

Abstract

Cardiac surgery is known to initiate a complex physiological response with the immune system activation (SIRS), *neurohormonal* response, metabolic changes, coagulopathies etc. SIRS is triggered by tissue injury, myocardial ischemia, reperfusion, use of anaesthesia, cardioplegia, extracorporeal circuit etc. Excessive immune system activation is associated with progression of SIRS, life-threatening multi-organ dysfunction (MOD), and increased morbidity/mortality in the postoperative period. The immune system response is regulated and terminated by both cellular and humoral regulatory and inhibitory mechanisms including changes in expression of in our study monitored molecules: CD200/CD200R, sCD200R and CD95/CD95L.

Methods: The study included the measurement the expression of CD95, CD95L, CD200R, and sCD200R molecules in granulocyte and monocyte populations in blood samples of 30 patients who underwent heart surgery using CPB. Samples collected before surgery, after surgery, and in the postoperative period (1st, 3rd, 7th day) were analysed by flow cytometry and sCD200R by ELISA.

Results: We discovered a significant increase in the percentage of granulocytes expressing inhibitory molecule CD200R (from 5% to 17.8%) instantly after surgery. It might be presumed that these cells are less susceptible to apoptosis, because they rarely expressed CD95, CD200R⁺CD95⁻ granulocyte subpopulation prevailed. Only a small percentage of granulocytes expressed both molecules CD200R and CD95 (from 0.5 to 2.06 %). This subpopulation of CD200R⁺CD95⁺ cells decreased expression of CD200R after surgery, and thus was likely to be a source of increased sCD200R in serum (from 96 to 294 ng/mL). CPB also affected the expression of CD95L on monocytes. The percentage of CD200R⁺CD95L⁺ monocytes rose on the 1th postoperative day (from 30.6 to 49.4 %) and decreased below the preoperative value on the 7th day after surgery (from 30.6 to 19.8 %). This population was constituted mainly by CD200R⁺CD95⁺ monocytes in which enhanced expression of CD95 was found (from 36,1 to 42,7). Differences were considered significant when $p < 0.05$.

Conclusion: Our data show that the expression of CD200R, CD95, and CD95L, as well as concentration of sDC200R was significantly influenced by cardiac surgery. This implies the role of these membrane molecules in the cell regulation – inhibition and apoptosis following cardiac surgery.