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Efficiency of using the closed cardiopulmonary bypass contour in coronary artery bypass grafting

D B Biktashev and **T D Lesbekov**
Turan-Astana, Kazakhstan

Aim: National Research Cardiac Surgery Center was one of the enrolling centers in conducting a clinical trial of closed cardiopulmonary bypass (CPB) contour - ROCsafe investigation in 2014-2015. The objective of this report was to study the direct results of cardiopulmonary bypass surgery in conditions of cardiopulmonary bypass in closed and open circuits.

Methods: Two cohorts of patients underwent coronary artery bypass grafting using open and closed CPB contours. Patients in group 1 (n = 50; mean age 65±4.2 years) underwent coronary artery bypass grafting in the closed CPB contour. Patients in group 2 (n = 50; mean age 64 ±5.3years) underwent coronary artery bypass grafting in the open CPB contour. Clinical characteristics of both cohorts were comparable. The total time of cardiopulmonary bypass was lower in the 1st group than in the 2nd group (58min±12.7 and 64min ±16.9, respectively; p = 0.04). The average number of grafts was 3±0.67 in the 1st (control group), 3±0.53 in the 2nd (comparative group). Postoperative analysis of laboratory indicators has been divided into two stages at the time of six hours and sixteen hours.

Results: The level of hemoglobin in the 1st group by the end of six hours after operation was higher, than in the 2nd group and was 112g/L ±14.15 and 106 g/L ±11.18 (p = 0.01), respectively; the level of hematocrit was 33.1 ±3.89 and 29.89 ±4.06 (p = 0.001), respectively; the level of erythrocytes at this stage was 3.9x1012 ±0.51 and 3.6x1012 ±0.36 (p = 0.007), respectively. After 16 hours of operation, the level of hemoglobin and erythrocytes in-group 1 remains higher as well. Leucocytes and C-reactive protein levels reduction in the 1st group were revealed also: the level of leucocytes was 10x109 ±13.2 and 11.3x109 ±2.4 (p= 0.02) respectively; the level of C-reactive protein was 4mg/dl ±2.8 and 5.6 mg/dl ±2.2 (p=0.01) respectively. There were no statistically significant changes in urea and creatinine levels in both groups.

Conclusion: The closed contour of cardiopulmonary bypass can be used effectively and safe for coronary artery bypass grafting surgery.

biktashevdamir@gmail.com

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