1   | 6.0 ± 0.9   | 0.03 [1990 v. 1990] |
| Plasma HDL-C (mmol/L) |          |             |             |             |             |             |                                         |
| All patients    | 108         | 1.25 ± 0.43 | 1.28 ± 0.38 | 1.29 ± 0.44 | 1.32 ± 0.44 | 1.36 ± 0.44 | 0.006 [1990 v. 1986, 1987, 1989, 1990] |
|                 |             | 1.10 ± 0.32 | 1.12 ± 0.29 | 1.12 ± 0.31 | 1.15 ± 0.33 | 1.16 ± 0.33 | NS |
| Women           | 59          | 1.30 ± 0.48 | 1.36 ± 0.42 | 1.44 ± 0.49 | 1.47 ± 0.47 | 1.50 ± 0.52 | 0.002 [1990 v. 1998] |
| Weight (kg)     | 130         | 79.4 ± 15.0 | 79.1 ± 15.4 | 78.4 ± 15.9 | 78.3 ± 15.8 | 78.0 ± 15.6 | 0.002 [1986 v. 1988, 1989, 1990] |
| Men             | 62          | 85.8 ± 10.7 | 84.7 ± 10.3 | 83.7 ± 10.8 | 84.2 ± 11.5 | 83.9 ± 12.1 | 0.004 [1986 v. 1988, 1989, 1990] |
| Women           | 68          | 73.6 ± 16.1 | 74.1 ± 17.5 | 73.6 ± 18.2 | 72.9 ± 17.3 | 72.6 ± 16.5 | NS |

*DBP = diastolic blood pressure, SBP = systolic blood pressure.

**NS = Statistically not significant, P > 0.05.

1TC = total cholesterol level. Normal range: < 5.5 mmol/L.

2HDL-C = high density lipoprotein cholesterol level. Normal range: > 1.0 mmol/L (men), > 1.2 mmol/L (women).
Ultravist is a non-ionic contrast medium which is supplied ready for use in solutions of various concentrations (see table below).

<table>
<thead>
<tr>
<th>Concentration</th>
<th>mg/ml</th>
<th>150</th>
<th>240</th>
<th>350</th>
<th>370</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organically bound iodine</td>
<td>204</td>
<td>306</td>
<td>455</td>
<td>480</td>
<td>510</td>
</tr>
<tr>
<td>Organically bound iodine (mg/ml)</td>
<td>0.18</td>
<td>0.27</td>
<td>0.41</td>
<td>0.44</td>
<td>0.48</td>
</tr>
<tr>
<td>Preferred diluent (pH 7.4)</td>
<td>50</td>
<td>75</td>
<td>100</td>
<td>125</td>
<td>150</td>
</tr>
<tr>
<td>Preferred diluent (pH 7.4) mg/ml</td>
<td>0.09</td>
<td>0.13</td>
<td>0.18</td>
<td>0.22</td>
<td>0.26</td>
</tr>
<tr>
<td>Concentration mg/ml</td>
<td>140</td>
<td>210</td>
<td>315</td>
<td>345</td>
<td>375</td>
</tr>
<tr>
<td>Preferred diluent (pH 7.4)</td>
<td>100</td>
<td>150</td>
<td>225</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>Preferred diluent (pH 7.4) mg/ml</td>
<td>0.07</td>
<td>0.10</td>
<td>0.14</td>
<td>0.16</td>
<td>0.20</td>
</tr>
<tr>
<td>Viscosity (mPa.s or cP)</td>
<td>0.03</td>
<td>0.05</td>
<td>0.08</td>
<td>0.10</td>
<td>0.12</td>
</tr>
<tr>
<td>Viscosity at 37°C</td>
<td>0.65</td>
<td>1.00</td>
<td>1.50</td>
<td>2.00</td>
<td>2.50</td>
</tr>
<tr>
<td>Viscosity at 37°C (cP)</td>
<td>0.04</td>
<td>0.06</td>
<td>0.09</td>
<td>0.12</td>
<td>0.15</td>
</tr>
<tr>
<td>Viscosity at 37°C (cSt)</td>
<td>0.028</td>
<td>0.035</td>
<td>0.042</td>
<td>0.049</td>
<td>0.056</td>
</tr>
</tbody>
</table>

**Pharmacological/Pharmacokinetics**

Ultrasound is a highly effective contrast agent for imaging the cardiovascular system, particularly for the diagnosis of coronary artery disease.

