Effects of sevoflurane on cognitive deficit, motor function, and histopathology after cerebral ischemia in rats.

Abstract:

BACKGROUND: The volatile anesthetic sevoflurane exhibits neuroprotective properties when assessed for motor function and histopathology after cerebral ischemia in rats. Damage of hippocampal neurons after ischemia relates to a number of cognitive deficits that are not revealed by testing animals for motor function. Therefore, the present study evaluates cognitive and behavioral function as well as hippocampal damage in rats subjected to cerebral ischemia under sevoflurane compared with fentanyl/nitrous oxide (N(2)O)/O(2) anesthesia. METHODS: Thirty-four rats were trained for 10 days using a hole-board test to detect changes in cognitive and behavioral function. Rats were randomly assigned to the following groups: (A) sham/fentanyl/N(2)O/O(2) (n=7); (B) ischemia/fentanyl/N(2)O/O(2) (n=10); (C) sham/2.0 vol% sevoflurane in O(2)/air (n=7); and (D) ischemia/2.0 vol% sevoflurane in O(2)/air (n=10). Cerebral ischemia was produced by unilateral common carotid artery occlusion combined with hemorrhagic hypotension (mean arterial blood pressure 40 mmHg for 45 min). Temperature, arterial blood gases, and pH were maintained constant. Cerebral blood flow was measured using laser-Doppler flowmetry. After surgery, cognitive and behavioral function was re-evaluated for 10 days. On day 11, the brains were removed.
for histopathologic evaluation (hematoxylin/eosin-staining). RESULTS: Cognitive testing revealed deficits in declarative and working memory in ischemic rats anesthetized with fentanyl/N(2)O. Rats anesthetized with sevoflurane during ischemia showed a significantly better outcome. Hippocampal damage was significantly worse with fentanyl/N(2)O. CONCLUSION: The present data add to previous investigations showing that sevoflurane prevents a deficit in cognitive function and histopathological damage induced by cerebral ischemia in rats.

Zeitschriftentitel / Abkürzung: Acta Anaesthesiol Scand
Jahr: 2009
Band: 53
Heft / Issue: 6
Seiten: 774-82
Sprache: eng
Print-ISSN: 0001-5172
TUM Einrichtung: Anästhesiologie
Occurences: Einrichtungen > Fakultäten > Fakultät für Medizin > Kliniken und Institute > Klinik für Anästhesiologie > Klinik für Anästhesiologie (DHM) > 2009
entries: