Letter to the Editor

Ischemia-Modified Albumin in Ischemic Disorders

[Letter regarding "A Case of Acute Type B Aortic Dissection: Limited Role of Laboratory Testing for the Diagnosis of Mesenteric Ischemia" (Ann Thorac Cardiovasc Surg 2007; 13: 360–4)]

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To the Editor:

We have read with interest the article by Dr. Koichi Akutsu et al., who highlighted that currently available laboratory markers are not sensitive enough to detect the presence of mesenteric ischemia.[1)] This conclusion was supported by evidence that creatine phosphokinase, lactate dehydrogenase, and lactate levels were negative. However, there are emergent diagnostic opportunities that might enable a timely and reliable detection of generalized and localized ischemic events and that were not considered by the authors. From a biological perspective, tissue necrosis is time-dependent and occurs when the action of the endogenous mechanisms of response to ischemia is finally overwhelmed. During acute ischemic conditions, the metal binding capacity of albumin for transition metals, such as copper, nickel, and cobalt, is reduced, generating a metabolic variant of the protein commonly known as ischemia-modified albumin (IMA). Although the precise mechanism for IMA generation is yet unknown, in vivo generation of this marker might be interpreted as an efficient endogenous mechanism of response to ischemia, preventing tissue damage or limiting the extent of necrosis. Recently, it has been reported that patients with intermittent claudication have significantly elevated IMA, and skeletal muscle ischemia during arterial surgery results in significantly increased circulating IMA. IMA is also chronically increased in subjects suffering from conditions characterized by persistent peripheral ischemia, such as systemic sclerosis,[2)] and in athletes performing strenuous physical exercise.[3)] Although larger trails are needed, a preliminary study reported a sensitivity of 100% and a specificity of 86% for detecting intestinal ischemia.[4)] Because of the high negative predictive value of this marker, IMA might represent a potential diagnostic aid in this specific clinical setting because it would identify mesenteric ischemia before irreversible organ damage may have occurred.

References

1. Akutsu K, Matsuda H, Sasaki H, Minatoya K, Ogino H, et al. A case of acute type B aortic dissection: limited role of laboratory testing for the diagnosis of mesenteric ischemia. *Ann Thorac Cardiovasc Surg* 2007; **13**: 360–4.
2. Montagnana M, Lippi G, Volpe A, Salvagno GL, Biasi D, et al. Evaluation of cardiac laboratory markers in patients with systemic sclerosis. *Clin Biochem* 2006; **39:** 913–7.
3. Lippi G, Salvagno GL, Montagnana M, Schena F, Ballestrieri F, et al. Influence of physical exercise and relationship with biochemical variables of NT-pro-brain natriuretic peptide and ischemia modified albumin. *Clin Chim Acta* 2006; **367:** 175–80.
4. Polk JD, Rael LT, Craun ML, Mains CW, Davis-Merritt D, et al. Clinical utility of the cobalt-albumin binding assay in the diagnosis of intestinal ischemia. *J Trauma* 2008; **64:** 42–5.

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