

The following abstracts—from medical journals containing the most recent literature on hypertension in the elderly—were selected for their relevance to a managed care perspective.

Effect of a Formulary Change in Antihypertensive Therapy

A prospective study of physician records and patient-reported side effects, obtained from medical records and patient questionnaires, was conducted to assess blood pressure control and adverse side effects associated with shifting hypertensive patients from nifedipine gastrointestinal therapeutic system (GITS) to felodipine extended-release tablets. A total of 127 patients (95% male, 88% nonblack, 44% with coronary disease) met all the study criteria. To be included in the study, patients had to have been taking each drug for at least 2 months and, in each case, to have visited the clinic at least twice. Physicians were unaware of the data collection. The mean doses of nifedipine GITS and felodipine were 55 ± 24 mg/day and 8 ± 2.6 mg/day, respectively. Supplemental antihypertensive agents were used similarly in both groups. Systolic blood pressure (BP) and heart rates were similar in both groups; diastolic BP was modestly lower in patients taking felodipine ($P < 0.05$). As reported by both patients and providers, the incidence of side effects between the groups was similar. In this cohort of older veterans with hypertension and substantial comorbidity (diabetes mellitus, coronary artery disease, or peripheral vascular disease), felodipine was at least as effective as nifedipine for BP control.

Gustin G, White WB, Taylor S, Daragjati C. Clinical outcome of a mandatory formulary switch for dihydropyridine calcium channel blocker therapy at a Veteran's Administration medical center. *Am J Hypertens* 1996;9:312-316.

Morbidity and Mortality Among Elderly Hypertensives in Sweden

The Swedish Trial in Old Patients with Hypertension (STOP-Hypertension) enlisted 1,627 male and female patients between the ages of 70 and 84 from 116 health centers throughout Sweden to establish the value of antihypertensive treatment among an older population. This prospective, randomized, double-blind study was designed to measure the efficacy of antihypertensive treatment on the incidence of myocardial infarction, other fatal cardiovascular events, fatal, and nonfatal stroke in elderly hypertensives. The patients chosen had demonstrated 3 recordings during a 1-month placebo run-in period of systolic pressure from 180 to 230 mm Hg and diastolic pressure of at least 90 mm Hg; or a diastolic pressure from 105 mm Hg to 120 mm Hg regardless of the systolic pressure. The investigators divided the study group into 812 individuals placed on active therapy with 3 beta-blockers and 1 diuretic vs 815 individuals given placebo. The study lasted 65 months; the average length of participation was 25 months. The authors concluded that antihypertensive treatment can significantly reduce cardiovascular morbidity and mortality in the population of elderly hypertensives.

Dahlof B, Lindholm LH, Hansson L, et al. Morbidity and mortality in the Swedish Trial in Old Patients with Hypertension (STOP-Hypertension) *Lancet* 1991;338:1281-1285

British Study on Treatment of Elderly Hypertensives

This randomized, placebo-controlled, single-blind trial was designed to investigate the efficacy of treating hypertensive patients in the 65- to 74-year-old age group with diuretics or beta-blockers in order to diminish the risk of morbidity and mortality due to stroke or cardiovascular disease. A total of 4,396 patients were selected from 226 general practices; during an untreated 8-week run prior to the study, those selected had an average systolic pressure between 160 and 209 mm Hg and average diastolic pressure less than 115 mm Hg. Participants were randomized into three groups: one group received 50 mg atenolol daily; one received 25 mg or 50 mg hydrochlorothiazide plus 2.5 mg or 5 mg amiloride daily; the third group received placebo. The patients treated with beta-blockers or diuretics had a 25% reduction in stroke (95% CI, 3% to 42%; $P = 0.04$); a 19% reduction in coronary events (95% CI, 2% to 29%; $P = 0.03$). Interestingly, the diuretic group demonstrated significant reduction in all areas when compared with the placebo group: a 31% reduction in risk of stroke (3% to 51%; $P = 0.04$); a 44% reduction in coronary events (21% to 60%; $P = 0.0009$); and a 35% reduction in all cardiovascular events (17% to 49%; $P = 0.0005$), while the beta-blocker group showed no significant reductions in these end points. The authors concluded that diuretics can significantly reduce the risk of morbidity and mortality caused by stroke and cardiovascular events in elderly patients.

Medical Research Council. Medical Research Council trial of treatment of hypertension in older adults: Principal results. *BMJ* 1992;304:405-412

Strategies for Ensuring Compliance in the Treatment of Hypertension

It has been reported that partial compliance or even noncompliance are common problems in the treatment of many medical conditions, among them hypertension. Since the consequence of noncompliance is poor blood pressure control, which may in turn lead to cardiovascular events and damage, it is essential to increase compliance with prescribed treatment plans. The authors examined possible methods that physicians can employ to ensure compliance with prescribed hypertensive medications. In order to ensure compliance, it must first be monitored. Compliance should be monitored at every visit since it tends to decrease over time. Direct compliance measures include drug, metabolite, or marker levels in blood or urine samples; indirect measures include patient self-report, pill counts, use of pill containers equipped with microprocessors to record openings, and physician judgment. There are various steps that may be taken to augment compliance; these include providing patients with an adequate knowledge and understanding of the importance of treatment, explaining the treatment procedures in a concise and understandable manner, and categorizing the information shared with the patient according to its importance. Treatment may also be tailored to fit into the patient's daily routine, reminders such as pill calendars may be supplied, and family/social support may be enlisted to ensure compliance. Perhaps the most important method of ensuring compliance, however, is to make the dosage regimen as simple as possible. However, for cases in which a simple dosage regimen is impossible, introducing the complex regimen gradually may help the patient to adjust and thus ensure compliance.

Sanson-Fisher RW, Clover K. Compliance in the treatment of hypertension. A need for action. *Am J Hypertens*. 1995;8:82s-88s

G-Protein Alterations in Elderly Hypertensives

Defective vasodilator function may be a factor in the development and continuance of hypertension, particularly in the elderly. Additionally, impaired beta-adrenergic-mediated vasodilation and reduced lymphocyte beta-adrenergic activation of adenylyl cyclase have been seen in both elderly and hypertensive patients. This study was designed to determine whether alterations in guanine nucleotide regulatory protein (G-protein), which link receptor activation with effector function, could be the cellular mechanism behind defective vasodilator function. In order to do so, the investigators evaluated the following: (1) human lymphocyte adenylyl cyclase activity; (2) stimulatory G-proteins by cholera toxin-mediated [³²P]ADP ribosylation and, in hypertensive patients, with alpha₅-specific and beta-subunit antisera; and (3) inhibitory G proteins by pertussis toxin-mediated [³²P]ADP ribosylation and, in elderly patients, with alpha_{11 2}- and beta-subunit-specific antisera. Lymphocytes from both elderly and hypertensive patients showed similar reductions in isoproterenol-stimulated adenylyl cyclase, but aluminum fluoride-stimulated activity was diminished only in lymphocytes from the hypertensive patients, and was inversely correlated with mean blood pressure. In lymphocytes from elderly patients, pertussis toxin-mediated labeling was significantly increased but cholera toxin-mediated labeling and inhibitory G-protein labeling by immunodetection were unaltered. The authors concluded that G-protein functions are altered in both elderly and hypertensive patients; furthermore, in both cases stimulation of adenylyl cyclase is impaired. Such defects are related to disparate alterations in stimulatory and inhibitory G-proteins.

Feldman RD, Tan CM, Chorazyczewski J. G protein alterations in hypertension and aging. *Hypertension* 1995;26:725-732.

Reducing Stress in Elderly African American Hypertensives

It has been reported that chronic stress is linked to the development of hypertension. This randomized, controlled, single-blind study was designed to determine the short-term potential and efficacy of 2 stress reduction programs in the treatment of elderly African American hypertensives. Researchers selected 127 African American patients, both male and female, chosen from a primary care inner-city health center, and ranging in age from 55 years to 85 years. Patients had an initial systolic blood pressure of no more than 189 mm Hg and a diastolic blood pressure between 90 mm Hg and 109 mm Hg; the final baseline blood pressure was no more than 179/104 mm Hg. Of the 127 participants, 16 did not complete the 3-month follow-up blood pressure measurements. Meditation, progressive muscle relaxation, and lifestyle modification were compared; primary outcome measures were changes in systolic and diastolic pressure from baseline to follow up; secondary outcome measures were linear blood pressure patterns, changes in home blood pressure, and compliance with the interventions. After adjustment for baseline differences, meditation was found to reduce systolic pressure by 10.7 mm Hg (P) and diastolic pressure by 6.4 mm Hg (P). Progressive muscle relaxation reduced systolic pressure by 4.7 mm Hg (P) and diastolic pressure by 3.3 mm Hg (P). Both groups had high rates of compliance. The researchers concluded that certain mental and physical stress-reduction techniques were effective in lowering mild hypertension in elderly African Americans, with meditation proving to be approximately twice as effective as progressive muscle relaxation.

Schneider RH, Staggers F, Alexander CN, Sheppard W, Rainforth M, Kondwani K, et al. A randomized controlled trial of stress reduction for hypertension in older African Americans. *Hypertension* 1995;26:820-827.

Plasma Renin Activity in Elderly Hypertensives

It has been reported that there exists an inverse relationship between plasma renin activity (PRA) and age in both hypertensive and normotensive patients. Hypertensive patients are also reported to have lower plasma prorenin levels. This study was designed to seek a possible connection between renin and prorenin suppression and hypertension in elderly, white patients. The 91 patients in the study were grouped as follows: 65 untreated hypertensives ranging in age from 69 to 94 years, with an average age of 79 and a blood pressure of at least 160/95 mm Hg; and a control group of 26 normotensives ranging from 66 to 99 years of age, with an average age of 77. The PRA of the hypertensive patients (1.71.6 ng/mL/h) showed no significant variation from that of the normotensive patients (1.50.8 ng/mL/h). In fact, there was no correlation between PRA and age in either group, but was inversely correlated to blood pressure in the hypertensive group ($r=-0.25$; $P=0.05$). There was also no significant difference between the hypertensive (14.68.6 ng/mL/h) and normotensive (15.17.0 ng/mL/h) groups in plasma prorenin. The investigators concluded that neither PRA nor plasma prorenin were significantly suppressed in elderly hypertensive or normotensive patients. However, since an inverse correlation between age and PRA has been reported elsewhere, further study is needed to determine whether it is a matter of normal renin/prorenin patients having a greater rate of survival to old age.

Trenkwalder P, James GD, Laragh JH, Sealey JE. Plasma renin activity and plasma prorenin are not suppressed in hypertensives surviving to old age. *Am J Hypertens* 1996;9:621-627.

Findings of the Systolic Hypertension in the Elderly Program (SHEP)

This randomized, double-blind, placebo-controlled study was designed to assess the effectiveness of antihypertensive treatment in the reduction of morbidity and mortality due to stroke associated with isolated systolic hypertension (ISH) in an elderly population. A total of 4,736 ambulatory patients of age 60 years or older (average age: 72 years) were selected from community-based tertiary care centers; they were randomized into an active treatment group of 2,365 and a placebo group of 2,371. Of these, 57% were women and 14% were black. Upon joining the study, 3,161 patients were not taking antihypertensive medication; 1,575 patients were. The patients' systolic pressure ranged from 160 mm Hg to 219 mm Hg with an average of 170 mm Hg; diastolic pressure was less than 90 mm Hg with an average of 77 mm Hg. Treatment was provided on a stepped-care basis; step 1, dose 1 was 12.5 mg/d chlorthalidone, or matching placebo; dose 2 was 25 mg/d. Step 2, dose 1 was 25 mg/d atenolol, or matching placebo; dose 2 was 50 mg/d. At the average follow-up point of 54 months, patients demonstrated an average systolic pressure of 155 mm Hg for the placebo group and 143 mm Hg for active treatment group. At the same point, the average diastolic pressure for the placebo group was 72 mm Hg; the average for the active treatment group was 68 mm Hg. Also at this point, the incidence of stroke was 5.2 per 100 patients in the active treatment group and 8.2 per 100 in the placebo group. The relative risk by proportional hazards regression analysis was 0.64 ($P = 0.0003$). The investigators concluded that antihypertensive drug treatment reduced the total incidence of stroke by 36%, with a 5-year absolute benefit of 30 events per 1,000 patients. In addition, major cardiovascular events were reduced, with a 5-year absolute benefit of 55 events per 1,000 patients.

SHEP Cooperative Research Group. Prevention of stroke by antihypertensive drug treatment in older persons with isolated systolic hypertension. *JAMA* 1991;265:3255-3264.

Prevalence of Physical Exercise Among the Elderly

It is generally accepted that physical activity has beneficial effects on most of the population; this study was designed to examine the prevalence and certain correlates of leisure-time physical exercise among an elderly population. Data from a group of 7,801 elderly respondents (5,018 females and 2,783 males) to the 1990 National Health Interview Survey were examined. Thirty-seven percent of the male respondents engaged in regular physical activity (defined as 3 or more times per week for 30 minutes or more) during the two weeks preceding the questionnaire; 24% of the female respondents engaged in physical exercise. The correlates examined included perception of stress in preceding 2 weeks (males: OR, 1.7; 95% confidence interval [CI], 1.2-2.4; females: OR, 1.3; 95% CI, 1.0-1.6), lack of physical limitations (males: OR, 1.3; 95% CI, 1.0-1.6; females: OR, 1.7; 95% CI, 1.4-2.0), correct exercise knowledge (males: OR, 2.4; 95% CI, 1.9-3.1; females: OR, 2.7; 95% CI, 2.2-3.4), and the perception of good to excellent health (males: OR, 1.5; 95% CI, 1.1-1.9; females: OR, 1.6; 95% CI, 1.3-1.9). The respondents who had been diagnosed with hypertension usually pursued physical activity upon the advice of their physicians (males: OR, 1.6; 95% CI, 1.2-2.3; females: OR, 1.5; 95% CI, 1.2-1.9). The most popular leisure-time physical activities among the respondents were walking (males, 69%; females, 75%) and gardening (males, 45%; females, 35%).

Yusuf HR, Croft JB, Giles WH et al. Leisure-time activity among older adults. *Arch Intern Med* 1996;156:1321-1326.