

学位論文要約
Extended Summary in Lieu of the Full Text of a Doctoral Thesis

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学位論文題目 : Propofol but not desflurane maintains rat cerebral arteriolar responses to
Thesis Title acetylcholine during acute hyperglycemia.

学位論文要約 :
Summary of Thesis

Background: Acute hyperglycemia in the perioperative period is one of the common comorbidities that increases mortality and morbidities. In stroke patients, acute hyperglycemia is associated with mortality and poor neurological functional recovery. Acute hyperglycemia causes vascular endothelial dysfunction in various organs, including the cerebral vessels. However, the influence of anesthetics on the cerebral blood vessels under hyperglycemic conditions remains unclear. We investigated the endothelial function of rat cerebral arterioles during acute hyperglycemia, under propofol or desflurane anesthesia.

Methods: A closed cranial window preparation was used to measure the changes in the pial arteriolar diameters, induced by topical application of acetylcholine (ACh). First, each rat was anesthetized with propofol or desflurane. Subsequently, the responses of pial arterioles to ACh during normoglycemia and hyperglycemia were observed. Next, under pentobarbital anesthesia, each rat was administered either propofol or its solvent, intralipid, to observe the responses of the pial arterioles to ACh during normoglycemia and hyperglycemia.

Results: In the propofol group, under hyperglycemic conditions, vasodilatory effects induced by ACh were maintained. In the desflurane group, under hyperglycemic conditions, vasodilator responses to ACh were significantly impaired than those under normoglycemic conditions. Under pentobarbital anesthesia, in both the propofol and intralipid groups, vasodilatory effects induced by ACh were maintained during both normoglycemia and hyperglycemia.

Conclusions: Propofol but not desflurane maintained vasodilator responses in rat cerebral arterioles to ACh, an endothelium-dependent vasodilator, during both normoglycemia and hyperglycemia. Thus, in patients with acute hyperglycemia, propofol may yield a better neurological prognosis than desflurane.