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Systemic Hypertension: An Overview of the Problem

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Hypertension is growing in prevalence and most of this growth represents isolated systolic hypertension in the elderly. Attempts at prevention are critical but likely are ineffectual. Therefore, the delivery and acceptance of current medical regimens must be improved.
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Simply put, the problem of hypertension is that its incidence continues to increase while our ability to control it remains limited. Already the single most common reason for office visits to physicians and for the use of prescription drugs, hypertension will demand an even greater use of time and money to manage the larger number of patients who will be afflicted in the future.

Increasing Incidence

Two demographic facts are responsible for the increasing incidence of hypertension—the aging of the population and the growing number of obese people. According to the latest survey of the US population, the number of people with hypertension has increased from 50 to 65 million over the past decade.[1] Most of this increase is caused by the larger number of people over age 65, most of whom have systolic hypertension. In the Framingham cohort, almost 90% of both men and women who were normotensive at age 55 or 65 developed hypertension over the next 20 years.[2] This progressive increase in systolic blood pressure is secondary to the apparently inexorable increase in large artery stiffness, accentuated by a more rapid reflection of the pressure wave from the periphery.[3]

The increasing incidence of obesity in virtually all developed nations increasingly begins in early childhood, reflecting both a greater caloric intake of soft drinks and fast foods and a lesser caloric expenditure from physical activity.[4] Although the obesity epidemic has now become common knowledge, whether societies have the ability to stop it remains questionable.

With weight gain the majority of people, including more and more children, develop the other features of the metabolic syndrome, including an increase in blood pressure.[5]

Potential of Prevention

Life expectancy is increasing in all but the least-developed societies and it is hoped that it will continue to do so. More importantly, the mortality from causes that are amenable to currently available health care has not decreased proportionately in much of the world.[6] Most of the improvement that has been monitored carefully in the United Kingdom comes from the cessation of cigarette smoking.[7] Unfortunately, countries such as Japan and China have not yet begun to address this problem, in large part because their governments are the sellers of cigarettes and they are unwilling to forego immediate income for far greater distant savings.

Parenthetically, although smoking cessation generally is not included in the maneuvers known to prevent hypertension (Table 1), there is a sustained increase in blood pressure while people smoke and this pressor effect likely contributes to the cardiovascular damages induced by smoking.

Beyond the obvious success in getting people to quit smoking, there has been precious little evidence that the other lifestyle changes that could prevent hypertension have been adopted successfully. The evidence is stronger for the ability of lifestyle changes, namely weight loss by diet and physical activity, to prevent the onset of type 2 diabetes[8] than for the prevention of hypertension. This may reflect a shorter time span for the progression of glucose intolerance into overt diabetes or a more immediate benefit of weight loss on insulin sensitivity.

Partly in response to the apparent inability of lifestyle changes to prevent the development of hypertension, Julius et al[9] began a controlled trial of an antihypertensive drug in patients with high-normal blood pressure (ie, 130 to 139/85 to 89) to see if the progression of overt hypertension at least can be delayed, if not prevented.

It may very well turn out that drug therapy will be the only practical way to prevent hypertension. Some may argue that

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Table 1 Lifestyle Modifications

Stop smoking
Lose weight if overweight
Reduce sodium intake to 110 mmol/d (2.4 g sodium or 6 g sodium chloride)
Maintain adequate dietary potassium, calcium, and magnesium intake
Increase physical activity
Limit alcohol intake to ≤1 oz/d of ethanol (24 oz of beer, 8 oz of wine, or 2 oz of 100-proof whiskey)

the imposition of a drug, even as apparently benign as the angiotensin II–receptor blocker being used in the Trial of Preventing Hypertension, could have unforeseen consequences[10] that make such intervention for prevention inappropriate. Whether or not active drug therapy will be acceptable for population-wide prevention, the demonstration of its effectiveness is certainly an appropriate study.

