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右美托咪定对腰椎全麻手术患者术后疼痛及认知功能的影响

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摘要 目的:探讨右美托咪定对腰椎全麻手术患者术后疼痛及认知功能的影响。**方法:**选择 2014 年 3 月~2015 年 12 月在我院行腰椎全麻手术的 84 例患者为研究对象,按照随机数字表法分为对照组(42 例)和试验组(42 例),患者均常规给予芬太尼及顺式阿曲库铵麻醉诱导,试验组患者在麻醉诱导过程中给予右美托咪定静脉注射,对照组患者仅给予氯化钠注射液静脉注射。分别于术前(T0)、手术开始 2 h(T2)、术后 24 h(T24)检测血清肾上腺糖皮质激素,采用疼痛视觉模拟评分法(VAS)进行疼痛评定;采用简易智能精神状态量表(MMSE)于术后 1d 和 2d 进行认知状态评定,并计算术后认知功能障碍(POCD)发生率;同时观察患者不良反应发生情况。**结果:**试验组患者 T2 和 T24 时肾上腺糖皮质激素水平明显低于 T0, T2 时试验组患者肾上腺糖皮质激素水平明显低于对照组,差异有统计学意义($P<0.05$)。试验组患者 T2 时 VAS 评分明显低于对照组,差异有统计学意义($P<0.05$)。术后 1d 和 2d 时试验组患者的 MMSE 评分高于对照组, POCD 发生率明显低于对照组;两组患者术后 2d 时 MMSE 评分高于术后 1d, POCD 发生率明显低于术后 1d, 差异均有统计学意义($P<0.05$)。两组患者均未见除 POCD 以外的不良反应。**结论:**右美托咪定有较强的抗氧化能力,可有效减轻腰椎全麻手术患者的疼痛程度,提高患者的认知功能。

关键词:右美托咪定;腰椎全麻;疼痛;认知功能;肾上腺糖皮质激素

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Effect of Dexmedetomidine on Postoperative Pain and Postoperative Cognitive Function in Patients with Lumbar Spinal Anesthesia Surgery

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ABSTRACT Objective: To study the effect of dexmedetomidine on postoperative pain and cognitive function in patients with lumbar spinal anesthesia surgery. **Methods:** 84 patients with lumbar spine surgery who were treated in our hospital from March 2014 to December 2015 were selected as the research object, they were divided into the control group (42 cases) and the experimental group (42 cases) according to random number table methods. All patients were routinely given fentanyl and cisatracurium for anesthesia induction, the patients in the experimental group were given dexmedetomidine by intravenous injection in all process, and the patients in the control group patients were only given sodium chloride injection by intravenous injection. The serum of adrenal cortex hormone were detected in surgery (T0), 2 h after surgery (T2) and 24 h after surgery (T24), and the pain assessed by using visual analog pain score (VAS). The cognitive state were assessed by using simple intelligent mental state scale (MMSE) in postoperative 1 d and 2 d, and the incidence of postoperative cognitive dysfunction (POCD) were calculated. The adverse reactions were observed. **Results:** The serum of adrenal cortex hormone of the experimental group in T2 and T24 were significantly lower than that in T0, the experimental group in T2 was significantly lower than the control group, the differences were statistically significant; The score of VAS of experimental group in T2 was significantly lower than that in the control group, the difference was statistically significant ($P<0.05$). The MMSE score of experimental group on 1 d and 2 d higher than that in the control group, and the incidence of POCD in experimental group were significantly lower than the control group. The MMSE score of two groups in postoperative 2 d were higher than that in postoperative 1 d, the incidence of POCD in postoperative 2 d was significantly lower than that in postoperative 1 d, the differences were statistically significant ($P<0.05$). There were no adverse reactions except POCD. **Conclusion:** The dexmedetomidine have strong antioxidant capacity on treatment patients with lumbar spinal anesthesia surgery, which can effectively ease the pain, improve the cognitive function of patients.

