



Postoperative atrial fibrillation and ischemic stroke: The role of homocysteine

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We have read with interest the review by Thijs et al.,¹ focused on postoperative atrial fibrillation (POAF) and its important role in early stroke and other multiple adverse early outcomes.

The authors examined different mechanisms involved in POAF development, i.e. surgical manipulation of the heart, pharmacological and haemodynamic changes, postoperative inflammation, reperfusion injury, postoperative autonomic alterations. However, they completely disregarded the role of hyperhomocysteinemia (HHcy) that may be relevant in POAF developing in some cardiac surgery patients.

Indeed, HHcy represents a very common finding after heart transplantation,² where it may contribute to atrial remodelling, leading to an increased risk of atrial arrhythmias in denervated hearts.³ Accordingly, in these patients, HHcy correlates with high values of P wave dispersion, a condition which reflects a heterogeneous atrial conduction and represents a risk factor for atrial fibrillation occurrence.⁴

From a mechanistic point of view, it has been demonstrated that homocysteine plays a direct effect on atrial ionic channels (inhibition of I_{to} and IK_{ur} currents, increase of IK_1 and I_{Na} currents), producing early after-depolarisations and causing focal ectopic/triggered activity. Moreover, HHcy determines a biochemical damage on atrial extracellular matrix (structural remodelling), causing subsequent atrial fibrosis with slow and heterogeneous atrial conduction that favours the appearance of a vulnerable reentrant substrate.³ In addition to these mechanisms, HHcy may also contribute to a prothrombotic state, favouring atrial thrombosis and ischaemic embolic stroke.⁵

Finally, HHcy has been associated with early recurrence of atrial tachyarrhythmia after procedure of catheter ablation, representing a predictor of early recurrence of atrial fibrillation.⁶

As recently highlighted by Spence et al.,⁷ these observations may be of particular clinical relevance. In fact, in patients undergoing cardiac surgery who developed HHcy, an appropriate homocysteine-lowering treatment

with folic acid and methylcobalamin may contribute to prevent atrial fibrillation development, thus improving the outcome of these subjects.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Contributorship

MA conceived the study. MA, PEL and GM contributed to write the manuscript. All authors reviewed and edited the manuscript and approved the final version of the manuscript.

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