Report of the Canadian Hypertension Society's consensus conference on the management of mild hypertension*†

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Since the publication in 1977 of joint recommendations by the Canadian Cardiovascular Society, the Canadian Heart Foundation and the Ontario Council of Health on the detection and management of hypertension in Canada, several clinical trials on the efficacy of antihypertensive drug treatment in patients with mild hypertension have been undertaken. The Canadian Hypertension Society (CHS) felt that the results of these trials should be reviewed to determine whether existing recommendations on treatment should be changed. Three expert panels appointed by the CHS reviewed evidence on the clinical efficacy of antihypertensive therapy, the diagnosis of hypertension and the treatment of mild hypertension, and formulated recommendations on the care of mildly hypertensive patients in Canada. A consensus conference of biomedical scientists, practising physicians and government representatives reviewed and reached agreement on the panels' recommendations. The final recommendations of the conference are presented in this report.

Les recommandations communes de la Société canadienne de cardiologie, de la Fondation canadienne des maladies du coeur et du Conseil ontarien de la santé quant au dépistage et au traitement de l'hypertension artérielle au Canada ont paru en 1977. Depuis lors, on a entrepris plusieurs essais cliniques de l'efficacité des médicamants hypotenseurs dans l'hypertension artérielle légère. Afin de savoir si les résultats de ces essais indiqueraient des modifications du traitement recommandé à l'heure actuelle, la Société canadienne d'hypertension artérielle a chargé trois comités d'experts de passer en revue l'évidence sur l'efficacité clinique des thérapeutiques anti-hypertensives, le diagnostic de l'hypertension artérielle et le traitement de ses formes légères, et de formuler des recommandations quant à celui-ci pour le Canada. Le tout a été présenté lors d'une conférence regroupant des biométriciens, des médecins praticiens et des représentants de l'État. Les recommandations sur lesquelles ces participants sont tombés d'accord font l'objet du présent rapport.

In 1977, task forces of the Canadian Cardiovascular Society, the Canadian Heart Foundation and the Ontario Council of Health published joint recommendations concerning the detection and management of hypertension in Canada, based on extensive review of studies available at that time.[1] In 1982 the Canadian Hypertension Society (CHS) established a task force to review matters related to the management of hypertension in Canada, and the management of mild hypertension was identified as an area of prime interest.

The 1977 task forces' recommendations for treatment included the initiation of antihypertensive drug therapy among all adults with fifth-phase diastolic blood pressures consistently at or above 105 mm Hg and among those with diastolic blood pressures of 90 to 104 mm Hg and evidence of target organ damage (as defined in the Veterans Administration trials[2,3]). Also recommended was the use of individual clinical judgement in making treatment decisions about patients who were less than 18 years of age, who had diastolic blood pressures of 90 to 104 mm Hg and no evidence of target organ damage, or who had isolated systolic hypertension.

Since the publication of these recommendations three well designed randomized clinical trials on the efficacy of antihypertensive drug treatment in patients with mild hypertension have been reported on,[4-6] and a fourth trial is in progress.[7] The CHS felt that the results of these trials should be reviewed to determine whether existing recommendations on treatment should be changed. In addition, it was considered important to review matters related to the measurement of blood pressure and the establishment of the diagnosis of mild hypertension, considering particularly the variability of blood pressure and the tendency of initially high values to decrease with time but without therapy. Finally, the issues of nonpharmacologic and initial pharmacologic treatment of mild hypertension were also regarded as important matters for consideration, especially in view of the substantial increase in new data about the use of β-adrenergic-blocking drugs.

To pursue this interest the CHS appointed three expert panels to review current evidence on the clinical efficacy of antihypertensive therapy, the diagnosis of

*The conference is intended to be the first of an annual series sponsored by the Canadian Hypertension Society on important issues in the care of hypertensive patients.

†Chairman of organizing committee: Dr. Alexander Logan. Chairmen of panels: Dr. David Sackett (efficacy of therapy), Dr. Brian Haynes (diagnosis) and Dr. John Ruedy (treatment). Chairman of meeting: Dr. Gerald Klassen.

