Dokumenttyp: journal article

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Titel des Beitrags: Combined administration of nitric oxide gas and iloprost during cardiopulmonary bypass reduces platelet dysfunction: a pilot clinical study.

Abstract: BACKGROUND: Thrombocytopenia and platelet dysfunction are major mechanisms of cardiopulmonary bypass-induced postoperative hemorrhage. This study evaluated the effects of low amounts of nitric oxide, iloprost (prostacyclin analog), and their combination administered directly into the oxygenator on platelet function, platelet-leukocyte interactions, and postoperative blood loss in patients undergoing coronary artery bypass grafting. METHODS: Blood samples from 41 patients randomized to the control, nitric oxide (20 ppm), iloprost (2 ng x kg^-1 x min^-1), or nitric oxide plus iloprost groups were collected during cardiopulmonary bypass. Platelets and leukocytes were enumerated. Platelet membrane glycoprotein Ib and glycoprotein IIb/IIIa, P-selectin, platelet-derived microparticles, leukocyte CD11b/CD18 (Mac-1), and platelet-leukocyte aggregate were quantified by means of flow cytometry. Collagen and thrombin receptor-activating peptide-induced platelet aggregation in whole blood was analyzed by means of aggregometry. RESULTS: Both nitric oxide or iloprost attenuated cardiopulmonary bypass-induced thrombocytopenia, reduction of glycoprotein Ib and glycoprotein IIb levels, translocation of P-selectin, microparticle formation, Mac-1 upregulation, and suppression of collagen-induced aggregation. Nitric
oxide plus iloprost was significantly more effective in preventing thrombocytopenia, microparticle formation, and P-selectin translocation. Moreover, this treatment preserved thrombin receptor-activating peptide-induced aggregation, which was not rescued by single treatments. Both nitric oxide and nitric oxide plus iloprost attenuated postoperative blood loss. CONCLUSIONS: Nitric oxide plus iloprost reduced the deleterious effects of cardiopulmonary bypass, such as thrombocytopenia, platelet activation, platelet-leukocyte aggregate formation, and suppression of platelet aggregative responses. The reduced postoperative bleeding observed with this treatment suggests that this is a new and clinically feasible therapeutic option for patients subjected to cardiopulmonary bypass.