

论著

## 七氟烷和异氟烷急性暴露对SD仔鼠海马的神经毒性作用

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**摘要** **目的** 探讨七氟烷与异氟烷急性暴露对SD仔鼠海马的毒性作用及其机制。**方法** 出生7 d的雄性SD仔鼠分别急性暴露3.6%七氟烷和2.3%异氟烷6 h。TUNEL和活化胱天蛋白酶3片段的免疫组化技术(IHC)检测神经元凋亡; 透射电镜观察海马神经元形态学的改变; Western Blotting检测胱天蛋白酶3表达。**结果** 与正常对照组相比, 七氟烷和异氟烷组海马神经元凋亡显著增加( $P<0.05$ )。TUNEL显示, 与正常对照组神经元凋亡数量( $2\pm 2$ )相比, 七氟烷和异氟烷组海马神经元凋亡数量显著提高, 分别为 $13\pm 2$ 和 $22\pm 5$ , 且异氟烷组与七氟烷组神经元凋亡数相比较有统计学差异( $P<0.05$ )。透射电镜见七氟烷和异氟烷组大鼠海马神经元内有残缺不全的细胞核、肿胀的线粒体和内质网。Western Blotting结果显示, 胱天蛋白酶3表达显著增加( $P<0.05$ ), 且异氟烷作用强于七氟烷( $P<0.05$ )。**结论** 七氟烷和异氟烷急性暴露可致发育中神经元的凋亡; 在等效浓度下异氟烷能引起更严重的神经元损伤。

**关键词** [七氟烷](#) [异氟烷](#) [海马](#) [细胞凋亡](#) [神经毒性](#)

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## Neurotoxicity effects of sevoflurane and isoflurane acute exposure on hippocampus of neonatal SD rats

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### Abstract

**OBJECTIVE** To investigate toxic effects and mechanisms of acute exposure to the inhaled anesthetics of sevoflurane and isoflurane on hippocampus in neonatal SD rats. **METHODS** SD male rats of 7-day-old were exposed to 3.6% sevoflurane and 2.3% isoflurane respectively for 6 h. TUNEL and activated caspase 3 immunohistochemical staining were used to detect neuron apoptosis. Transmission electron microscope was utilized for morphology observation of hippocampus neurons. Western Blotting was applied to check expression of activated caspase 3. **RESULTS** Compared with normal control group( $2\pm 2$ ), neuron apoptosis were more in sevoflurane and isoflurane groups, neuron apoptosis number increased significantly to  $13\pm 2$  and  $22\pm 5$ , respectively, and there was statistical significance in neuron apoptosis number between sevoflurane and isoflurane group. There were misshapen nucleuses, swelling mitochondria and endoplasmic reticulums in sevoflurane and isoflurane groups under electron microscope. Western Blotting showed that expression of activated cleaved caspase 3 increased significantly ( $P<0.05$ ) and isoflurane was inclined to cause more severe apoptosis neurodegeneration than sevoflurane ( $P<0.05$ ). **CONCLUSION** Acute exposure of sevoflurane and isoflurane could induce apoptosis neurodegeneration. Isoflurane could cause more insults to brain of rats than sevoflurane at the equivalent concentration.

**Key words** [sevoflurane](#) [isoflurane](#) [hippocampus](#) [apoptosis](#) [neurotoxicity](#)

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