

# Hypertension in Pregnancy Tied to Later CV Events

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CHICAGO — Women who develop hypertension during pregnancy face a substantially increased risk of cardiovascular events later in life, based on a review of more than 4,000 women.

Hypertension in pregnancy is an “underrecognized risk factor” for subsequent cardiovascular events and for developing other markers of elevated cardiovascular risk, Dr. Vesna D. Garovic said at the annual scientific sessions of the American Heart Association.

“Traditionally, hypertension in pregnancy was not thought to play a major role in cardiovascular disease,” noted Dr. Garovic, a nephrologist at the Mayo Clinic in Rochester, Minn. But based on these findings, physicians who care for middle-aged or elderly women should obtain a history of their pregnancy outcomes. Women with a history of hypertension in pregnancy need aggressive treatment to reduce their modifiable risk factors, and close monitoring for the onset of cardiovascular events, she said.

Results from prior studies of women who had hypertension in pregnancy did not establish these links, probably because they involved relatively few women and had relatively brief follow-up. Those studies also lacked racial and ethnic diversity, and often focused exclusively on

cardiovascular death as their end point.

Dr. Garovic and her associates analyzed comprehensive clinical information gathered for women in the Family Blood Pressure Program, a study organized and funded by the National Heart, Lung, and Blood Institute. The study group of nearly 4,800 women included roughly equal numbers who were white, African American, Hispanic, and Japanese. The group included 3,421 women who were normotensive during each pregnancy, 643 women who developed hypertension during at least one pregnancy, and 718 women who had no pregnancy that lasted longer than 6 months. (This third group was not included in the analysis.)

The key index event was hypertension in pregnancy and not preeclampsia because the researchers who ran the Family Blood Pressure Program collected data only on hypertension during pregnancy and not information on the incidence of proteinuria or edema during pregnancy.

The women’s median age was 54 years when their clinical data were collected, and cardiovascular events were only counted if they first occurred after age 39.

The cumulative incidence of stroke among the women who had hypertension in pregnancy was 5.2%, compared with 2.7% among those who were normotensive in pregnancy, a statistically significant difference. The rate of coronary heart disease was 6.8% among those with a histo-

## Cardiovascular Risk Factors in Middle Age Linked to Hypertension in Pregnancy

Prevalence or average level in women who were:

Risk factor	Hypertensive in pregnancy (n = 643)	Normotensive in pregnancy (n = 3,421)
Microalbuminuria	17%	12%
Ankle-brachial index <0.9	11%	8%
Left ventricular hypertrophy	19%	13%
Serum C-reactive protein	0.46 mg/dL	0.34 mg/dL
Serum homocysteine	9.5 micromol/L	9.2 micromol/L

Note: All differences between the two study groups are statistically significant.

Source: Dr. Garovic

ry of hypertension during pregnancy, compared with 5.4% among those without this background, also a statistically significant difference.

The prevalence rates of several risk factors for cardiovascular disease were significantly greater in the women with a history of hypertension in pregnancy compared with those who had no such history, even after controlling for possible confounding factors. (See table.)

The prevalence of hypertension at the time of data collection was 61% among women with a history of hypertension in pregnancy, compared with 57% among

those without this history. More notably, the average age of hypertension onset was 52 years for the women who had hypertension in pregnancy, compared with 60 years for those who did not.

Women who develop hypertension in pregnancy may have underlying endothelial dysfunction. Pregnancy may serve as a physiologic “stress test” that transiently unmasks the condition, and the disorder and its consequences become more overt again later in life. Alternatively, in some predisposed women, pregnancy itself may trigger endothelial dysfunction that later leads to other disorders, Dr. Garovic said. ■

## Stress, Anger Tied to Onset of HT

BY PATRICE WENDLING  
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TUCSON, ARIZ. — High levels of anger and long-term psychological stress are independent predictors that prehypertension will progress to hypertension, coronary artery disease, and coronary artery disease-related death, Dr. Marty Player said at the annual meeting of the North American Primary Care Research Group.

Dr. Player presented a secondary data analysis of the Atherosclerosis Risk in Communities (ARIC) study, a prospective study of 15,792 men and women aged 45-64 years at the time of enrollment in four U.S. communities. The analysis included 2,334 individuals free of cardiovascular disease with blood pressure in the prehypertension range, defined as a systolic BP of 120-139 mm Hg or diastolic BP of 80-89 mm Hg. First examinations were conducted from 1987 to 1989, with annual telephone interviews and three triennial visits through 1998.