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hypertension and the treatment of mild hypertension. These three groups prepared detailed reviews and formulated recommendations for the practical management of mild hypertension in the Canadian setting.*

Objectives

Thirty-one biomedical scientists, practising physicians and government representatives met at Mount Sinai Hospital, Toronto on Nov. 10 and 11, 1983 to arrive at a common understanding of the evidence and to achieve consensus concerning recommendations for the care of mildly hypertensive patients in Canada. The names of the participants are listed in Appendix I.

The three major objectives of the conference were:

- To determine whether all individuals with mild hypertension (i.e., with diastolic blood pressures of 90 to 104 mm Hg) and no target organ damage should be treated, taking into account patient utilities (i.e., thoughts on the risks and benefits of treatment), labelling and modification of lifestyle, and the cost-effectiveness of treating mildly hypertensive patients.
- To review the evidence concerning the accurate measurement of blood pressure and the relation between individual blood pressure assessments and the diagnosis of hypertension.
- To assess the relative effectiveness, safety and cost of thiazide diuretics and β-adrenergic blockers in reducing the blood pressure of mildly hypertensive patients and to determine the usefulness of sodium restriction and weight reduction as alternative or adjunctive treatment to drug therapy.

It was recognized that three important elements had to be considered when formulating health policy recommendations on whether mild, uncomplicated hypertension ought to be identified and treated. First, the recommendations were being made against a background of uncertainty about the outcome of the British Medical Research Council (MRC) trial on mild hypertension (expected date of termination: August 1985). It was argued that recommendations that might have to be rescinded (in view of the MRC trial results, were they to show that treatment was useless or harmful) should not be made. Second, a decision to recommend treatment for even some mildly hypertensive patients implies that society can, and should, handle the increased clinical burden and that resources may have to be diverted from other health-related uses. Finally, recommendations were being made at a time of rapidly falling cardiovascular mortality.[8]

The recommendations in this report reflect the agreements that were reached on the information presented at the conference. In addition, the participants agreed that higher priority should continue to go to ensuring adequate detection, referral, treatment and continuing follow-up of moderately to severely hypertensive persons because the risk–benefit and cost-effectiveness balances of treatment in these individuals are superior to those in mildly hypertensive patients.

*The evidence considered by the conference in reaching its recommendations and the detailed reports of the three panels are available in monograph form from the author.

Efficacy of antihypertensive therapy

The health risks of mild hypertension are small, especially when compared with those of more severe blood pressure elevation, but the risk of vascular complications in mildly hypertensive people is almost twice that in nonhypertensive individuals. Antihypertensive drugs almost certainly reduce the risk of some of the consequences of mild uncomplicated hypertension, but the magnitude of the benefits to the individual patient will be small. Finally, the recommendations of the conference were influenced by mounting evidence of adverse psychologic and social effects experienced by some individuals when they are labelled as having hypertension.[9–15]

Recommendations

- Antihypertensive treatment should be initiated among all mildly hypertensive patients with diastolic pressures consistently at or above 100 mm Hg. (This lowers the cut-off point from the previously recommended 105 mm Hg.)
- Antihypertensive treatment should be initiated among all mildly hypertensive patients with diastolic pressures of 90 to 99 mm Hg who have target organ damage. Target organ damage is defined as (a) left ventricular hypertrophy demonstrated by electrocardiography; (b) a history of or electrocardiographic evidence of myocardial infarction; (c) a history of or clinical evidence of stroke; (d) a history of intermittent claudication; or (e) a serum creatinine level higher than 150 μmol/L. (This definition of target organ damage replaces that of the Veterans Administration trials,[2,3] used in the previous recommendations.)
- The goal of treatment is a diastolic pressure below 90 mm Hg. (This recommendation is unchanged.)
- Individual clinical judgement should be exercised in making treatment decisions about patients who have diastolic pressures of 90 to 99 mm Hg and no target organ damage, have other risk factors for cardiovascular disease, have isolated or predominantly systolic hypertension (i.e., a pulse pressure over 80 mm Hg) or are less than 18 years of age. (This recommendation is essentially unchanged.)

