

Biomarker behavior in children with pulmonary hypertension risk due congenital heart surgery: A single centre experience in Argentine pediatric patients with oral citrulline supplementation

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Pulmonary hypertension (PH) is a major cause of morbi-mortality among patients with congenital heart disease (CHD) and also a potentially severe complication after surgical repair. Oral citrulline, a precursor to NO synthesis, is safe and efficacious for decreasing the risk of postoperative PH. Biomarker research holds an enormous potential for diagnostic/prognostic purposes in different states of patients.

Objective: To evaluate the levels of plasma citrulline, arginine, homocysteine and nitric oxide (NO) metabolites and pulmonary artery pressures (PAP) pre-post cardiac surgery.

Study design: 16 Argentine pediatric patients with CHD undergoing cardiopulmonary bypass were randomized in two groups: (A) with and (B) without perioperative citrulline supplementation.

Main results/Discussion: a) Plasma citrulline median levels before surgery were lower in both groups respect to referential values, probably due to the poor nutritional status of our patients. Group A surpassed post-surgery the minimum recommended level to avoid PH; it did not happen in group B. b) Arginine average concentration after surgery remained constant in group A; while in group B, it decreased abruptly 12 hours post-surgery. This behavior would be attributed to the high demand of arginine in a metabolic stress situation to form NO. c) Homocysteine post-surgery average levels in group A were into the normal range and more stable with respect to group B. d) NO average concentration after surgery remained more stable in group A, with a significant decrease in group B at 12 hs, a critical moment in the risk of PH. e) Mean PAP in the postoperative period, none of the patients in group A showed values higher than 20 mmHg, whereas in group B, 67% of the measurements were \geq than that reference level.

Conclusions: We reaffirm that citrulline supplementation may be effective in reducing postoperative pulmonary hypertension and biomarkers could evidence patient status as a translational medicine application.