Key words: Dexmedetomidine; Lumbar spinal anesthesia; Pain; Cognitive function; Adrenal cortex hormone

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前言

腰椎骨折和腰椎间盘突出是老年患者临床常见疾病,主要采取手术治疗,由于手术创伤大、刺激强度高,腰椎全麻术后麻醉恢复期长,导致患者死亡率高^[1]。手术创伤使机体的皮质醇类激素、促肾上腺皮质激素、生长激素等分泌异常,肿瘤坏死因子(tumor necrosis factor, TNF)和白介素(interleukin, IL)等炎症因子升高,阿片类镇痛药物剂量增大,严重影响患者术后认知功能^[2,3]。有研究报道右美托咪定是一种新型的 α_2 肾上腺素能激动药,为美托咪定的活性右旋异构体,具有镇痛、镇静、抗焦虑等功能,可明显减少应激和炎症反应,且对中枢胆碱能影响较小,具有保护脑组织,改善全麻术后患者认知功能的作用^[4,5],但右美托咪定运用于腰椎全麻手术的报道则较少,因此,本研究探讨右美托咪定对腰椎全麻手术患者术后疼痛及认知功能的影响,为临床应用提供参考,现报道如下。

1 资料与方法

1.1 临床资料

选择 2014 年 3 月~2015 年 12 月在我院行腰椎全麻手术患者 84 例为研究对象,其中腰椎骨折患者 45 例,腰椎间盘突出患者 39 例,美国麻醉师协会(ASA)分级为 I 级~III 级^[6]。依据随机数字表法分为对照组(42 例)和试验组(42 例)。其中对照组男 26 例,女 16 例,年龄 61~79 岁,平均(67.34 ± 3.34)岁,ASA 分级 I 级 12 例,II 级 25 例,III 级 5 例,体质量指数(Body Mass Index, BMI)为(24.47 ± 3.23)kg/m²。试验组男 24 例,女 18 例,年龄 62~79 岁,平均(67.53 ± 3.53)岁,ASA 分级 I 级 11 例,II 级 26 例,III 级 5 例 BMI 为(24.12 ± 3.34)kg/m²。在性别、年龄、ASA 分级及 BMI 等资料比较,两组患者差异无统计学意义($P>0.05$),具有可比较性。

1.2 纳入和排除标准

纳入标准:年龄 60~80 岁,无脑中风史、脑外伤及中枢系统疾病。排除标准:存在认知功能障碍或精神病史者,近期服用抗精神病药物者,视力、听力及语言功能障碍者,合并高血压、糖尿病及严重内科疾病或凝血功能障碍者,心肝肾功能不全,血液病、全身及免疫性疾病者,酒精成瘾者,药物过敏者。本研究方案经医院伦理委员会审批通过并由患者或家属签署知情同意书。

1.3 麻醉方法

术前两组患者禁食、禁饮,排空肠道及膀胱,给予注射用顺苯磺酸阿曲库铵(规格:5 mg,浙江仙琚制药股份有限公司,生产批号:20140211)0.2 mg/kg 和枸橼酸芬太尼注射液(规格:2 mL:1 mg,江苏恩华药业股份有限公司,生产批号:20131216)5 μ g/kg 进行诱导麻醉,术中根据麻醉情况可给予盐酸瑞芬太尼(规格 2 mg,国药集团工业有限公司,生产批号:20131124)0.1 mg/kg 静脉泵注,以维持麻醉效果。试验组患者麻醉诱导时给予盐酸右美托咪定注射液(规格:2 mL:0.2 mg,四川国瑞药业有限责任公司,生产批号:20140115)1.0 μ g/kg 静脉注射,输注持续 15 min,麻醉诱导以 1.0 μ g/(kg·h)麻醉诱导过程中静脉滴注盐酸右美托咪定。对照组患者静脉滴注氯化钠注射液(规格:100 mL:0.9 g,上海华源长富药业集团辽宁制药有限公司,生产批号:20150605)。患者行气管插管后,行腰椎全麻手术。

1.4 观察指标

分别于术前(T₀)、手术开始 2 h(T₂)、术后 24 h(T₂₄)抽取患者静脉血液,检测血清肾上腺糖皮质激素水平。采用疼痛视觉模拟评分法^[7](Visual analogue scale, VAS)评定 T₀、T₂、T₂₄疼痛情况,分析镇痛效果,无痛为 0 分,难以忍受的最剧烈疼痛为 10 分。简易智能精神状态量表^[8](Mini-mental state examination, MMSE)评定术后 1d 和 2d 的认知状态,并计算术后认知功能障碍(Postoperative cognitive dysfunction, POCD)发生率。MMSE 量表包括 5 个维度 11 个条目,最高分 30 分,分值越高认知功能越高;MMSE 得分<10 分为 POCD^[9]。POCD 发生率=POCD 患者例数/患者总例数×100%。