Improvement of Current Therapy

Before giving up on lifestyle changes, perhaps we should recognize that attempts directed at individual patients, particularly after they have developed hypertension, are simply not going to be adequate. Rather, population-wide changes need to be implemented. As shown in Table 2, there are multiple practical ways to improve on the toxic environment of childhood wherein the problems of adult life begin.[11] Simple steps may help a great deal, reaching back even to the encouragement of breastfeeding rather than bottle formulas. The slowing of postnatal growth that accompanies breastfeeding rather than the more rapid weight gain with bottle formulas has been shown to eventuate in lower blood pressure levels later in life.[12]

Meanwhile, the management of patients with hypertension must be improved. Despite the potential multiple ways to improve patient adherence to therapy (Table 3), the only well-documented improvement has been a reduction in the number of daily doses of drugs.[13] Fortunately, pharmaceutical companies have provided formulations within every class of antihypertensive agent that provide full 24-hour effectiveness with 1 daily dose. There is no reason to use more than 1 dose per day.

Table 2 Ways to Clear the Toxic Environment for Children

Location	Activity
Home	Provide time for healthy meals and physical activity; limit television and computer games
School	Require physical activity; provide healthful foods and snacks
Urban design	Protect open spaces; build easy accesses for physical activity
Marketing	Tax fast food and soft drinks; subsidize nutritious foods; require nutrition labels on all packages; and Prohibit marketing directly to children

Adapted from Ebbeling CB et al.[11]

Table 3 Guidelines to Improve Maintenance of Antihypertensive Therapy

Be aware of the problem and be alert to signs of inadequate intake of medications
Recognize and manage depression
Articulate the goal of therapy: to reduce blood pressure to near normotension with few or no side effects
Educate the patient about the disease and its treatment
Provide individual assessments of current risks and potential benefits of control
Involve the patient in decision making
Provide written instructions
Encourage family support
Maintain contact with the patient
Encourage visits and calls to allied health personnel
Allow the pharmacist to monitor therapy
Give feedback to the patient via home blood pressure readings
Make contact with patients who do not return
Keep care inexpensive and simple
Do the least work-up needed to rule out secondary causes
Obtain follow-up laboratory data only yearly unless indicated more often
Use home blood pressure readings
Use nondrug, low-cost therapies
Use once-daily doses of long-acting drugs
Use generic drugs and break larger doses of tablets in half
If appropriate, use combination tablets
Use calendar blister packs (if and when they are marketed)
Tailor medication to daily routines
Use detailed clinical protocols monitored by nurses and assistants
Prescribe according to pharmacologic principles
Add 1 drug at a time
Start with small doses, aiming for 5– to 10–mm Hg reductions at each step
Have medication taken immediately on awakening in the morning or after 4 AM if patient awakens to void
Be willing to stop unsuccessful therapy and try a different approach
Anticipate and address side effects
Adjust therapy to ameliorate side effects that do not disappear spontaneously
Continue to add effective and tolerated drugs, stepwise, in sufficient doses to achieve the goal of therapy
Provide feedback and validation of success

It has become obvious that more than 1 drug will be needed for most patients. The seventh Joint National Committee report,[14] along with recommendations of other expert groups, clearly emphasized the need for the provision of adequate therapy to decrease blood pressure to the appropriate goal levels of therapy. Although the costs of multiple drugs may seem prohibitive for many patients, particularly in

the absence of a national health care delivery system in the United States, appropriate less-expensive agents should be available for all who need them. The problem of inadequate management is often the practitioner's unwillingness to provide adequate therapy, rather than the patient's unwillingness to take it.

The Final Solution

As bleak as the scenario may appear, an optimistic view seems warranted. Clearly, improvements in mortality from coronary disease have been documented, even though prevention and management of hypertension seem to have played only a minor role.[7]

Not only must more intensive control of hypertension be emphasized but the incorporation of other therapies to reduce cardiovascular consequences needs to be adopted. The impressive reduction in strokes with the use of statins is particularly noteworthy.[15] Hypertension will remain a problem but we can do better in alleviating its consequences.

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