Resume

Cognitive decline is a common perioperative complication, affecting about one-quarter of patients at one week after surgery. It is a temporary disorder, which influences mainly executive functions, memory and spatial orientation. The decline is short-lived, with complete resolution in first months after surgery. Low education and higher age are the only known risk factors with hard evidence, although it can be diagnosed also in younger patients. Particularly in seniors, this disorder is associated with deterioration of the quality of life. No differences in incidence were found between general and regional anaesthesia, neither between certain anaesthetics. The only evidence-based prevention is a minimalization of the impact of surgery and anaesthesia on patients, e.g. with fast-track approach. Optimization of the depth of the anaesthesia using EEG and derived parameters is promising, but with little evidence yet. Research of the postoperative cognitive dysfunction (POCD) is significantly influenced with the heterogeneity of published studies, consensus on POCD definition and diagnostics is still missing. Another important limiting factor is a continuous change in methods and drugs in anaesthesia and perioperative care in last twenty years, and therefore comparing current results with older studies is difficult.

The aim of the presented study was to compare the possible difference in POCD occurrence after anaesthesia with sevoflurane and propofol, the dependency of POCD on several considered risk factors, and to study the possible relationship between POCD positivity and changes in event-related potentials. Sixty patients were enrolled in years 2013-2015, 43 of them were included in final analysis. Patients had undergone resection of lumbar intervertebral disk herniation under inhalational anaesthesia using sevoflurane or intravenous propofol. The dose of anaesthetics in both arms was titrated according to bispectral index. Patients were examined with a battery of neuropsychological tests on the day before operation and then on days 1, 6 and 40 after. Record of event-related potentials (waves N100, P3a and P3b) was obtained during the same visit.

No significant difference in POCD positivity was found between both anaesthesia types in any of testing dates (POCD was found in 48 vs. 60 %, 18 vs. 20 % and 17 vs. 11 % - sevoflurane vs. propofol on day 1, 6 and 40 after surgery). The frequency of POCD was similar as in previously published studies. Any of suggested risk factors (age, sex, anaesthesia risk score, duration of anaesthesia, postoperative nausea and vomiting) was associated with POCD. There was a significant decline in certain cognitive domains, with the strongest impact on semantic

memory. This worsening was symmetric after propofol and sevoflurane and was still present one week after surgery. A significant decrease of amplitudes and prolongation of latencies was observed postoperatively. These changes were more pronounced after sevoflurane a lasted till the last examination. No clinical correlate for this phenomenon was found in any of patients. In statistical analysis, no significant association between POCD and changes of event-related potentials was found.

Key messages:

- Significant cognitive decline lasting few days after surgery can be found in the majority of patients. This phenomenon need not be perceived by the patient.
- The postoperative cognitive disorder is temporary with normalization in weeks to months in the vast majority of patients.
- There is no difference in POCD frequency after sevoflurane and propofol anaesthesia.
- Sevoflurane causes long-term changes of event-related potentials, mainly wave P3a. This finding is without clinical correlate.
- Event-related potentials are not currently suitable for POCD diagnostics.