ISCHEMIA MODIFIED ALBUMIN

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The diagnosis of myocardial ischemia is problematic due to the lack of a gold standard test. In the emergency setting, there is heavy reliance on the electrocardiogram (ECG) however the ECG has a poor sensitivity for the diagnosis of cardiac ischemia. A blood-borne biomarker is an attractive alternative to cardiac imaging or stress testing as it would be relatively cheaper and logistically easier and faster to obtain. In addition it could be utilized as part of the routine repertoire of a clinical chemistry laboratory. A number of candidate biomarkers have been proposed for the detection of cardiac ischaemia, however only Ischemia Modified Albumin (IMA) has been released for clinical use. An ischemic state results in free radical release that alters the capacity of human albumin to bind transition metal ions at the N-terminus. The modified form of albumin can be detected by the use of a chemical reaction involving cobalt binding and this is the basis of the Albumin Cobalt Binding (ACB) test for IMA. The ACB test is CE marked and FDA approved for clinical diagnostic use. IMA is a good discriminator between ischemic and non-ischemic patients. Changes in IMA concentration have been demonstrated to occur following induced ischemia during coronary angioplasty. The extent of albumin modification is related to the number of balloon inflations and the presence of a collateral circulation within the myocardium. There is a rapid rise followed by a fall to normal concentrations by 24 hours. Clinical studies have shown that IMA appears to offer on admission an early test which can be combined with ECG findings and cardiac troponin measurements for the early exclusion of acute coronary syndrome (1,2). IMA is an independent predictor of short and long term adverse outcomes in patients with acute chest pain in the emergency setting (figure 1) (3). However this test is relatively new and uncertainties still remain. Elevations of IMA occur outside the context of acute chest pain which raises concern over its specificity. Some analytical questions remain concerning sample stability and potential interferences. The mechanism of IMA formation and the precise entity being measured are not fully known. Nevertheless, IMA measurement remains the only current clinical biomarker which may be used for the diagnosis of patients with suspected cardiac ischemia.

Figure 1: 1-year all-cause mortality in the patients stratified by median ischemia-modified albumin (IMA) value (93.3 U/mL).

References: