

Desflurane: Pharmacology

Anesthetic Pearls: Anesthetic Implications of Similarities of Desflurane and Isoflurane

In general, the pharmacokinetics and pharmacodynamics of Desflurane can be compared to Isoflurane. Both halogenated inhalational agents have similar properties that may be manipulated in the spectrum of general anesthesia.

CNS Effects:

Cerebral blood flow is similarly unchanged at 1.1 MAC. Autoregulation of Cerebral Blood Flow to changes in BP and PaCO₂ is maintained at 1 MAC. Cerebral metabolic oxygen requirements are decreased in a dose-dependant manner. In hypocapnic patients with intracranial masses, Desflurane concentrations less than 1 MAC (0.8 MAC) do not increase ICP whereas greater than 1 MAC (1.1 MAC) cause an increase in ICP by 7 mmHg.

Circulatory Effects:

Desflurane resembles Isoflurane by causing a decrease in both MAP and SVR. There is also an increase HR and right atrial pressure with little to no effect on CO and PVR. An increase in Desflurane concentration from 0.5 to 1.5 MAC increases the sympathetic nervous system and renin-angiotensin activity.

Respiratory Effects:

Both Desflurane and Isoflurane depress ventilation leading to a dose-related decrease in tidal volume and increase in respiratory rate, arterial carbon dioxide tension, dead space / tidal ventilation ratio, and intrapulmonary shunt fraction. Also, these inhalational agents are mild respiratory irritants.

Hepatic Effects and Metabolism:

Both agents are oxidatively metabolized by liver cytochrome P-450 to form acetylated protein products by mechanisms similar to Halothane metabolism. The metabolism of Desflurane is 0.02% compared to Isoflurane 0.2%. Desflurane is considered very safe regarding immune-mediated hepatotoxicity because it is metabolised less than Halothane, Enflurane, and Isoflurane. However, hepatotoxicity after Desflurane anesthesia has been described in patients previously exposed to Halothane after more than 10 years.

Chemical & Physical Characteristics	<u>Desflurane</u>	<u>Isoflurane</u>
MAC	6.6	1.12
Molecular Wt.	168	184
Boiling Poin (°C)	22.8	48.5
Vapor Pressure	669	240