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异丙酚重复镇静对大鼠空间学习记忆能力及其海马齿状回新生神经元的影响(PDF)

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Title: Repeated propofol sedation impairs spatial learning and memory in rats and newborn neurons in rat hippocampus dentate gyrus

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关键词: 异丙酚; 空间学习记忆; 大鼠海马; 神经毒性; 成年神经再生

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摘要: 目的 观察异丙酚重复镇静对大鼠海马齿状回新生神经元形态及对大鼠空间学习记忆能力的影响。 方法 48只成年SD大鼠分为异丙酚组和溶媒对照组，异丙酚组给予异丙酚重复镇静（100 mg/kg，2次/d，共7 d），溶媒对照组给予同等体积的溶媒（脂肪乳剂）。Morris水迷宫检测首次给予异丙酚28 d后大鼠空间学习记忆能力。首次给药后以BrdU进行标记，分别计数首次给药后1、14 d和28 d大鼠海马齿状回颗粒下区BrdU阳性细胞数。激光共聚焦显微镜观察首次给药后14 d SD大鼠海马齿状回新生神经元树突分枝数量和长度的变化。 结果 在使用异丙酚镇静28 d后，与溶媒对照组相比，成年大鼠发现隐藏物体的时间显著延长[异丙酚组（14.55±1.25）s，溶媒对照组（9.36±2.54）s，$P<0.05$]。与溶媒对照组相比，大鼠海马齿状回颗粒下区BrdU阳性细胞数在首次给药后1 d无明显变化，但在首次给药后14 d[异丙酚组(2 560.58±42.76)个，溶媒对照组(2 941.42±46.66）个，$P<0.05$]和28 d[异丙酚组(1 297.75±31.99)个，溶媒对照组(2 273.75±40.29）个，$P<0.05$]均显著减少。首次给药后14 d，异丙酚镇静组成年SD大鼠海马齿状回新生神经元树突的长度[（异丙酚组(267.25±14.20)μm，溶媒对照组(394.33±32.59)μm，$P<0.05$]和分枝数[异丙酚组(2.92±0.29)个，溶媒对照组

(5.67±0.49)个，*P*<0.05]明显低于对照组。　结论　异丙酚重复镇静可损害成年大鼠的空间学习记忆能力和新生神经元的树突复杂度。

Abstract: Objective To determine the effect of repeated propofol sedation on the morphology of newborn neurons in rat hippocampus dentate gyrus and on the spatial learning and memory abilities in rats. Methods A total of 48 SD rats were randomly divided into 2 groups, propofol group and control group. The rats were given intraperitoneal injection of 1% propofol (100 mg/kg) or intralipid at same dose twice per day for 7 consecutive days, respectively. Spatial learning and memory was assessed by Morris water maze test in 28 d after the first treatment. 5-Bromo-2′-deoxyuridine (BrdU) was injected after first treatment, and the numbers of BrdU positive cells in the subgranular zone (SGZ) of dentate gyrus were counted in 1, 14 and 28 d after first treatment. Dendritic length and branch of the newborn neurons in the dentate gyrus were assessed in 14 d after first treatment by confocal microscopy. Results Repeated propofol sedation exerted significant delay in rats to find hidden objects in 28 d after first treatment (14.55±1.25 *vs* 9.36±2.54 s, *P*<0.05). The number of BrdU positive cells in SGZ of propofol group had no change in 1 d after the first treatment, and then significantly decreased in 14 d(2 560.58±42.76 *vs* 2 941.42±46.66, *P*<0.05) and 28 d (1 297.75±31.99 *vs* 2 273.75±40.29, *P*<0.05) when compared with the control group. Total dendritic length and branch number of newborn neurons in dentate gyrus were obviously decreased in 14 d after first treatment in rats of propofol group than control group (267.25±14.20 *vs* 394.33±32.59 μm, *P*<0.05; 2.92±0.29 *vs* 5.67±0.49, *P*<0.05). Conclusion Repeated propofol sedation is detrimental to learning and memory abilities and to dendritic complexity of newborn neurons in adult rats.

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