**Summary**

Nowadays, the peripheral blood stem cells are the preferred source of the hematopoietic stem cells for autologous and allogeneic transplantations. We studied the clinical and laboratory premobilization and precollection parameters on groups of patients and donors mobilized for HSC collection and locked for their capability to predict the mobilization efficiency.

The mobilization of chronic lymphocytic leukemia and multiple myeloma patients using combination of chemotherapy and granulocyte- colony stimulating growth factor (G-CSF) revealed the relation between the circulating CD34+ level in peripheral blood and certain blood count parameters before mobilization: haemoglobin level and platelets count. Multiple myeloma patients with haemoglobin > 108 g/l had 3.35 x higher chance of successful mobilization in comparison to those with lower entry levels. In CLL patients the time from the last chemotherapy to mobilization attempt was an important mobilization result predictor (successful mobilization rate only 8 % at interval < 2 months vs. 50 % at interval > 2 months, p=0.0098).

The influence of the age on the mobilization efficiency was assessed in healthy donors groups especially. It was found that there is a negative correlation between the donor's age and the amount of CD34+ cells mobilized into peripheral blood ($p<0.0001$, $r_s= -0.40$) or collected into afheresis product ($p<0.0001$, $r_s= -0.39$). The higher age of an allogeneic donor means increased risk of the suboptimal mobilization and inadequate graft. We also observed the frequency of adverse reactions of the mobilization and collection procedures. Aphereses were well tolerated in all donors, however in older ones the higher rate of adverse events was recorded (29 % vs. 15 %, p=0.0096).

The changes of the plasmatic levels of certain cytokines and the expression of adhesion molecules on CD34+ cell caused by G-CSF were tested. When comparing the premobilization cytokines levels between good and poor mobilized donors, the difference was found for sICAM-1 and borderline for IL-6. The cut-off, which might help to distinguish poor mobilizing donors before starting the G-CSF, was determined for both sICAM-1 (cut-off 100 ng/ml, odds ratio 4.8, p=0.0206, 95 % CI: 1.27 – 18.11) and IL-6 (cut-off 32 pg/ml, odds ratio 15.6, p=0.0112, 95 % CI: 1.87 – 130.18). The assessment of the adhesion molecules expression showed the negative relation between the CD34+ level in the peripheral blood on day +5 and the expression of antigens CD11a (p=0.0002, $r_s= -0.59$) and CD184 (p=0.0075, $r_s= -0.44$).

Furthermore we examined the extent of the interlaboratory variability of the CD34+ enumeration. This test is necessary for evaluation of the mobilization efficiency and the graft quality too. Repeated external quality control cycles resulted in the reduction of the variability among the laboratories.

In conclusion, it might be stated that some predictive factors, which determine the mobilization results, can be found for HSC mobilization. None of these factors itself is able to predict the mobilization results, however their combination can prospectively identify poor mobilized patients or donors and allow the modification of the mobilization protocol.