

Epilepsy is one of the most common neurological diseases and occurs in nearly 1% of the world population. Regardless of the etiology of epilepsy (idiopathic, symptomatic or cryptogenic), its course may be affected by various factors. The most important factors that lead to provocation of seizures are considered to include sleep deprivation, stress, abuse of diet, alcohol consumption and the abolition, menstruation, fever, flashing TV screens, music, reading, some foods ("energy" drinks, Coca-Cola) and medicines (analeptic stimulants, some antibiotics, drugs, antipsychotics, antidepressants). All these factors must be considered in the management of patients with epilepsy, including if it is necessary to use anesthesia. Some medicines (including those used in anesthetia) may significantly interact with antiepileptic drugs taken by patients with epilepsy.

In patients with known epilepsy it is necessary to clarify its etiology, type and frequency of seizures, the factors that provoke the attack, taking antiepileptic drugs (AEDs) in the past and present and their side effects. In patients who take valproate and carbamazepine, complete blood count, bilirubin, transaminases and coagulation should be investigated. Before the planned intervention the measurement of plasma concentrations of AEDs is desirable.

As is known, the selection of AEDs for epilepsy is made according to the type of seizures, effectiveness and side effects of AEDs in the individual patient.

Rational use of AEDs to control seizures is very important for the patient, so anesthesiologists should know the basic pharmacological properties of the most commonly used AEDs such as: phenobarbital, phenytoin, valproic acid, carbamazepine, lamotrigine, topiramate, levetiracetam.

Some inhaled anesthetics have anticonvulsant effect (isoflurane). Some of them do not substantially affect epileptiform brain activity (nitrous oxide). But some of them can cause epileptiform EEG activity and can provoke seizures, especially at high concentrations in the respiratory mix (sevoflurane and enflurane).

Intravenous anesthetics may affect epileptiform EEG activity and epileptic seizures also in the different way. Barbiturates for example: thiopental is a well-known anticonvulsant, but methohexital has the convulsive effect that is used to detect the localization of epileptic foci in the surgical treatment of epilepsy. Benzodiazepines do anticonvulsant effect, potentiate the activity of AEDs. They are recommended for use in the sedation of patients with epilepsy and as first-line drugs for generalized seizures. Propofol has a strong antiepileptic activity. It is used for

treatment of epileptic status as a second-line drug. Ketamine in low doses, etomidate and sodium oxybutyrate are proconvulsants. Clonidine and dexmedetomidine have no pro- or anti-convulsive activity, so they can be used in patients with epilepsy. Opiates (fentanyl, morphine, sufentanyl and alfentanyl) may cause generalized seizures, especially when they are used in high doses.

The diagnosis of epileptic seizure is very difficult during general anesthesia, especially when muscle relaxation is used. Monitoring of epileptic activity during general anesthesia is conducted using bispectral index (BIS), obtained in the analysis of the EEG.

Although high doses of local anesthetics have proconvulsive action, regional anesthesia is not contraindicated in patients with epilepsy. Be aware that several other medications can also have proconvulsive action (analeptic stimulants, some antibiotics, antipsychotics, antidepressants). In addition to changes in the AEDs concentration and influence of anesthetics, analgesics and other drugs used in anesthesia, changes of some physiological constants can induce epileptic seizures also.

AEDs intake in the postoperative period should be restored as quickly as possible. It is recommended to monitor plasma concentrations of AEDs in at least 48 hours after the operation due to changes in volume redistribution of protein, in hepatic metabolism and renal excretion. If the seizure has developed in perioperative period and lasts more than 5 minutes, then it needs medication (benzodiazepines, diphenine, phenobarbital, midazolam, propofol, thiopental, isoflurane).

Thus, for optimal perioperative management of patients with epilepsy it is necessary to determine the type, frequency, precipitating factors of seizures (both drug and non drug). Be sure that dose and mode of use of AEDs and their interaction with anesthetics were considered. In case of seizures in the perioperative period, it is important to diagnose and stop them on time.