Journal of Alzheimer's Disease 2010 vol.21 N4, pages 1153-1164

Coronary artery bypass surgery provokes alzheimer's disease-like changes in the cerebrospinal fluid

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Abstract

Several biomarkers are used in confirming the diagnosis of cognitive disorders. This study evaluates whether the level of these markers after heart surgery correlates with the development of cognitive dysfunction, which is a frequent complication of cardiac interventions. Concentrations of amyloid-β peptide, tau, and S100β in the cerebro-spinal fluid were assessed, as well as cognitive functions were evaluated before and after coronary artery bypass grafting, utilizing immuno-assays and psychometric tests, respectively. A drastic rise in the level of S100β was observed one week after the surgery, a mark of a severe generalized cerebral injury. The level of amyloid-β peptide significantly decreased, whereas the concentration of tau markedly increased six months postoperatively. Gradual cognitive decline was also present. These findings clearly demonstrate post-surgical cognitive impairment associated with changes in biomarkers similar to that seen in Alzheimer's disease, suggesting a unifying pathognomic factor between the two disorders. A holistic approach to coronary heart disease and Alzheimer's-type dementia is proposed.

http://dx.doi.org/10.3233/JAD-2010-100702

Keywords

Alzheimer's disease, amyloid-β peptide, biomarker, cardiac surgery, cerebrospinal fluid, cognitive function, postoperative cognitive decline, S100β, tau