44577 - CARDIOPULMONARY-BYPASS INDUCES HYPERGLYCEMIA ONLY IN PREOPERATIVE INSULIN RESISTANT PATIENTS

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Background: Cardiopulmonary-bypass (CPB) induces insulin resistance (IR) and severe hyperglycemia. There is growing evidence that aggressive maintenance of blood glucose within the physiological range is an essential component of perioperative care. Notwithstanding the adverse clinical effects of hyperglycemia on outcome, perioperative normoglycemia cannot be reliably achieved, despite the use of large doses of insulin. The aim of this study was to determine to what extent preoperative insulin resistance affects the development of hyperglycemia and the amount of insulin infused during CPB.
Methods: Local IRB approval was obtained for this study. Fifty patients undergoing cardiac surgery were screened by using the Homeostatic Model Assessment (HOMA) in two populations: insulin-resistant patients (RP) and non-insulin resistant patients (NP). Patients with a preoperative HOMA less than 2.1 were defined NP, and patients with a preoperative HOMA more than 2.1 were defined RP. Al patients received a total intravenous anesthesia with remifentanil 0.4 mcg/kg/min and propofol 70mcg/kg/min. During surgery blood glucose levels were measured in all patients and hyperglycemia was treated with a standard protocol of continuous insulin infusion. HOMA was repeated 48 h after surgery to determine the postoperative state of insulin resistance.
Results: The proportion of NP who had at least once blood glucose level over 120mg/dl during CPB was 22% while in RP this proportion was 100% ($p < 0.001$). The proportion of NP who received at least one unit of insulin during CPB was 11% while in RP this proportion was 100% ($p < 0.001$). Blood glucose levels during surgery are reported in figure 1. Mean cumulative amount of insulin infused during surgery are reported in figure 2. Risk factors for postoperative insulin resistance were preoperative insulin resistance ($p = 6.9 \times 10 -8$), aortic cross-clamping time ($p=0.004$) and mixed oxygen venous saturation arriving in ICU ($p = 0.04$).
Conclusions: Only patients who are IR before cardiac surgery develop hyperglycemia and need insulin infusion during CPB.
References
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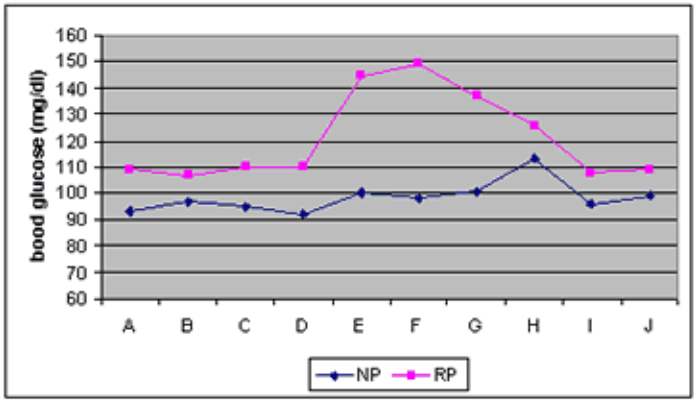
Figure 1: Blood glucose during cardiac surgery



NP = preoperative non insulin resistant patients, RP = preoperative insulin resistant patients.
A = after intubation, B = after sternotomy, C = after aortic cannulation, D = 15 minutes after starting of CPB, E = maximal cooling, F = 15 minutes after maximal cooling, G = after starting to rewarm, H = normothermia (esophageal temperature 36-37 °C, bladder temperature >36 °C, I = 30 minutes after discontinuation of CPB, J = after arrival in intensive care unit