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**The use of hydroxyethyl starch and crystalloid solutions during off-pump coronary artery bypass grafting surgery.**

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**Summary.** The article presents the experience of using of hydroxyethyl starch solutions (HES) during off-pump coronary artery bypass grafting surgery (CABG). A comparative analysis of the use of HES solution with other races crystalloid target. Analyzed the efficacy and safety of this solutions during elective off-pump cabg.

**Key words:** hydroxyethyl starch, off-pump coronary artery bypass grafting surgery, infusion therapy, blood transfusion.

**Introduction.** Coronary artery bypass grafting (CABG) on a beating heart as a method of surgical treatment of coronary heart disease (CHD) is increasing distribution. The anesthetic management of these interventions is the need to ensure stable hemodynamics during operations against the background of impaired left ventricular filling process and a brief period of myocardial ischemia due to surgical manipulation. The choice of tactics infusion therapy is still an unresolved issue. Compared with crystalloid solutions, colloid solutions are more effective in maintaining intravascular volume due to the lower volume of distribution. Colloid solutions crystalloid prevail in the degree of increase in cardiac output and, consequently, increase oxygen delivery to organs and tissues. Hydroxyethyl solutions (HES) is often used among other colloidal solutions for correction of hypovolemia in perioperative period. However HES solutions have a number of drawbacks that limit their widespread application. These include: effects on hemostasis system (reduced consentration of von Willebrand and coagulation factor VIII, and inhibition of platelet function), kidney function (increased risk of acute kidney injury) and potentiation of systemic inflammatory response. Therefore, the feasibility of using HES solutions in the perioperative period still remains unresolved issues.

**Purpose of the study.** Compare regimes of infusion therapy with the use of HES and without in perioperative period in patients with coronary artery disease.

**Materials and methods.** A retrospective analysis of treatment in patients who from January to August 2015 was isolated off-pump CABG performed was conducted. Of these, 32 were selected case histories of patients who enforced isolation CABG-3 on a beating heart. The criteria for inclusion of patients in the study were: left ventricular ejection fraction of 50% or more, the initial level of blood creatinine <140 mmol / L, hemoglobin level> 120 g / L, platelet count> 150x109 / l.

Patients were divided into 2 groups: Group 1 - those who HES preparations were not applied, and infusion therapy program included only crystalloid solutions; Group 2 - patients who are in the perioperative period used drugs HES (HES solution is 130 / 0.4 at a dose of 20 ml / kg).

 All operations were performed under total volatile anesthesia with sevoflurane. Intraoperative monitoring – invasive arterial blood pressure, central venous pressure (CVP), electrocardiography registration with ST-analysis, pulseoximetry.

Laboratory control includes: determining blood count (hemoglobin, hematocrit, number of erythrocytes, leukocytes, platelets), blood chemistry (total protein, glucose, creatinine, urea), electrolyte, acid-base and the gas composition, blood coagulation with the definition of activated partial thromboplastin time (aPTT).

**Results.** All patients had isolated performed off-pump CABG - 3 . General characteristics of patients included in the study are presented in Table 1.

Table 1.

**Clinical data of the study groups.**

|  |  |  |  |
| --- | --- | --- | --- |
| Index | Group 1, n=16,M±SD | Group 2, n=16,M±SD | χ2;p |
| Age, years | 57,5±5,2 | 56,2±4,9 | 0,7; р>0,05 |
| Sex (female) | 2 (12,5%) | 3(19%) | 0,2; р> 0,05 |
| Diabetes mellitus | 3(19%) | 2(12,5%) | 0,7; р> 0,05 |
| NYHA class | 2,9±0,4 | 3,1±0,5 | 0,7; p>0,05 |
| Operation time, hours | 3,3±0,41 | 3,4±0,43 | 0,7; p>0,05 |
| EUROSCORE, % | 1,3±0,7 | 1,1±0,3 | р>0,05 |

Antiplatelet drugs (aspirin, clopidogrel) were canceled more than 5 days to perform surgery in patients of both groups. Patients in group 2 the total volume of HES 130 / 0.4 does not exceed 1000 ml.

The data obtained clinical study are presented in Table 2.

Table 2.

**Clinical study results.**

|  |  |  |  |
| --- | --- | --- | --- |
| Index | Group 1; n=16;M±SD | Group 2 n=16;M±SD | р |
| Intraoperative fluid balance, ml | 1714±244 | 1996±477 | 0,04 |
| Intraoperative blood loss, ml | 477±126 | 610±188 | 0,02 |
| Amount of exudate for 24 hours after surgery, ml | 289±84 | 369±101 | 0,02 |
| The total amount of exudates, ml | 468±110 | 577±139 | 0,02 |
| Dose of HES solution 130/0,4 ml/kg | 0 | 11,6±3,4 |  |
| Blood transfusion, ml | 0 | 279±23(n=3) |  |
| Mortality | 0 | 0 |  |

Intraoperative fluid balance was higher in patients of the second group. Intraoperative blood loss and the amount of fluid during the drainage of a postoperative wound than 24 hours, and for all the stay were higher in patients who were appointed HES preparations. Due to increased blood loss, the second group 3 patients required transfusion of packed red blood cells..

In both study groups managed to maintain stable hemodynamics at all stages of surgery. Therefore, sympathomimetic drugs were not used. Not a single case was recorded perioperative myocardial infarction. Hospital mortality in the studied groups was zero.

**Conclusion.**

1. The use of HES and crystalloid solutions to ensure stable hemodynamics effectively during off-pump CABG.

2. The use of HES solutions increased perioperative blood loss and need for transfusion.

3. In the elective surgery preference should be given to crystalloid solutions HES preparations.

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