Peripheral detection of S100β during cardiothoracic surgery

What are we really measuring?

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ABSTRACT

Background: In cardiac surgery, extracranial proteins may falsely elevate measurements of serum S100β. Objectives of this study were to 1) quantify S100β levels in serum and pericardial cavity during coronary artery bypass grafting (CABG) and, 2) identify proteins recognized by standard immunodetection as S100β.

Methods: Systemic and pericardial cavity blood from 5 patients undergoing CABG were sampled prior to, during and after cardiopulmonary bypass (CPB). A commercially available ELISA kit was used to quantify S100β. Two-dimensional gel electrophoresis, Western blot and mass spectroscopy were also performed to identify S100β and other proteins.

Results: Mean S100β levels measured by ELISA in systemic and pericardial cavity blood were (in ng/ml) 1.3±0.48 and 120.8±57 prior to CPB, 0.7±0.05 and 138±38 during CPB and 1.9±0.4 and 127±25 after CPB, respectively. However, gel electrophoresis and Western blot analysis revealed proteins other than S100β to be present in the pericardial cavity giving falsely elevated serum S100β levels measured by immunoassay. Mass spectroscopy of identified potential candidates revealed contaminants including haptoglobin I precursor, apolipoprotein A-1 precursor, complement factor B precursor, and complement C3 precursor.

Conclusions: S100β immunoassays are not specific for S100β and give a falsely elevated reading due to contaminants from surgical field that cross-react with the assay’s antibody. This does not appear to be an issue in non-surgical patients. Caution must be exerted when evaluating immunodetection results for low-abundance proteins under conditions where contamination of the sample is likely.