Elevated branched-chain amino acid levels tied to heart failure risk

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Adults with type 2 diabetes may be more likely to experience heart failure if they have elevated branched-chain amino acid levels, according to findings published in Diabetes/Metabolism Research and Reviews, and researchers caution these people to avoid taking branched-chain amino acid supplements.

“Emerging evidence suggests that abnormal myocardial energy metabolism may play a vital role in the pathogenesis of heart failure. Branched-chain amino acids are essential amino acids derived solely from the diet and have been well-recognized as one of the key energy substrates to the myocardium. Notably, abnormal branched-chain amino acids metabolism due to excessive dietary branched-chain amino acid intake, increased synthesis or reduced clearance can cause dysregulation of cellular metabolism, leading to endothelial dysfunction and systemic inflammation,” Alice P.S. Kong, MBChB, MD, MRCP, FRCP, ECFMG, FHKAM, professor in the department of medicine and therapeutics at The Chinese University of Hong Kong in Shatin, Hong Kong, and Lee-Ling Lim, MBBS, MRCP, of the department of medicine and therapeutics at The Chinese University of Hong Kong, Shatin, Hong Kong, told Healio. “In line with existing experimental data, the present findings have provided important insights into the potential metabolic derangement for developing heart failure in people with type 2 diabetes, although further validation in other populations is required.”

Kong, Lim and colleagues analyzed blood samples from 2,139 adults with type 2 diabetes and no cardiovascular or renal disease (mean age, 54.8 years; 51.8% women) in the Hong Kong Diabetes Register to assess baseline branched-chain amino acid levels. The researchers also identified
heart failure hospitalizations in the cohort across 13.6 years of mean follow-up time using the Clinical Management System of the Hong Kong Hospital Authority.

The researchers identified heart failure hospitalizations in the records of 115 participants. The median branched-chain amino acid level was 639.3 µmol/L for those who experienced heart failure compared with 605.2 µmol/L for those who did not experience heart failure ($P = .01$), which made for a 5.6% difference, according to the researchers. In addition, heart failure risk was increased by 28% when branched-chain amino acid levels rose by 1 standard deviation in fully adjusted models ($OR = 1.28; 95\% \text{ CI}, 1.11-1.48$).

“Given increasing public interest in high protein/branched-chain amino acid diet, the present findings did not support the use of branched-chain amino acids as health supplements or high dietary protein/branched-chain amino acid intake in people with type 2 diabetes, who are at risk of impaired branched-chain amino acid metabolism,” Kong and Lim said. “Nevertheless, more prospective studies and randomized controlled trials with interval branched-chain amino acid sampling are required to evaluate the long-term safety and efficacy of different preventive and therapeutic interventions for optimizing circulating levels of branched-chain amino acid levels in people with type 2 diabetes.” – by Phil Neuffer

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