1.5 数据分析

数据分析采用 SPSS19.0,以 n(%)表示计数资料,应用 χ^2 检验;以($\bar{X} \pm S$)表示计量资料,组间比较采用 t 检验,以 $P<0.05$ 为表示有统计学意义。

2 结果

2.1 两组患者肾上腺糖皮质激素比较

T₀ 和 T₂₄ 时时两组患者的血清肾上腺糖皮质激素水平比较,差异无统计学意义($P>0.05$)。试验组患者 T₂ 和 T₂₄ 时肾上腺糖皮质激素水平明显低于 T₀, T₂ 时试验组患者明显低于对照组,差异有统计学意义($P<0.05$),见表 1。

表 1 两组患者肾上腺糖皮质激素浓度比较(nmol/L)

Table 1 Comparison of the concentration of adrenal cortex hormone in the two groups(nmol/L)

Groups	n	T ₀	T ₂	T ₂₄
Control Group	42	164.37± 34.28	123.42± 31.51*	65.29± 21.47**&
Experimental Group	42	163.46± 33.86	103.51± 30.58*	64.69± 20.59**&
t	-	0.122	2.939	0.131
P	-	0.451	0.002	0.448

Note: Compared with T₀, * $P<0.05$; Compared with T₂, & $P<0.05$.

2.2 两组患者 VAS 评分比较

T₀ 和 T₂₄ 时时两组患者的 VAS 评分比较,差异无统计学意义($P>0.05$)。T₂ 和 T₂₄ 时两组患者的 VAS 评分明显低于

T₀, T₂ 时试验组患者 VAS 评分明显低于对照组,差异有统计学意义($P<0.05$)。见表 2。

表 2 两组患者 VAS 评分比较(分)

Table 2 Comparison of the score of VAS in the two groups(score)

Groups	n	T ₀	T ₂	T ₂₄
Control Group	42	4.53± 0.76	1.63± 0.71*	0.31± 0.15**
Experimental Group	42	4.61± 0.79	1.03± 0.67*	0.28± 0.16**
t		0.473	3.983	0.886
P		0.319	0.000	0.189

Note: Compared with T₀, *P<0.05; Compared with T₂, **P<0.05.

2.3 两组患者 MMSE 评分和 POCD 发生率比较

1 d 和 2 d 时试验组患者的 MMSE 评分高于对照组,而 POCD 发生率低于对照组;且两组患者 2 d 时 MMSE 评分高于

1 d, POCD 发生率低于 1 d, 差异均有统计学意义(P<0.05)。见表 3。

表 3 两组患者 MMSE 评分和 POCD 发生率比较

Table 3 Comparison of MMSE score and rate of POCD in the two groups

Groups	n	1 d		2 d	
		MMSE score	Rate of POCD	MMSE score	Rate of POCD
Control Group	42	10.29± 5.67	14(33.33%)	12.83± 6.21	6(14.29%)*
Experimental Group	42	12.46± 6.12	6(14.29%)	15.43± 7.11	1(2.38%)※
T/ X ²		1.686	4.200	1.785	3.896
P		0.048	0.040	0.039	0.048

Note: Compared with 1 d, *P<0.05.

2.4 两组患者不良反应比较

试验组和对照组患者均未发生 POCD 意外的腰椎全麻不良反应,差异无统计学意义(P>0.05)。

3 讨论

腰椎全麻手术治疗老年患者,由于机体组织器官功能的衰减,术中造成的氧化应激介导的神经内分泌激素的释放和炎症反应,可导致患者术后认知功能的降低^[10,11]。因老年患者机体反应下降和生理功能减退,对麻醉和手术的耐受下降,往往容易发生各种并发症^[12]。中枢神经系统极易发生变化,记忆受损、焦虑、社交机能、认知能力下降,常出现 POCD 等神经功能并发症^[13]。随着老龄化加剧,POCD 给家庭和社会带来严重影响。如何加速患者术后恢复、减少麻醉副作用、降低不良反应发生率成为麻醉研究热点^[14]。右美托咪定特异性作用于 α₂ 受体,可降低儿茶酚胺水平,减少神经细胞膜损害和神经突触间兴奋的传递,在国外得到广泛应用^[15,16]。本研究探讨右美托咪定对腰椎全麻手术患者术后疼痛及认知功能的影响,为临床应用提供参考,具有重要的意义。

