Cytokine Levels Higher in White Hypertensives

BY PATRICE WENDLING

CHICAGO — Plasma levels of the proinflammatory cytokines tumor necrosis factor–alpha and interleukin-6 were surprisingly higher in whites vs. blacks with hypertension in a pilot study of 46 patients.

The tumor necrosis factor–alpha (TNF-alpha) was 1.19 pg/mL in 14 white hypertensive patients, compared with 0.62 pg/mL in 12 black hypertensives.

Interleukin-6 (IL-6) levels were higher in whites, at 1.31 pg/mL versus 0.79 pg/mL in blacks, Dr. Ralph Watson said at a meeting sponsored by the International Society on Hypertension in Blacks. The difference between groups did not reach statistical significance for either cytokine, likely because of small patient numbers.

The finding is surprising because inflammation is thought to be one of the driving forces behind high blood pressure and end-organ damage, both of which have been shown in several studies to be worse in black than in white hypertensives.

In addition, the few studies that have compared IL-6, TNF-alpha, or C-reactive protein levels in blacks and whites have found either higher levels in blacks or no difference between races.

Dr. Keith Norris, ISHIB conference cochair and interim president of Charles Drew University in Los Angeles, called the data provocative and asked whether weight could be driving the finding. Dr. Watson acknowledged that white hypertensives were slightly heavier at a mean weight of 202 pounds than were African Americans at a mean weight of 193 pounds.

White hypertensives had a slightly lower mean blood pressure of 128/78 mm Hg vs. 134/85 mm Hg for black hypertensives. Members of both groups were aged 59 years, but were on a variety of different antihypertensive medication regimens that may have affected their IL-6 or TNF-alpha levels, said Dr. Watson, director of the hypertension clinic at Michigan State University in East Lansing.

Dr. Janice P. Lea of Emory University in Atlanta, session chair, questioned what percentage of African Americans were on ACE inhibitors because they traditionally have had lower prescriptions of angiotension blockade. Dr. Watson said they have not yet done that analysis, but plan to do so.

Notably, IL-6 levels were significantly higher in the 26 patients with hypertension than in the 20 normotensive patients (1.34 pg/mL vs. 0.60 pg/mL), as were TNF-alpha levels (1.06 pg/mL vs. 0.46 pg/mL). This finding confirms several previous studies showing increased levels of inflammatory cytokines in persons with prehypertension and hypertension.

Still, the relationship between inflammation and hypertension remains unclear, Dr. Watson said. IL-6 and TNF-alpha are produced and secreted mainly by activated tissue macrophages in response to injury or infection, and act on endothelial cells at the DNA transcription level. The inflammatory response, however, is also closely intertwined with the process of repair, which begins during the early phases of inflammation.

"Blacks have far more strokes, end-stage renal disease, and coronary artery disease as a result of their hypertension than whites, and the assumption has been that this is because of increased inflammation contributing to the damage," Dr. Watson said in an interview. "The question now is whether a lack of inflammation repair of the endothelial damage caused by hypertension could be contributing to the elevated rates of end-organ damage we see in black hypertensives, and whether elevated levels of inflammatory markers in white hypertensives contribute to their lower rates of end-organ damage."

Dr. Watson and colleagues are planning to validate the findings in another 50 black and white hyper- and normotensive patients and to assess the effect of hypertensive medications on TNF-alpha and IL-6 levels in hypertensive patients.

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