**Indications**

Ultrasound is contraindicated in patients with known hypersensitivity to iodopropynol.

**Contraindications**

Ultrasound is not administered to patients with known hypersensitivity to iodopropynol.

**Dosage and Administration**

Ultrasound is administered as a single intravenous injection of 10 ml, followed by a saline flush of 100 ml. The injection should be given slowly to avoid a rapid increase in blood pressure. The dose should be increased gradually over a period of 2-3 minutes. The injection site should be monitored for any signs of adverse reactions, such as flushing, swelling, or discomfort.

**Precautions**

- **General**
  - Any contrast medium solution left over from the examination must be discarded immediately.
  - The potential risk of anaphylactic reactions may be increased under the following conditions: large dose of contrast medium, rapid infusion, or repeated intravenous administration.
- **Other**
  - Other precautions which apply to the radiographic contrast procedures are the same for Ultravist as they are for conventional iodine media.

**Use in Pregnancy**

Ultravist is considered to be contraindicated during pregnancy.

**Use in Children**

Ultravist is not recommended for children under the age of 12 years.

**Interactions with Other Drugs**

- Ultravist may interact with other drugs, particularly those that affect the cardiovascular system, such as beta-blockers, calcium channel blockers, and diuretics.
- Ultravist may also interact with other radiographic contrast agents.

**Adverse Reactions**

Adverse reactions to Ultravist are rare and usually mild. The most common reactions are flushing, sweating, and hypotension. More serious reactions, such as anaphylaxis, have been reported but are rare.

**Other Symptoms**

Other symptoms which may occur include:

- Headache, dizziness, flushing, sweating, hypotension, tachycardia, bradycardia, hypotension, hypertension, hypoxia, and hypoglycemia.
- Anaphylaxis, angioedema, urticaria, and other allergic reactions.

**References**

Experiences shows that hypersensitivity reactions occur more frequently in patients with an allergic disposition.

Severe reactions requiring emergency treatment can occur in the form of anaphylactic shock and a circularity reaction accompanied by peripheral vasodilatation and subsequent hypotension, reflex tachycardia, nausea, epigastric, substernal and coryzal and possible leading to unconsciousness. Pain, muscle aches, dizziness, tachycardia, ECG changes and arrhythmias may occur following intravascular administration of potassium.

It is known that a systemic angiography and other procedures in which the contrast medium reaches the brain stem may be accompanied by neurologically complications such as coma, transient stroke, and choreoathetosis, transient paraplegia, disturbed vision or black facial muscles and - particularly in epileptics and patients with focal brain damage - epileptic fits. Very rarely, the injection of this contrast medium has been described on intravascular administration of the contrast medium as well. Temporary renal failure may occur in rare cases. Delayed reactions can occasionally occur.

Dosage and administration

Vials containing contrast medium solutions are intended not for the withdrawal of multiple doses. The rubber stopper should never be pierced more than once. The use of cannulas with a long tip and a diameter of more than 2 mm is recommended for piercing the stopper and drawing up the contrast medium (decalcified withheld cannula with a side hole, e.g. Mohr-Adina canula, can be considered suitable).

General information

Patients must present themselves in a fasted and adequately hydrated state on the day of the examination. Preparation for the examination should be made for diarrhea and antitussives. In the case of abdominal angiography and anorexia, the diagnostic yield is increased if the bowels are empty of faecal matter and gas. On the two days prior to the examination patients should therefore avoid bulky food and vegetables and eliminate all food and fluid containing fruit, citrus fruits, dark and fresh bread and all kinds of uncooked vegetables. On the day before the examination, patients should avoid eating after 8:00 p.m. It is important that the patient is appropriate to administer laxatives in the evening. In the case of digital subtraction angiography or angiography, pretreatment with an anticoagulant or heparin is recommended in order to minimize the risk of procedure-related thrombosis and embolism.