本研究发现,T₂ 和 T₂₄ 时肾上腺糖皮质激素水平较术前降低,T₂ 时试验组患者低于对照组,差异有统计学意义。说明右美托咪定可减轻腰椎全麻手术患者的应激反应。肾上腺糖皮质激素的水平与患者神经状态紧密相关,手术可通过刺激下丘脑-垂体-肾上腺轴,使合成和释放的糖皮质激素增加,不利于患者术后认知功能的恢复,损伤大脑海马结构,使记忆功能有所降低^[17]。本研究中试验组患者 T₂ 时 VAS 评分明显低于对照组,差异有统计学意义。说明右美托咪定有辅助麻醉药短效镇

痛的功效。这与右美托咪定的抗炎药理作用有关,通过降低患者炎症反应间接改善患者的认知功能^[18]。同时本研究发现,1d 和 2d 时试验组患者的 MMSE 评分高于对照组,而 POCD 发生率低于对照组;且两组患者 2d 时 MMSE 评分高于 1d,POCD 发生率低于 1d,差异均有统计学意义。说明右美托咪定可改善椎全麻患者的精神状态,提高术后患者的认知功能。右美托咪定能通过调控儿茶酚胺的释放抑制氧化应激,且其抗氧化效应随药物浓度增加而增强,可阻断交感神经兴奋性神经递质,减轻海马细胞的损伤,抑制肾上腺糖皮质激素合成,降低 POCD 的发生率及不良反应有关^[19,20]。同时右美托咪定对腰椎全麻手术患者未见 POCD 外的不良反应,安全性较好。

综上所述,右美托咪定对腰椎全麻手术患者可降低血清肾上腺糖皮质激素水平,减轻手术应激,降低患者的疼痛评分,有辅助麻醉药短效镇痛的功效,可改善椎全麻手术患者的精神状态,提高患者认知功能,且安全性较好,值得临床推广应用。

参考文献(References)

- [1] Hanna TN, Zygmunt ME, Harmouche E, et al. Association of lumbar fractures, abdominal aortic calcification, and osteopenia [J]. Clin Imaging, 2015, 39(4): 662-666
- [2] Yousef GT, Lasheen AE. General anesthesia versus segmental thoracic or conventional lumbar spinal anesthesia for patients undergoing laparoscopic cholecystectomy[J]. Anesth Essays Res, 2012, 6(2): 167-173
- [3] McCunniff PT, Young ES, Ahmadinia K, et al. Smoking is Associated with Increased Blood Loss and Transfusion Use After Lumbar Spinal Surgery[J]. Clin Orthop Relat Res, 2016, 474(4): 1019-1025