Diagnosis of mild hypertension

Faulty assessment of blood pressure is common and results in some normotensive individuals' being labelled as hypertensive and some hypertensive individuals' remaining undetected. Furthermore, inaccurate readings can result in over- or undertreatment. The conference was particularly impressed by the evidence on four matters of measurement and diagnosis. First, nonmercury sphygmomanometers are widely used but are inherently and demonstrably less accurate than mercury devices.[16] Second, the choice of the appropriate cuff size for the arm circumference of the individual being assessed is of considerable importance, particularly since use of the regular adult cuff size will produce falsely high readings in the many adults that are overweight.[17] Third, even with equipment that is in satisfactory

working order, health professionals frequently measure blood pressure inaccurately.[18] Finally, placebo-controlled trials of drug therapy for mild hypertension have shown that a high proportion of subjects with initially elevated pressures in multiple readings experience progressive declines in blood pressure readings to normotensive levels with no active treatment.[5,7] These observations featured prominently in the recommendations that were formulated.

Recommendations

- For reasons of accuracy and dependability, the use of mercury sphygmomanometers is recommended for the diagnosis of mild hypertension. Each physician should have and maintain in good order at least one mercury sphygmomanometer. If an aneroid sphygmomanometer is present in the office it should be calibrated at least twice yearly against the mercury sphygmomanometer.
- The bladder size of blood pressure cuffs should be measured, and the limits of arm circumference should be marked clearly on the cuff according to the guidelines in Table I.
- Elevated blood pressure diagnosed from automatic blood pressure recorders should be verified by regular mercury sphygmomanometry by a skilled observer.
- All health profession students who will be taking blood pressure readings as part of their professional duties should have formal training in proper technique and should be required to pass a skill-based examination to demonstrate their competence. To accomplish this, faculties of health sciences should review their current teaching and evaluation of blood pressure determination technique, modify or enhance them if necessary, and ensure that all graduates are competent in the recommended procedure.[19]
- Many health professionals currently in practice have been shown to have faulty technique in blood pressure assessment, which results in inaccurate readings. Therefore, health professionals should review their technique and accuracy and should undertake further instruction and competence testing if necessary. This review of skills might take place at continuing medical education events or medical conventions.
- If an initial blood pressure reading is elevated in a person not previously known to have hypertension, at least two readings should be taken at the same session in the arm with the higher pressure, the recommended procedure[19] for accurate blood pressure determination being followed carefully. It is acceptable to use either the average or the minimum reading in the arm with the higher pressure as a guide to the need for further assessment.

Table I—Limits of arm circumference in adults according to bladder size of blood pressure cuff

Bladder size (cm)	Arm circumference (cm)
12 × 23	< 33
15 × 33	33–41
18 × 36	> 41

- If the blood pressure at a visit is mildly elevated (i.e., a diastolic blood pressure of 90 to 104 mm Hg, fifth-phase Korotkoff sound) and there is no evidence of hypertension-related organ or vessel damage, the person's blood pressure should be reassessed by means of at least two measurements on each of at least three occasions over a period of 6 months. A diagnosis of hypertension should not be made unless the diastolic readings from these visits remain above 90 mm Hg, and the patient should not be told that he or she has "hypertension" or "high blood pressure" until the diagnosis has been established.
- The search for target organ damage and exogenous causes of elevated blood pressure should proceed as follows.

(a) On the first visit that elevated blood pressure is detected the patient should be questioned or the medical record reviewed, or both, to determine whether there is a history of myocardial infarction or angina pectoris, transient ischemic attacks or stroke, peripheral arteriovascular insufficiency or renal insufficiency. If the patient has a history of any of these conditions an appropriate physical examination and a diagnostic test evaluation should be done, and the period of observation of the blood pressure should be compressed according to the severity of the condition(s) discovered. In addition, if an exogenous cause of hypertension is found, such as the use of oral contraceptives, conjugated estrogens or nonsteroidal anti-inflammatory drugs, consideration should be given to eliminating it, particularly if the blood pressure remains elevated at further follow-up assessments.