Dosage

Depending on age, weight, cardiac output, general state of health, the clinical problem, examination technique, and location and vellum of the region to be examined an appropriate dose should be used. Suggested dosages are given below and are for adults of normal weight unless otherwise stated. Urographic agents are not used in children. Each bottle should be used only once and any residue should be discarded.

Intravenous urography

- Dosage
  - The dose should be 300 mg/kg body weight (1 ml Ultrafast) or 375 ml Ultrafast-Sol, 1.3 ml Ultrafast-240 kg body weight) if the clinical problem also requires adequate filling of the urinary bladder. In the case of severe shock the dose should be increased. In the case of severe shock the dose should be increased. In the case of severe shock the dose should be increased. In the case of severe shock the dose should be increased.
  - The time of excretion in urine is, e.g. a 10-12 ml injection into the cubital vein, 10-20 ml excreted into the renal vein per minute. The period of time for which the contrast medium is in contact with the wall of the biliary tree can be reduced by injecting 20 to 40 ml isoproterenol solution as a bolus immediately after the injection.
  - The intravascular injection of a bolus of 10 ml Ultrafast-240 or 15 ml Ultrafast 300 is recommended in cases of severe shock. The volume used in conventional angiography for bolus contrast injection, bolus volume, and flow rate can be reduced for intravenous digital subtraction angiography.

Suggestions for the treatment of contrast medium incidents

- Management of anaphylaxis is according to the Scientific and Therapeutics Sub-committee of the Australian College of Allergy, and the American Society 1986 Vol 9 No. 2, P.2-36.
  - The need for prompt action in the case of severe contrast medium incidents to have all drugs and instruments for emergency therapy readily available and to be familiar with the practice of emergency measures.
  - Minimum resources necessary outside a hospital are:
    - Immediate treatment to control vasomotor and anaphylactic shock.
    - Immediate removal of the affected area.
    - Effective treatment of shock.
    - Immediate restoration of ventilation and circulation.
    - Effective treatment of shock.
    - Medication treatment of drowsiness.

Product information approved by the TGA 59/91

Schoening Pty Limited
Incorporated in NSW ACN 060 203 351
27-33 Cockatoo Street, Rydalmere NSW 2116
Distributors for Schoening, AG Federal Republic of Germany: UJ223 556
TABLE 2: Supine diastolic blood pressures (DBPs) of patients when first seen at the hypertension clinic and during the period 1986–1990*

<table>
<thead>
<tr>
<th>DBP (mmHg)</th>
<th>Initial visit</th>
<th>1986</th>
<th>1987</th>
<th>1988</th>
<th>1989</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;90</td>
<td>63.4%</td>
<td>26.0%</td>
<td>23.7%</td>
<td>22.1%</td>
<td>19.8%</td>
<td>16.8%</td>
</tr>
<tr>
<td>&gt;95</td>
<td>56.5%</td>
<td>13.0%</td>
<td>11.5%</td>
<td>13.0%</td>
<td>9.9%</td>
<td>6.9%</td>
</tr>
<tr>
<td>&gt;100</td>
<td>47.3%</td>
<td>1.5%</td>
<td>5.3%</td>
<td>2.3%</td>
<td>3.1%</td>
<td>3.6%</td>
</tr>
</tbody>
</table>

*Results are percentages of patients (n=131).

