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Is Zero-Balance Ultrafiltration an effective clinical method for SIRS prevention during extracorporeal circulation in adults heart diseases correction?

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Background: Ultrafiltration, which is currently considered as a standard method to remove excess water administered during cardiopulmonary bypass (CPB), aims to minimize the adverse effects of hemodilution, such as tissue edema and blood transfusion. Three ultrafiltration techniques can be used before, during and after CPB procedure, including conventional ultrafiltration (CUF), zero-balance ultrafiltration (Z-BUF), and modified ultrafiltration (MUF) at the end of CPB. The aim of study The present abstract attempts to revise efficiency of Z-BUF ultrafiltration method, laboratory results, and clinical impacts.

Material and methods: 92 adults (51 men and 41 women) with acquired heart diseases were undergoing a single cardiac surgical procedure in condition of cardiopulmonary bypass (clamp aortic 89, 9± 38,8 min. and pump 135,14 ± 45,17 min. were divided into 3 groups. 1st group (no ultrafiltration) - 35 patients with classic cardiac surgery, 2nd with use of zero-balance ultrafiltration (ZBUF) group- 39 patients with classic cardiac surgery, and 3rd group ZBUF with miniinvasive cardiac surgery- 18 patients. ZBUF was performed by removing in ratio 3 l/m2 ultrafiltrate using a hemoconcentrator with priming volume 133 ml. For myocardial protection was used "Bretschneider" solution or blood cardioplegia with solution St. Thomas II (15 mL/kg) were performed. Patient data was taken before CPB (T1), immediately following CPB (T2), and 12 hours following the procedure (T3). There were no significant differences in diagnoses, clinical status, pump time, aortic cross-clamp time between groups.

Results: Laboratory data demonstrate presence of SIRS in all groups (high levels of leucocytes or monocytes, C reactive protein positive in 10,5% cases of 1st gr,11,2% cases of 2nd gr. and 10,9%in 3rd gr.). The length of mechanical ventilation was statistically lower more in 3rd ZBUF group and in 2nd ZBUF group than in 1st group (1,4 ±0,3 hour (3rd gr.), 2,5±1,7 hour (2nd) and 3,8±1,8 hour(3rd),P 0,01). The length of stay in ICU was statistically lower in 2nd ZBUF group (2,2± 1,5 days) versus (3,5±1,3 days) control group P = 0,03

Conclusions: This study demonstrates that ZBUF ultrafiltration is an efficient method that can be used during CPB in the adults and help to remove significant amounts of body water what seriously impact clinical results. The use of ultrafiltration in our study had no effect on organ dysfunction during the postoperative period and should be used for volemic control in patients who undergo extracorporeal circulation. This result suggests that Z-BUF improves the pulmonary function in this model of severe lung injury and may be an effective tool in attenuating the CPB derived inflammatory process.

Biography

Eugen Varlan was advised as stager reseacher in scientific laboratory of cardiosurgery of Cardiology Institute In 1995 and in few months (november 1995) sucessfully performed extracorporeal circulation in cardiac surgery operations. During 23 years she performed above 3600 extracorporal circulations in majority cases of pediatric cardiac surgery (radical correction of Tetralogy Fallot, radical correction of Atrioventricular Canal, mitral and tricuspidal annuloplastic, Glenn and Fontan operations with extracorporeal circulation assistance, switch correction of Transposition of Grand vessels, Mustard operation, Norwood corection) and off course assistance at all types of adult operations and ECMO. By my insistence was introduced in practice in Republic of Moldova the method of modified ultrafiltration (can see my publications in" Art of surgery"- journal of Moldavian surgery society). Currently working at "SANADOR" hospital in Bucharest the capital of Romania Republic.

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