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STUDY QUESTIONS IMPACT OF HEMOGLOBIN VARIATIONS ON MORTALITY IN DIALYSIS PATIENTS

Risk of Death Linked to Persistently Low Hemoglobin, Not Variability Itself

Washington, DC (Wednesday, December 5, 2007) — For patients with dialysis-related anemia, the risk of death is increased when hemoglobin levels remain persistently low over a period several months—not necessarily when they fluctuate over time, according to a study in the January *Clinical Journal of the American Society of Nephrology*.

"Our results show that the effect of hemoglobin variability on mortality, beyond the absolute level of hemoglobin, may not confer much additional risk, after adjusting for other illnesses and hospitalizations," comments David T. Gilbertson, Ph.D., of the Minneapolis Medical Research Foundation, Minneapolis, Minn.

Dr. Gilbertson and colleagues used data on nearly 160,000 dialysis patients to analyze the effects of variations in hemoglobin level on the risk of death. Patterns of hemoglobin variability during the first six months of 2004 were analyzed and compared with mortality rates over the subsequent six months.

Hemoglobin is the oxygen-carrying compound in the blood. Anemia, or low hemoglobin levels, is one of the most frequent complications of kidney failure and is associated with an increased risk of death in dialysis patients. Treatment including erythropoietin and intravenous iron has been a major advance in the management of kidney failure-related anemia, yet low blood counts and variation in hemoglobin levels continue to be a problem for many dialysis patients.

In the study, patients who developed low hemoglobin levels during the monitoring period were at increased risk of death. This was true both for patients with temporary reductions in hemoglobin and those whose hemoglobin level was persistently low. This risk was considerably greater than any risk associated with fluctuations in hemoglobin levels.

On further analysis, the key risk factor seemed to be the amount of time spent with a low hemoglobin level—not the hemoglobin variations themselves. Patients who spent three months or longer with low hemoglobin levels had the highest mortality rates.

"A number of research groups have shown that variability of hemoglobin levels is very common in patients receiving dialysis for end-stage renal disease," says Dr. Gilbertson. "Low hemoglobin levels, which are an indication of anemia, have been shown to be associated with poor outcomes. It is relatively unknown

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whether fluctuations in hemoglobin levels add additional risk." If so, then more intensive treatment might be needed to keep hemoglobin levels within a relatively narrow range.

"Our results suggest that fluctuations in hemoglobin levels probably do not add much to the mortality risk for patients with dialysis-related anemia," Dr. Gilbertson concludes. "Low hemoglobin levels show significantly greater associations with increased risk of death than fluctuations in hemoglobin levels." More research will be needed to evaluate the causes of variations in hemoglobin levels, including what proportion of the variability is under the control of doctors and dialysis centers.

This study was supported by a research contract from Amgen, Inc., Thousand Oaks, Calif. The contract provides for the investigators of the Minneapolis Medical Research Foundation to have the final determination of the content of this publication. The following study authors have received consulting fees from Amgen: David T. Gilbertson, Robert N. Foley, and Allan J. Collins. Study author Brian D. Bradbury works in the Department of Epidemiology at Amgen, Inc.

The study entitled, "Hemoglobin Level Variability: Associations with Mortality" is available online at <http://cjasn.asnjournals.org> and in print in the January issue of the *Clinical Journal of the American Society of Nephrology* (CJASN).

The ASN is a not-for-profit organization of 10,500 physicians and scientists dedicated to the study of nephrology and committed to providing a forum for the promulgation of information regarding the latest research and clinical findings on kidney diseases.

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