Reducing Antihypertensive Medication Use in Nursing Home Patients

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Of the 1.5 million nursing home residents, about 40% are aged 85 years or older, and a similar percentage have hypertension. The rates of incorrect diagnoses from the “white coat” effect and from errors in blood pressure evaluation are as frequent in older persons as in younger persons. The benefits of antihypertensive treatment and the risks of lowering blood pressures in the very old (≥85 years) are uncertain. Elderly patients experience adverse effects from drug treatment that are unique to their age group and that complicate management problems associated with polypharmacy and multiple comorbid conditions. Trials to withdraw or lower the dosage of antihypertensive medications have been successful in up to 40% of elderly persons when combined with salt restriction and weight loss, but such studies are lacking in nursing home patients. The management of hypertension should be reevaluated in nursing home patients.

Pharmacological therapy reduces risks for complications of hypertension (stroke, congestive heart failure, renal failure, and mortality) in young1-7 and elderly8-13 patients. Although there is strong evidence of benefit from drug treatment for most patients, several areas of uncertainty remain. Among these are rates of diagnostic accuracy, risks, and benefits of therapy in the very old (≥85 years) and in those either with multiple comorbid conditions or living in long-term institutional settings such as nursing homes. Although much of the content of this review pertains to all elderly patients, we focus on those residing in nursing homes. These patients have many comorbid conditions for which they take multiple medications. They are at increased risk for adverse drug reactions, and changes resulting from management modifications can be observed and continuously monitored.

HYPERTENSION IN NURSING HOME PATIENTS

Forty percent of the approximately 1.5 million nursing homes residents are aged 85 years or older,14 and between 32% and 44% have hypertension.15-17 To our knowledge, there have been few hypertension studies in nursing home patients. The prevalence of hypertension reported as only 14.0% in the 1985 National Nursing Home Survey18 is considerably lower than the rate of 54.9% for noninstitutionalized persons aged 65 to 74 years19 and the rates of 34.0% (men) and 50.0% (women) for those aged 85 years and older.20 Using a database of almost 300 000 nursing home patients in 5 US states, Gambassi et al17 report hypertension in 32%, with the highest prevalence among African Americans and women. Seventy percent receive antihypertensive medications. This percentage decreases with increasing age (≥85 years: odds ratio, 0.85; 95% confidence interval [CI], 0.81-0.89). Recorded blood pressure readings were unavailable in this study, and the extent of blood pressure control is unknown. Data from 2 cross-sectional studies are similar. In a survey of 617 patients in 17 Texas nursing homes,13 and in one16 of 804 patients in 3 New York nursing homes, rates of hypertension were reported as 40% and 44%, respectively. Studies that use higher blood pressures to define hyper-
tion. Perhaps the amount of time spent in bed contributes to the high rates of dementia, 15% to 36%; and diabetes, 15% to 27%.15,16 Rates of dementia range from 36% to 43%.15,23

Polypharmacy also complicates therapy in hypertensive nursing home patients. Avorn and Gurwitz24 report an average of 7.2 prescribed medications daily; Beers et al,15 8.1; and Trilling et al16 8.7. In the latter report, the number of daily medications is 9.4 for patients with hypertension and 8.0 for those who are normotensive. The distribution of antihypertensive medications is as follows: calcium channel blockers, 26% to 30%; diuretics, 23% to 28%; angiotensin-converting enzyme inhibitors, 22% to 27%; β-blockers, 8%; and α-blockers, 5.3%.16,17 These data on calcium channel blockers are similar to those reported by others16,27 and mirror the distribution in the general geriatric population, in whom they are the most commonly prescribed antihypertensive medications.28,29

The number of hypertensive nursing home patients who do not receive antihypertensive medications varies from 24% to 30%.16,17 Blood pressure control (<140/90 mm Hg) is excellent, achieved in 88.8% of patients taking medication.16 Perhaps the amount of time spent in bed contributes to the high rate of successful blood pressure control. Of those treated, 54.0% to 58.7% receive 1 and 32.7% receive 2 drugs.16,17

ACCURACY OF DIAGNOSIS

Incorrect technique for blood pressure measurement might result in incorrect diagnoses. Using a trained physician as the reference standard, Stoneking et al30 found that nursing home staff significantly underestimated systolic blood pressure and overestimated diastolic blood pressure, resulting in the misclassification of hypertension in 21% of patients. An additional source of error is falsely elevated blood pressure readings from “white coat hypertension.” In a study of 50 untreated patients with hypertension aged 70 years and older (mean ± SD, 79 ± 6 years), 9 (18%) were classified as having white coat hypertension and an additional 13 (26%) as having an intermediate hypertension between normal and abnormal.31 Findings in younger persons are similar32,33 and, together with other studies,34,35 suggest that some patients with hypertension might be normotensive. Although it is likely that the hypertension was present for most nursing home residents before admission, studies15-17 of hypertension in nursing home patients do not report rates of new diagnoses following admission. The extrapolation of findings in an ambulatory setting to nursing homes is questionable, because blood pressure measurements taken at the bedside might not be subject to the white coat effect. The issue is germane because some investigators36,37 suggest that white coat hypertension might not be benign and could cause cardiovascular abnormalities that include stiffness, loss of compliance, and elasticity of cardiac muscle. Although there is little evidence from longitudinal studies38 that this group of patients is at increased risk for cardiovascular morbidity or mortality, the prognosis is uncertain and continued monitoring is indicated.

If the diagnosis of hypertension is in doubt, ambulatory blood pressure measurements (automated multiple blood pressure readings during a 24-hour period), although expensive, could help resolve the problem. Correlation between office and ambulatory blood pressure readings is poor even when measurements from as many as 6 office visits are averaged.39 Ambulatory blood pressure readings predict cardiac size and function better than office blood pressure determinations.40 Adjustment of antihypertensive medication using ambulatory blood pressure readings results in less intensive treatment, while maintaining good control of blood pressure and improved well-being, when compared with adjustments based on office measurements.41

CARDIOVASCULAR RISKS FROM HYPERTENSION IN THE VERY OLD

The cardiovascular risks in the very old (≥85 years) from uncontrolled hypertension are uncertain.42 Bullitt and Fletcher43 report a negative relation between hypertension and mortality in men older than 75 years and in women older than 85 years, with hypertensive persons living longer. In a study of 795 community-dwelling men and women aged 75 years and older, a decrease of 5 mm Hg or greater in diastolic blood pressure in men was associated with an increased all-cause mortality (relative risk, 2.33; 95% CI, 1.39-3.91) and cardiovascular mortality (relative risk, 3.13; 95% CI, 1.47-6.60). Men taking antihypertensive medication whose diastolic blood pressure decreased had a higher risk of mortality (relative risk, 12.33; 95% CI, 2.73-55.72) when compared with treated men whose diastolic blood pressure did not decrease.44 Using data from the Framingham study, D’Agostino et al45 found that, independent of antihypertensive treatment, low diastolic blood pressures were associated with increased cardiovascular deaths in persons with a history of myocardial infarction, but increased systolic blood pressures caused a small but statistically significant increase in cardiovascular disease. Other investigators interpret these relations differently. The National Institute on Aging-Sponsored Established Populations for Epidemiologic Studies in the Elderly46 concludes that excess mortality in elderly persons with a lower blood pressure might in part be due to comorbid conditions and suggests that there is no consistent relation between diastolic pressure and mortality. In a community study of 835 people older than 85 years, Bosshuizen et al47 conclude that the relation between low blood pressure and increased mortality is caused by poor health and not by the blood pressure levels.
None of the randomized treatment trials of elderly patients enrolled enough patients aged 85 years and older to provide a definitive answer about the value of drug therapy in this age group. The study by the European Working Party on High Blood Pressure in the Elderly found that treatment conferred little or no benefit for persons older than 80 years. Subsequent subgroup analyses of data from that study for the group aged 80 years and older showed no treatment benefit for total and cardiovascular mortality but suggest that treatment “probably still prevented cardiovascular complications, stroke and cardiac end points.” Subgroup analyses of the treated group aged 80 years and older compared with the placebo group in the Systolic Hypertension in the Elderly Program showed a reduction in episodes of congestive heart failure and strokes.

Data from observational studies and clinical trials fail to define the benefits and risks of treating hypertension in the very old. Definitive answers could be forthcoming from the ongoing Hypertension in the Very Elderly Trial. This is an open study, however, and it is unlikely that nursing home patients are included; patients confined to bed and those with dementia are excluded.

RISKS OF PHARMACOLOGICAL THERAPY

In addition to commonly experienced adverse effects from antihypertensive medications, elderly persons are subject to risks that differ from those in younger persons. In a stratified random sample of 1358 persons aged 65 years and older, Cumming et al reported an increased risk of falls (odds ratio, 1.8; 95% CI, 1.2-2.8) in persons taking diuretics. Other investigators also report an association between diuretics and falls in elderly persons, although some report no association. Possible mechanisms for the presumed relation are hypokalemia-induced cardiac dysrhythmias and orthostatic hypotension. The risk of falls from use of diuretics, if true, is to some extent mitigated by the reduced risk of hip fracture, presumably due to increased bone density.

Other adverse effects of antihypertensive medications have been reported in older persons. In a study of 1430 adults aged 45 to 89 years, drug therapy was associated with meaningful decreases in reported health status. Heckbert et al note that hypertensive patients taking calcium channel blockers or loop diuretics had more abnormalities on their magnetic resonance imaging scans and lower scores on modified Mini-Mental State Examinations than users of β-blockers or benzothiadiazides. Using multiple logistic regression analyses, Guo et al report a relation between cognitive impairment, slower pulse rates, limitations of activities of daily living, and heart failure combined with low systolic blood pressures (<130 mm Hg) among 1389 persons with an average age of 85 years. Cognitive impairment was also related to low diastolic pressures (<70 mm Hg), as were limitations of activities of daily living, slow heart rate, increasing age, and arrhythmias. Use of antihypertensive agents in these patients was not assessed. Skoog et al, however, report that blood pressure declines years before the onset of dementia, similar to or lower than in persons without dementia. Although Guo et al reported an association of low blood pressure with Alzheimer disease, a report from the Systolic Hypertension in Europen Trial that compared placebo (n = 1180) with calcium channel blockers (n = 1238) found that the incidence of dementia was reduced from 7.7 to 3.8 cases per 100 patient-years (21 vs 11 patients; P = .05). The relation between antihypertensive therapy and cognitive impairment, therefore, is uncertain.

Withdrawal of antihypertensive agents can correct medication-induced abnormalities and adverse effects. The normalization of electrolytes and carbohydrate and lipid metabolism after withdrawal of antihypertensive medications and the disappearance of erectile dysfunction, impaired glucose tolerance, dizziness, Raynaud phenomenon, dyspnea, and gout have been reported.

In summary, the potential benefits of antihypertensive pharmacological therapy in elderly persons must be assessed against adverse consequences. After analyses of data from 300,000 nursing home patients, Gambassi et al conclude the following about the use of antihypertensive agents, “it is completely unknown whether the risks of therapy may outweigh the benefits among severely impaired patients.”

TRIALS TO REDUCE DOSAGE OR WITHDRAW ANTIHYPERTENSIVE MEDICATIONS

There are several compelling reasons to consider reduction of dosage or discontinuation of antihypertensive drugs in the very old. Elderly patients are more sensitive to volume depletion and sympathetic inhibition than are younger individuals. Since comorbid conditions and concurrent medications also are more frequent in older persons, risks of adverse drug interactions and adverse effects are increased.

To our knowledge, there are few reports of trials to step down dosage or withdraw antihypertensive medications in elderly patients and none in nursing home residents. Hansen et al note that of 105 elderly hypertensive patients in whom medications were withdrawn, blood pressures increased to unacceptable levels soon after withdrawal in 51 (48.6%), but 43 (41.0%) remained normotensive for 11 months. In addition, drug treatment was simplified for patients in whom medication therapy was restarted. Before withdrawal, 14 patients were taking 2 or more medications compared with 2 after restarting medication therapy.

Lernfelt et al observed 25 hypertensive patients aged 70 years and older, without evidence of cardiovascular disease, for 2 years after withdrawal of medication. Although blood pressures increased in 14 patients who completed the study, there were no changes in left ventricular morphologic features or diastolic function. In this group, however, there was a statistically significant decrease in left ventricular fractional shortening but no signs of congestive heart failure. In a group of primary care patients, Straand et al report successful withdrawal of diuretic therapy in 18 (55%) of 33 patients followed up for 6 months.
In a study of 333 elderly hypertensive patients aged 74 years and older, withdrawal of treatment was successful during the first year in 40% and for the full 5 years in 20%. During the period of no treatment, the patients had a lower total mortality risk than that of the general Swedish population matched for age and sex and a lower risk of cardiovascular events than those who continued to be treated.70 Nadal et al71 report successful discontinuation of antihypertensive medication in 14 (16%) of 86 elderly patients during a 3-year period. Fotherby and Potter72 were able to discontinue antihypertensive medication for 12 months in 25% of ambulatory patients aged 65 to 84 years and for 24 months in 20%. Predictors of successful discontinuation of medication were lower body mass index, lower electrocardiographic voltage (rV1 and sV6), and lower systolic blood pressures while undergoing treatment.

Nutritional therapy can augment the effect of medication,73 and a diet has been suggested when attempting to modify antihypertensive medication dosage. In the Trial of Nonpharmacologic Interventions in the Elderly,74,75 43.6% of patients aged 60 to 80 years assigned to sodium reduction and weight loss, 37.8% assigned to sodium reduction only, 39.2% assigned to weight loss only, and 16.3% assigned to usual care remained normotensive and without an adverse cardiovascular event for 30 months after the withdrawal of antihypertensive medications.

Meta-analysis for the studies cited is inappropriate because of marked differences in the characteristics of the populations (baseline demographic and illness characteristics) and in study design (method of medication withdrawal, criteria for restarting medication therapy, and length of follow-up). Since all of these trials were in ambulatory populations, the findings might not apply to institutionalized patients.

HAZARDS OF DRUG WITHDRAWAL

None of the studies previously quoted report adverse consequences from withdrawing antihypertensive medications in patients who remained normotensive. Withdrawal of diuretics might result in recurrence of peripheral edema that some patients find uncomfortable, and others may object to discontinuing a medication they had taken for several years. Since many patients whose blood pressures were normalized following withdrawal of medications later reverted to hypertensive levels, long-term or lifetime follow-up is required.

GUIDELINES FOR WITHDRAWAL OF MEDICATION

Dannenberg and Kannel77 suggest the need to develop guidelines for physicians who want to attempt withdrawal of medication in hypertensive patients. They propose that for patients receiving multiple blood pressure medications, after normotension for 6 to 12 months, all but one be gradually withdrawn. Patients taking a single medication and normotensive for 6 to 12 months should have that medication withdrawn if pretreatment blood pressures were only mildly elevated or if significant improvement in risk factor reduction (decreases in body weight and sodium consumption and increases in exercise) has occurred since starting to take the medication. Patients in whom medication has been withdrawn should be monitored every 3 to 6 months for life and encouraged to reduce risks from overweight, excess sodium ingestion, and lack of exercise. We further suggest that these guidelines be tested in controlled clinical trials and be reviewed by the Joint National Committee. In their sixth and most recent report,78 the Joint National Committee on Prevention, Detection, and Treatment of High Blood Pressure recommends that step-down therapy of antihypertensive medications be considered after the blood pressure has been controlled for at least 1 year and that careful follow-up be performed in patients in whom antihypertensive medications have been withdrawn. Tested guidelines for step-down therapy and withdrawal are not included in this or prior reports.

CONCLUSIONS AND RECOMMENDATIONS

The diagnosis of hypertension might be incorrect in as many as 25% of patients because of the white coat effect and inaccurate or insufficient number of blood pressure assessments. The risks and benefits of treating hypertension in the very old are uncertain and, in addition to the risks of adverse effects from pharmacological agents experienced by younger patients, this population might face additional risks such as falls and mental disorders. Multiple comorbid conditions and polypharmacy characteristic of nursing home patients increase these risks and complicate therapy. Studies of healthy ambulatory populations should not be extrapolated to those who are infirm. Lack of evidence of benefit from randomized trials in the very old, however, does not prove that pharmacological therapy is not needed.

The nursing home population is an ideal group to consider step-down dosage and attempted withdrawal of hypertensive medications because patients’ blood pressures can be monitored frequently and antihypertensive medication therapy can be restarted if blood pressures increase to unacceptable levels. Although studies that attempt to reduce or remove antihypertensive medications in nursing home patients have not been reported, to our knowledge, after examining 58 nursing home patients with hypertension, Lapierre et al79 suggest that 43% of patients receiving therapy could have their medications discontinued or reduced. The absence of pharmacological therapy in 24% to 30% of patients with hypertension might indicate that physicians caring for these patients consider such therapy unnecessary. In contrast to ambulatory patients, the high degree of blood pressure control (88%) in nursing home patients with hypertension10 suggests that lower dosage and even withdrawal of antihypertensive medications could be successful in significant numbers, especially if combined with dietary changes.

We recommend that all nursing home patients taking antihypertensive medications be reevaluated. Not all patients are suitable for
therapy modification, and clinical judgment for individual patients is required. For example, patients taking antihypertensive medications for indications other than hypertension, such as β-blockers for angina or to prevent recurrent myocardial infarction, and those taking diuretics for congestive heart failure should not be included. Recent bouts of myocardial infarction or congestive heart failure are additional reasons for exclusion. Within the constraints imposed by comorbid conditions, diet should be optimized to reduce sodium intake and to achieve ideal weight.

In the absence of tested guidelines for reduction of dosage and subsequent withdrawal of medications, a conservative approach is suggested. Attempts should be made in patients taking single antihypertensive medications, whose blood pressures have been controlled during the preceding 12 months. For patients taking more than 1 antihypertensive medication, attempts should be made to achieve control with a single medication. Although calcium channel blockers are the most frequently used antihypertensive agents in nursing home patients, diuretics are generally preferred for systolic hypertension in elderly patients. Yet, recent data demonstrating decreased incidence of dementia in patients treated with calcium channel blockers need to be considered when deciding on which antihypertensive medication is most appropriate.

Dosage adjustments should be made slowly (particularly for patients taking β-blockers) and blood pressures monitored frequently, perhaps weekly until drug withdrawal is complete. Subsequently, blood pressures should be measured monthly (routine for most skilled nursing facilities) during the remainder of the patients’ stay in the institution. For those who leave, continued monitoring is desirable because blood pressures might increase again later.

These changes can be accomplished with few additional resources, and savings in costs of medications will probably offset costs of increased frequency of monitoring. Patients will most likely benefit with decreases in adverse effects and improved functional status, without incurring risks.

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