Reactivation of Immunomodulating Beta-Herpesvirus Infection in Patients Undergoing Microvascular Free Flap Surgeries and Its Association with Surgical Outcome

Arnis Vilks [1], ***Santa Rasa*** [3], ***Romans Dzalbs*** [4],
Modra Murovska [3], ***Biruta Mamaja*** [1, 2]

[1] *Riga Eastern Clinical University Hospital "Gailezers", Latvia*
[2] *Rīga Stradiņš University, Department of Anaesthesiology and Reanimatology, Latvia*
[3] *Rīga Stradiņš University, A. Kirchenstein Institute of Microbiology and Virology, Latvia*
[4] *Rīga Stradiņš University, Faculty of Medicine, Latvia*

Introduction. Beta-herpesviruses HHV-6 and HHV-7 are immunomodulating viruses. These viruses have the ability to impair host defence system seriously. HHV-7 selectively infects CD4+ cells, and the CD4 molecule is required for virus entry. The target cell for HHV-6 also is CD4+ lymphocyte and cellular receptor CD46, but HHV-6 can infect CD8+, γ/δ T cells, NK cells, *in vitro* immortalized B cells, and mononuclear phagocytes as well albeit unproductively. These viruses may indirectly contribute to other infectious pathogens by inhibiting the immune system. The stimuli for reactivation of these viruses are immunosupression.

The aim. The aim of this study was to investigate the effect of long lasting microvascular free flap surgery upon general or regional anaesthesia on reactivation of HHV-6 and HHV-7, and how this activation affects surgical outcome.

Materials and methods. 58 patients undergoing long lasting (average 5.7 h) microvascular free flap surgery were enrolled in this study. Anaesthesia methods – general anaesthesia (GA) (n = 35) or regional anaesthesia (RA) (n = 23), were chosen; depending of tissues defect and surgery planned donor place. Peripheral blood samples for the detection of viral infection markers were collected before and 10 days after surgery. HHV-6 and HHV-7 genomic DNA was detected using nested polymerase chain reaction (nPCR) with corresponding primers. The presence of viral sequences in peripheral blood leukocytes' (PBL) DNA was a marker of latent/persistent viral infection and in plasma DNA – of active viral infection.

Results. Before the surgery, latent HHV-6 infection was revealed in 13 patients with GA and in 6 patients with RA, active HHV-6 infection – in 2 patients with GA and in 2 patients with RA. Latent HHV-7 infection was revealed in 26 patients with GA and in 16 patients with RA, active HHV-7 infection – in 3 patients with GA and in 4 patients with RA. After the surgery, virus reactivation in GA group was observed in 7 patients (in one patient HHV-6 and in 6 patients HHV-7, respectively). These differences are statistically significant (p = 0.12). In RA group reactivation of HHV-7 was detected in one patient. Postoperatively in patients group with GA 6 surgical site infections (SSI) were observed, 1.28 repeated surgeries carried out. Mean time spent in ICU 4.03 (± 9.17) was days, duration of postoperative period – 29.53 (± 28.75) days. In GA group one case of SSI was observed and 0.77 repeated surgeries carried out. Mean time spent in ICU was 0.26 (± 0.76) days, duration of postoperative period – 14.72 (± 10.75) days.

Conclusion. Reactivation of HHV-6 and HHV-7 infection occurs more frequently in patients to whom general anaesthesia is applied. The results of this study highlights the potential immunosupression by long lasting general anaesthesia and its association with longer and more complicated postoperative period course.