TABLE 3: Antihypertensive therapy 1986–1990*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diuretics</td>
<td>51.9%</td>
<td>51.1%</td>
<td>48.9%</td>
<td>41.2%</td>
<td>37.4%</td>
</tr>
<tr>
<td>β-blockers</td>
<td>49.6%</td>
<td>36.6%</td>
<td>29.0%</td>
<td>34.5%</td>
<td>32.8%</td>
</tr>
<tr>
<td>Vasodilators (prazosin and hydralazine)</td>
<td>20.6%</td>
<td>12.2%</td>
<td>3.1%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Central nervous system agents</td>
<td>10.7%</td>
<td>6.1%</td>
<td>2.3%</td>
<td>3.1%</td>
<td>2.3%</td>
</tr>
<tr>
<td>ACE inhibitors</td>
<td>18.3%</td>
<td>29.0%</td>
<td>48.9%</td>
<td>48.9%</td>
<td>55.0%</td>
</tr>
<tr>
<td>Calcium channel blockers</td>
<td>15.3%</td>
<td>19.1%</td>
<td>15.3%</td>
<td>17.6%</td>
<td>22.9%</td>
</tr>
<tr>
<td>Monotherapy</td>
<td>36.2%</td>
<td>42.6%</td>
<td>49.8%</td>
<td>50.0%</td>
<td>44.9%</td>
</tr>
<tr>
<td>Most common drug combination</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diuretic and β-blocker</td>
<td>13.7%</td>
<td>12.0%</td>
<td>15.3%</td>
<td>16.0%</td>
<td>13.7%</td>
</tr>
<tr>
<td>Diuretic and ACE inhibitor</td>
<td></td>
<td>12.0%</td>
<td>15.3%</td>
<td>16.0%</td>
<td>13.7%</td>
</tr>
<tr>
<td>Diuretic and Calcium channel blocker</td>
<td>3.1%</td>
<td>3.1%</td>
<td>3.1%</td>
<td>3.1%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Non-drug</td>
<td>6.8%</td>
<td>5.1%</td>
<td>3.3%</td>
<td>4.1%</td>
<td>9.9%</td>
</tr>
</tbody>
</table>

*Results are percentages of patients (n=131). ACE = angiotensin converting enzyme.

The number of patients able to be treated with a single antihypertensive agent increased from 38% in 1986 to 50% in 1989 and 45% in 1990 (Table 3). The drugs most commonly used alone were β-adrenoceptor blocking agents in 1986 (45%) and 1987 (34%) and ACE inhibitors in the following three years (43% in 1988 and 1989 and 46% in 1990). Diuretics were the most commonly prescribed drugs in 1986 and 1987 (52% and 51% of patients) as they were frequently used in combination therapy, while the use of ACE inhibitors increased to 55% of patients in 1990.

The most frequently prescribed drug combination was β-adrenoceptor blocking agents with diuretics in 1986 (14%) and ACE inhibitors with diuretics in the subsequent years (between 13% and 18% of patients).

Sixteen per cent of patients were receiving triple drug combinations in 1986 (most commonly a β-adrenoceptor blocker with a diuretic and a vasodilator) versus 14% in 1990 (most commonly a diuretic with an ACE inhibitor and a calcium channel blocker). Between 7% and 10% of patients referred to the clinic as hypertensive responded to non-drug means of blood pressure control.

Plasma TC and HDL-C levels

Table 1 shows the mean plasma TC and HDL-C levels for the patients for whom paired data were available between 1986 and 1990. HDL-C levels were not routinely analysed by the hospital's biochemistry department until 1987, hence 1986 data have been omitted from Table 1.

Only in the women was there a significant fall in plasma TC levels, from 6.4 ± 1.1 mmol/L in 1986 to 6.0 ± 0.9 mmol/L in 1990 (P = 0.03). This fall was accompanied by a significant rise in HDL-C levels from 1.38 ± 0.48 mmol/L in 1987 to 1.47 ± 0.47 in 1990 (P = 0.002). The proportion of women with TC levels above the generally recommended level of 5.5 mmol/L fell from 80.4% in 1986 to 66.1% in 1990, which was statistically not significant (analysed using a non-parametric test for related observations). TC and HDL-C levels of the men did not change significantly over the five years; 59.6% in 1986 and 53.2% in 1990 had TC levels above 5.5 mmol/L.