- [4] Lu X, Li J, Li T, et al. Clinical study of midazolam sequential with dexmedetomidine for agitated patients undergoing weaning to implement light sedation in intensive care unit [J]. Chin J Traumatol, 2016, 19(2): 94-96
- [5] 朱娟,朱明慧,何帆,等.右美托咪定对腰椎手术中体感诱发电位及运动诱发电位的影响[J].辽宁医学院学报, 2014, 35(6): 12-14
Zhu Juan, Zhu Ming-hui, He Fan, et al. The Effects of Dexmedetomidine on Intraoperative SSEP and MEP in Spinal Surgery [J]. Journal of Liaoning Medical University, 2014, 35(6): 12-14
- [6] Nagge J, Bauer J. Different perspective on ASA use [J]. Can Fam Physician, 2016, 62(1): 30-31
- [7] Giannini SP, Latorre MD, Ferreira LP. Condition of Vocal Production-Teacher questionnaire: comparison of responses on Likert scale and visual analog scale[J]. Cotas, 2016, 28(1): 53-58
- [8] Lawton M, Kasten M, May MT, et al. Validation of conversion between mini-mental state examination and montreal cognitive assessment[J]. Mov Disord, 2016, 31(4): 593-596
- [9] Li Y, He R, Chen S, et al. Effect of dexmedetomidine on early postoperative cognitive dysfunction and peri-operative inflammation in elderly patients undergoing laparoscopic cholecystectomy [J]. Exp Ther Med, 2015, 10(5): 1635-1642
- [10] Azimi P, Benzel EC, Shahzadi S, et al. The prediction of successful surgery outcome in lumbar disc herniation based on artificial neural networks[J]. J Neurosurg Sci, 2016, 60(2): 173-177
- [11] Dagistan Y, Okmen K, Dagistan E, et al. Lumbar Microdiscectomy Under Spinal and General Anesthesia: A Comparative Study[J]. Turk Neurosurg, 2015, 25(5): 685-689
- [12] Benitez PR, Nogueira CS, Holanda AC, et al. Lumbar spinal anesthesia with cervical nociceptive blockade. Critical review of a series of 1,330 procedures[J]. Rev Bras Anesthesiol, 2016, 66(1): 86-93
- [13] Zywił MG, Prabhu A, Perruccio AV, et al. The influence of anesthesia and pain management on cognitive dysfunction after joint arthroplasty: a systematic review[J]. Clin Orthop Relat Res, 2014, 472(5): 1453-1466
- [14] Kim HJ, Park JH, Kim JW, et al. Prediction of postoperative pain intensity after lumbar spinal surgery using pain sensitivity and preoperative back pain severity[J]. Pain Med, 2014, 15(12): 2037-2045
- [15] Kuang Y, Xiang YX, Guo CX, et al. Population pharmacokinetics study of dexmedetomidine in Chinese adult patients during spinal anesthesia[J]. Int J Clin Pharmacol Ther, 2016, 54(3): 200-207
- [16] Patro SS, Deshmukh H, Ramani YR, et al. Evaluation of Dexmedetomidine as an Adjuvant to Intrathecal Bupivacaine in Infraumbilical Surgeries[J]. J Clin Diagn Res, 2016, 10(3): UC13-16
- [17] Hoffman J, Hamner C. Effectiveness of dexmedetomidine use in general anesthesia to prevent postoperative shivering: a systematic review [J]. JBI Database System Rev Implement Rep, 2016, 13(12): 287-313
- [18] Ko KH, Jun IJ, Lee S, et al. Effective dose of dexmedetomidine to induce adequate sedation in elderly patients under spinal anesthesia [J]. Korean J Anesthesiol, 2015, 68(6): 575-580
- [19] Tan WF, Miao EY, Jin F, et al. Changes in First Postoperative Night Bispectral Index After Daytime Sedation Induced by Dexmedetomidine or Midazolam Under Regional Anesthesia: A Randomized Controlled Trial[J]. Reg Anesth Pain Med, 2016, 41(3): 380-386
- [20] Vora KS, Baranda U, Shah VR, et al. The effects of dexmedetomidine on attenuation of hemodynamic changes and there effects as adjuvant in anesthesia during laparoscopic surgeries[J]. Saudi J Anaesth, 2015, 9(4): 386-392

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- [15] Xing D, Ma XL, Ma JX, et al. A meta-analysis of cervical arthroplasty compared to anterior cervical discectomy and fusion for single-level cervical disc disease [J]. J Clin Neurosci, 2013, 20(7): 970-978
- [16] Shao H, Chen J, Ru B, et al. Zero-profile implant versus conventional cage-plate implant in anterior cervical discectomy and fusion for the treatment of degenerative cervical spondylosis: a meta-analysis [J]. J Orthop Surg Res, 2015, 17(10): 148
- [17] Radcliff K, Coric D, Albert T. Five-year clinical results of cervical total disc replacement compared with anterior discectomy and fusion for treatment of 2-level symptomatic degenerative disc disease: a prospective, randomized, controlled, multicenter investigational device exemption clinical trial[J]. J Neurosurg Spine, 2016, (25): 1-12
- [18] Kang J, Shi C, Gu Y, et al. Factors that may affect outcome in cervical artificial disc replacement: a systematic review [J]. Eur Spine J, 2015, 24(9): 2023-2032
- [19] Zigler JE, Delamarter R, Murrey D, et al. ProDisc-C and anterior cervical discectomy and fusion as surgical treatment for single-level cervical symptomatic degenerative disc disease: five-year results of a Food and Drug Administration study[J]. Spine (Phila Pa 1976), 2013, 38(3): 203-209
- [20] Nandyala SV, Marquez-Lara A, Fineberg SJ, et al. Comparison of revision surgeries for one- to two-level cervical TDR and ACDF from 2002 to 2011[J]. Spine J, 2014, 24(12): 2841-2846
- [21] Zang L, Ma M, Hu J, et al. Comparison of Hybrid Surgery Incorporating Anterior Cervical Discectomy and Fusion and Artificial Arthroplasty versus Multilevel Fusion for Multilevel Cervical Spondylosis: A Meta-Analysis [J]. Med Sci Monit, 2015, 27(21): 4057-4067