Using a bivariate analysis, researchers found that the factors significant for progression from prehypertension to hypertension were advanced age, female

gender, and black race, reported Dr. Player, a research fellow, and colleagues in the family medicine department at the Medical University of South Carolina, Charleston. The research was presented as one of the meeting’s distinguished papers.

After the researchers adjusted for age, race, body mass index, diabetes mellitus, and exercise, the odds ratio of developing hypertension was 1.53 for any participant having a high score on the Spielberger Trait Anger Scale. High trait anger indicates anger that occurs frequently with high intensity and prolonged duration. The association was significant for men (odds ratio 1.71) but not for women (OR 1.34), he said.

The researchers also evaluated progression to coronary heart disease as indicated by a history of MI, revascularization procedure, MI on electrocardiogram, or fatal coronary heart disease recorded at a triennial visit or annual follow-up interview.

Using a bivariate analysis, researchers found that age, gender, and nonblack race were significant factors for progression of atherosclerosis disease. More men (17%) developed coronary heart disease or fatal

CHD, compared with women (5.8%), as did nonblacks (12%), compared with blacks (7.6%).

In a multivariate analysis, high levels of prolonged psychological stress, as assessed by the Maastricht Questionnaire, were significantly associated with progression to CHD and fatal CHD in all participants (OR 1.68). The association was stronger in women (OR 2.63) than in men (OR 1.54). About 10% of patients with a Maastricht Questionnaire score of 7 or less developed CHD or fatal CHD, vs. 9.5% of those with scores of 8-12, and 14% with a score of 12 or more.

High Spielberger anger scores were significant predictors of progression to CHD or fatal CHD in men (OR 1.92) but not in women (OR 0.95), reported the authors, whose work was supported by the U.S. Department of Health and Human Services’ Health Resources and Services Administration.

Further research should evaluate common psychosocial variables, such as depression and anxiety, and include younger patients. Behavioral therapy may provide benefit for patients with prehypertension, Dr. Player said. ■

## Less White-Coat Effect Seen With Hyperaldosteronism

SAN ANTONIO — Patients with treatment-resistant hypertension and hyperaldosteronism have higher ambulatory blood pressures and less white-coat hypertension than do those with resistant hypertension and normal aldosterone levels, Dr. Eduardo Pimenta said at a meeting of the Council for High Blood Pressure Research.

This may explain, in part, the finding in prior observational studies that hypertensives with hyperaldosteronism seem to have a greater risk of cardiovascular events than do equally hypertensive patients with normal aldosterone. It is well established that higher ambulatory blood pressure (BP) values and less white-coat hypertensive effect are associated with increased risk of cardiovascular events both in the general hypertensive population and in those with resistant hypertension, noted Dr. Pimenta of the University of Alabama, Birmingham.

Recent studies show that hyperaldosteronism plays a greater role in resistant hypertension than was historically thought to be the case. Dr. Pimenta reported on 252 consecutive patients referred for resistant hypertension (BP in ex-

cess of 140/90 mm Hg despite concurrent use of at least three drugs). Patients were on an average of 4.2 antihypertensive agents.

Of the 252 patients, 59 (23%) had hyperaldosteronism (plasma renin activity below 1.0 ng/mL per hour, and urinary aldosterone excretion of at least 12 mcg/24 hours). All discontinued spironolactone and other drugs affecting aldosterone at least 6 weeks prior to ambulatory BP monitoring.

The average in-office BP of the study participants was 160/89.4 mm Hg, with no significant difference between those with and without hyperaldosteronism. Despite the closely similar in-office BP in the two groups, those with high aldosterone had significantly higher daytime, nighttime, and 24-hour systolic and diastolic BP.

Moreover, the prevalence of white-coat hypertension—as defined by high BP in the clinic but a daytime ambulatory BP less than 135/85 mm Hg—was only 5% in resistant hypertensives with hyperaldosteronism, vs. more than 35% in those with normal aldosterone, Dr. Pimenta said at the meeting, sponsored by the American Heart Association.

—Bruce Jancin