There has been approximately a ten-fold increase in the use of cholesterol lowering agents amongst clinic patients during the study period (1.9% in 1986 versus 24.3% of patients in 1990). In 1986, 3.6% of the women and none of the men were prescribed cholesterol lowering drugs as compared with 28.6% of the women and 19.0% of the men in 1990. This increase can be attributed to the availability of newer cholesterol lowering agents such as the 3-hydroxy-3-methylglutaryl-coenzyme A (HMGCoA) reductase inhibitors (simvastatin and pravastatin) and the fibrin derivative gemfibrozil for individual patient use over the last two years, and also to the appearance of more convincing literature on the potential benefits of lipid lowering therapy on coronary heart disease.23-24

When women who had been taking cholesterol lowering agents during the study period were excluded from analysis (n = 19) the fall in TC levels in women became non-significant. TC levels of this group of 19 women decreased from 7.3 ± 1.1 mmol/L in 1986 to 6.6 ± 0.9 mmol/L in 1990 (P < 0.05), while TC levels of the men taking cholesterol lowering drugs (n = 10) fell from 6.4 ± 0.75 mmol/L in 1986 to 5.8 ± 0.90 mmol/L (P = 0.13) in 1990.

Weight

Paired data on weight were available for 130 patients (one paraplegic patient was excluded from analysis because of incomplete data). While a significant improvement in weight control was observed in the Clinic (Table 1) this was due to significant weight loss in men only (85.8 ± 10.7 kg in 1986 versus 83.9 ± 12.1 kg in 1990, P < 0.01). Despite this modest improvement, 88.7% of the men and 85.3% of the women recorded weights in excess of their maximum desirable weight in 1990. Furthermore, weights at entry to the clinic did not differ significantly from those of 1990.

Cigarette smoking

Analysis of smoking data revealed that 20 (15.3%) of the 131 patients were smokers in 1986 (19.6% of women, 14.3% of men). By 1990, seven patients had stopped smoking (two women, five men; P < 0.05) and no patients commenced smoking.

Alcohol use

Non-drinkers represented 28.6% of the men and 63.2% of the women in 1990, very similar to the 1986 figures of 30.2% and 63.2%, respectively. In 1990, mean alcohol consumption among drinking men was 118 g/week (range, 5–560 g/week) while women consumed on average 53 g/week (range 5–225 g/week). Of the drinking population, five men and two women were heavy drinkers, consuming more than 280 g/week and 140 g/week of alcohol respectively.
Multiple Risk Factor Intervention Trial scores and risk percentiles

As explained above, the analysis used only allowed estimation of a risk index in patients aged 25–64 years. Percentile and risk factor scores were analysed for 59 patients with consistent data over the five-year period (Table 4).

There was a significant improvement in the percentile position of patients (52 ± 23 in 1986 versus 43 ± 24 in 1990, P < 0.005) during the study period, but the improvement was entirely due to a significant fall in the percentile position of the women (from 61 ± 21 in 1986 to 41 ± 21 in 1990).

The risk factor scores of the women remained unchanged over the five years, while in the men (n = 28) the score increased from 1.26 ± 1.10 in 1986 to 1.93 ± 1.85 in 1990 (P < 0.05). The women had significantly higher percentile scores (P < 0.05) and risk factor scores (P < 0.05) than the men in 1986, but not in the consecutive years.

Discussion

We have previously reported a high incidence of multiple coronary risk factors in patients seen at our Hypertension Clinic.1 The results of this study indicate that a high proportion of our clinic patients have well controlled hypertension with only 6.9% having DBP above 95 mmHg. This compares favourably with the reported incidence of patients with DBP above 95 mmHg after treatment for one year in a French (27.2%)5 and a Scottish (32%) study6 and after two years' treatment in a Swedish hypertension clinic (52%).16 In general, however, the clinic program produced little evidence of improvement in risk factors in men stabilised on long term therapy, despite a small, but significant improvement in body weight (Table 1).

To date, only 25 of the 131 patients have taken part in our dietary counselling program. Details of this will be reported in a subsequent paper. Despite this dietary program and the introduction of new and expensive antihypertensive agents (Table 3), there was only a small decline in TC levels from 1986 to 1990. This was only statistically significant in the women where the average fall achieved was approximately 6%. The plasma HDL-C levels of the women also improved significantly, increasing by an average of 7% over the five years. The difficulty in correcting unfavourable plasma cholesterol profiles in hypertensive patients has also been reported by Curzi et al. who found that mean cholesterol levels had increased from 6.4 mmol/L to 6.6 mmol/L in patients attending their Glasgow clinic over a four-year period.24 An increase in the use of ACE inhibitors in our clinic did not appear to lead to better control of plasma cholesterol levels.

The proportion of smokers among clinic patients is lower than that reported by the 1989 Australian Risk Factor Prevalence Study for the general population (24% for men, 21% for women).1 We do acknowledge however that cigarette smoking is a factor predictive of poor compliance with clinic appointments25 and therefore the clinical patients studied here may represent a select group who are more likely to comply with lifestyle modification. Patient counselling by medical and paramedical staff resulted in 7 of 20 patients stopping smoking over the five years.

While the net effect of alcohol consumption on cardiovascular disease is unknown, there is a clear relationship between alcohol consumption, blood pressure and the incidence of hypertension.28,29 Currently, there are no established criteria for relating the level of alcohol consumption to the risk of coronary heart disease.28 The National Health and Medical Research Council of Australia defines "responsible drinking" as a daily alcohol consumption of 40 g or less for men and 20 g or less for women.30 According to this criterion, 88.9% of male and 92.0% of female drinkers attending our clinic are "safe" drinkers. However, self reported levels of alcohol consumption as obtained in the present study are likely to substantially underestimate the true alcohol consumption of the patients.

Analysis of cardiovascular "risk scores" was complicated by the large number of patients over 64 years of age (for whom percentile information was not available) and by the lack of risk probability data from the MRFIT study for women. We have applied the MRFIT data to both men and women. In the latter case it follows that the data could not be used to predict survival but it does allow an estimate of change of risk against a fixed criterion during the study period. The multiple risk factor score derived from the MRFIT data remained unchanged in the women and increased significantly in the men between 1986 and 1990. This increase in the men could be entirely attributed to the heavy weighting of age in the calculation of the score.

To overcome this large effect of increasing age McNeil et al. stratified the Australian population (aged between 25 and 64 years) into age and sex specific percentiles based on the 1983 National Heart Foundation Risk Factor Prevalence Study.20 The percentile position of the men in our study remained unchanged while the percentile position of the women improved significantly over the five years. This may be attributed to improved blood pressure control and lipoprotein profiles in women.

A major deficiency in the formula derived from these data and its use to stratify cardiovascular risk in the Australian community is that certain independent risk factors for cardiovascular disease such as
glucose tolerance, family history, physical activity and HDL-C level are omitted. Furthermore, stratification of risk was only possible for patients less than 64 years of age. Similar deficiencies exist for the other currently available formulae for calculating cardiovascular risk derived from population data.

In summary, a review of cardiac risk factors in patients attending our Hypertension Clinic has demonstrated good blood pressure control, a low level of alcohol consumption and a level of smoking below that of the general population. However, 89% of the men and 85% of the women remained above their maximum desirable weight. These data on multiple risk factors are likely to be relevant to other similar clinics and they emphasise the fact that obesity is closely associated with hypertension and is an important target for non-pharmacological intervention to lower blood pressure.

While there was a small but significant fall in cholesterol levels in the women over the study period, 53.2% of the men and 66.1% of the women still had TC levels above 5.5 mmol/L. Improvement of lipoprotein profiles, particularly in men, remains a major challenge. It is clear that more intensive methods of dietary advice and lifestyle modification are required if we are to achieve satisfactory reductions in weight and plasma cholesterol levels. In addition, it seems inevitable that with the greater availability of new agents to lower plasma lipids the use of lipid lowering drugs in hypertensive patients will become more widespread.

The study also demonstrates the value of a simple clinic record form, which allows computerisation of key clinic data and easy access for analysis of the progress of the clinic towards meeting its objectives and in identifying patients requiring special attention.

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References


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