(b) On the second visit, if the blood pressure remains elevated, a physical examination to detect target organ damage should be completed, if not already done, and an electrocardiogram, chest roentgenogram, urinalysis and serum creatinine determination should be ordered to further assess the possibility of target organ damage. Again, if target organ damage is detected the period of observation of the blood pressure should be compressed.

- If an individual's diastolic blood pressure is above 90 mm Hg on some occasions but not on others, he or she should be reassessed yearly. Such patients should not be told that they are hypertensive.

Treatment of mild hypertension

The terms of reference of the panel on treatment of mild hypertension included consideration of nonpharmacologic treatment and initial drug therapy. Because of conflicting evidence and problems with patient compliance, the panel and the conference had difficulty reaching consensus on the effectiveness of salt restriction and, for the obese, of weight reduction in lowering blood pressure. Nevertheless, salt restriction was regarded as the most promising of the nondrug treatments.

With respect to drugs, both thiazide diuretics and β-adrenergic-blocking agents were considered as initial individual treatments. The conference did not attempt to consider the effects of these drugs in combination, nor did it consider any other drugs as contenders for initial treatment. At the time of the 1977 report experience with β-blockers in hypertension was limited in North America, but it is now considerable. On the

basis of this experience it is clearly appropriate to prescribe either thiazides or β-blockers as the first treatment for mild hypertension unless there is a specific contraindication.

Since the aim of treatment of mild hypertension is to lower the risk of major cardiovascular complications, other risk factors, such as cigarette smoking, excessive use of alcohol and lipid disorders, should not be neglected in the management of hypertensive patients. Furthermore, weight reduction in the obese is a worthwhile general health measure.

Recommendations

- Thiazide diuretics and β-blockers are equally effective in reducing blood pressure in patients with mild hypertension. The likelihood of success in reducing blood pressure in an individual using either drug cannot presently be predicted by the identification of any known variables. If the drug initially selected is ineffective, it is recommended that its use be stopped and that the alternative drug be employed.
- The choice between thiazide diuretics and β-blockers for initial drug therapy in mild hypertension should be based on the potential risk of using either drug when there are coexistent conditions and the risk of adverse effects. Important adverse effects to be considered include hypokalemia, hyperglycemia, hyperuricemia and abnormal lipoprotein metabolism (thiazides) and bronchospasm, abnormal lipoprotein metabolism and Raynaud's phenomenon (β-blockers).
- To reduce the frequency and severity of hypokalemia with thiazides, the recommended dosage in the treatment of mild hypertension is 25 to 50 mg of hydrochlorothiazide once daily or 25 mg of chlorthalidone every 1 to 2 days. The initial use of a potassium-sparing diuretic or a combination of a thiazide diuretic and a potassium-sparing diuretic or potassium supplements is not recommended. Potassium loss secondary to the use of thiazides can be lessened by prescribing the recommended doses as well as moderate sodium restriction (to 150 mmol/d) or by replacing thiazides with β-blockers.
- The choice between thiazide diuretics and β-blockers cannot presently be based on potential but unproven long-term consequences of the metabolic or cardiovascular effects of the drugs.
- Sodium restriction to 60 to 80 mmol/d can be effective in reducing blood pressure in some patients with mild hypertension. A short trial of sodium restriction to this level may be justified in motivated patients to identify those who are responsive and are likely to adhere to such a diet. Specific dietary measures, including professional nutritional guidance, will likely be needed to achieve this level of sodium restriction.
- Sodium restriction to 150 mmol/d can have an effect additive to the lowering of blood pressure achieved with drugs in mild hypertension. As well, it can reduce the likelihood of hypokalemia with thiazide diuretics. Sodium restriction to this level can be achieved by removing the discretionary use of salt from the diet and is recommended as an ancillary measure in patients with mild hypertension.

This project was supported by grants from the Medical Research Council of Canada, the National Health Research and Development Program (file 6613-1229-50) and the Ontario Ministry of Health (grant RD122).

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