C1 esterase inhibitor concentrate during surgery with cardiopulmonary bypass: Is there an indication beyond substitution therapy in patients with hereditary angioneurotic edema?

To the Editor:

We read with interest the article by Alvarez, titled "Successful Use of C1 Esterase Inhibitor Protein in a Patient With Hereditary Angioneurotic Edema Requiring Coronary Bypass Surgery" (*J Thorac Cardiovasc Surg* 2000;119:168-71). We agree that substitution of C1 esterase inhibitor (C1INH) is the only efficacious therapy to prevent fatal complications in patients with hereditary angioneurotic edema (HANE) undergoing cardiac surgery with cardiopulmonary bypass (CPB). This fact was impressively documented by the case presented.

There is, however, one error in the text that bears comment. Although the article indeed presents the first clinical case of C1INH substitution in a patient with HANE during heart surgery, it was not the first time that C1INH had been given during CPB. In 1998, we¹ published the results of a group of patients receiving C1INH (Berinert; Aventis, Behring, Germany) to treat severe cardiocirculatory failure after emergency coronary revascularization for unsuccessful percutaneous transluminal coronary angioplasty. In these patients, postoperative depression of myocardial function had to be attributed to myocardial stunning caused by ischemia and reperfusion. From the knowledge of experimental findings demonstrating a cardioprotective effect of C1INH,^{2,3} we used the inhibitor concentrate as a rescue therapy after all conventional methods (ie, long reperfusion on CPB, catecholamines, inotropic dilators, and aortic counterpulsation) had failed to stabilize the patients' circulatory situation. All patients survived the intervention and had an uneventful postoperative course.

The effects of C1INH substitution in these particular patients may not have been exclusively limited to the successful treatment of ischemia-reperfusion phenomena. The coincidence of a 4- to 6-hour period of preoperative ischemia, depressed myocardial function, and CPB could have resulted in a fatal combination, including a strong inflammatory response. Because reperfusion injury and the inflammatory response to CPB are both complement-dependent, local and systemic effects of complement inhibition may have contributed to the rapid clinical improvement of these patients.

Although in recent years C1INH has been restricted to substitution therapy in patients with HANE,⁴ increasing evidence now exists that the inhibitor may be helpful in special clinical situations leading to an increased capillary permeability.⁵ In our opinion, these promising results obtained during ischemia-reperfusion, sepsis, or CPB should encourage the performance of clinical and experimental trials to further clarify the physiologic effects and possible therapeutic role of complement inhibition.

Robert Bauernschmitt, MD

Christian Schreiber, MD

Rüdiger Lange, MD

Clinic for Heart and Vascular Surgery

German Heart Center Munich

Lazarettstr 36

80636 Munich, Germany

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