



# Sevofluran – klinički značaj

## Clinical significance of Sevoflurane

Nebojša Stevanović

Klinički centar Kragujevac

Clinical Center Kragujevac

### Apstrakt

Sevofluran je nezapaljiva, neeksplozivna i isparljiva inhalaciona tečnost koja se pacijentu iporučuje preko isparivača, i koristi se za inhalacionu anesteziju kao halogenovani inhalacioni anestetik. Sevofluran je otkriven 1971. a od 1990 je u Japanu uveden u kliničku praksu. Od 1995 se koristi u Americi kao i u Evropi. Kod nas se koristi u svakodnevnoj praksi od početka 2000 –tih godina. Zbog svojih povoljnih fizičkih karakteristika Sevofluran je postao jedan od inhalacionih anestetika koji se najčešće upotrebljava u savremenoj kliničkoj praksi.

Osobine Sevoflurana su:

1. bistra bezbojna, nekorozivna, nezapaljiva, neeksplozivna, lako isparljiva tečnost,
2. niskog koeficijenta rastvorljivosti krv/gas,
3. slatunjav mirišljav gas,
4. ne deluje nadražajno,
5. deluje bronhodilatatorno,
6. ima kardioprotektivno dejstvo,
7. koronarni vazodilatator.

Sevofluran podleže 3–5%–doznoj zavisnoj biotransformaciji u jetri, do osnovnog metabolita heksafluoroisopropanol, neorganskog fluoridnog jona i CO<sub>2</sub>. Step en degradacije raste sa dužinom anestezije.

Dejstvo Sevoflurana na organske sisteme je sledeće:

1. Snižava metaboličku potrošnju kiseonika u nervnim ćelijama što izaziva depresiju EEG-a. Povećava protok kroz CNS (dozno zavisno), povećava blago intrakranijalni pritisak u vrednostima preko 1 MAC-a,
2. Dozno zavisno snižava arterijski pritisak i sistemski vaskularni otpor uz minimalni efekat na minutni srčani volumen. Smanjuje kontraktilnost za oko 25% u dozi od 1 MAC-a,
3. Ima izraženo bronhodilatatorno dejstvo. Izaziva respiratornu depresiju ali daleko manje od ostalih anestetika,
4. Izaziva relaksaciju skeletnih mišića i potencira dejstvo mišićnih relaksanata,
5. Ima neznatan uticaj na metabolizam jetre kao i na protok kroz bubrege, te su i oštećenja jetre veoma retka,
6. U dozi većoj od 1 MAC-a povećava rizik od atonije uterusa te povećava rizik od povećanog gubitka krvi kod carskih rezova u opštoj anesteziji.

Kontraindikacije za upotrebu sevoflurana su: poznata preosetljivost na sevofluran, istorija umerene do teške disfunkcije jetre praćene žuticom, temperaturom i eozinofilijom, poznata ili sumnjiva predispozicija za malignu hipertermiju.

Zbog svih navedenih karakteristika, kao i malog procenta neželjenih dejstava, i malog broja kontraindikacija sevofluran je apsolutno bezbedan i u svakodnevnoj upotrebi u celom svetu. Sevofluran je našao mesto u svim vrstama hirurgije kao samostalan anestetik ili kao deo balansirane anestezije. Od 2010 godine se u Srbiji najveći procenat opštih anestezija se izvodi sevofluranom.

### Abstract

Sevoflurane is a non-flammable, non-explosive, and volatile inhalation liquid that is delivered to the patient via an evaporator and is used for inhalation anesthesia as a halogenated inhalation anesthetic. Sevoflurane was discovered in 1971 and introduced into clinical practice in Japan in 1990. It has been used in The United States as in Europe since 1995. It has been used in our daily practice since the beginning of the 2000s. Due to its favorable physical characteristics, Sevoflurane has become one of the inhalation anesthetics that is most often used in modern clinical practice.

The characteristics of sevoflurane are:

1. clear, colorless, non-corrosive, non-flammable, non-explosive, easily volatile liquid
2. low blood/gas solubility coefficient,
3. sweet-smelling gas,
4. does not act as an irritant,
5. acts as a bronchodilator,
6. has a cardioprotective effect,
7. coronary vasodilator

Sevoflurane undergoes a 3-5% dose-dependent biotransformation in the liver, to the basic metabolite hexafluoroisopropanol, inorganic fluoride ion, and CO<sub>2</sub>. The degree of degradation increases with the length of anesthesia.

The effects of Sevoflurane on organic systems are:

1. It lowers the metabolic consumption of oxygen in nerve cells, which causes EEG depression. Increases flow through the CNS (dose-dependent), slightly increases intracranial pressure in values over 1 MAC.
2. Dose-dependently lowers arterial pressure and systemic vascular resistance with minimal effect on stroke volume. Reduces contractility by about 25% at a dose of 1 MAC.
3. It has a pronounced bronchodilator effect. It causes respiratory depression but less than other anesthetics.
4. Causes relaxation of skeletal muscles and potentiates the effect of muscle relaxants.
5. It has a slight effect on liver metabolism as well as the flow through the kidneys. Therefore, liver damage is very rare.
6. At a dose higher than 1 MAC, it increases the risk of uterine atony and increases the risk of increased blood loss during caesarean sections under general anesthesia.

Contraindications to the use of sevoflurane are known hypersensitivity to sevoflurane, history of moderate to severe liver dysfunction accompanied by jaundice, fever, and eosinophilia, known or suspected predisposition to malignant hyperthermia.

Due to all these characteristics, as well as the small percentage of side effects, and the small number of contraindications, sevoflurane is absolutely safe in everyday use worldwide. Sevoflurane has found a place in all types of surgery as a stand-alone anesthetic or as part of balanced anesthesia. Since 2010, the highest percentage of general anesthetics in Serbia has been performed with sevoflurane.