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·临床研究·

全凭静脉麻醉对腔镜下甲状腺手术的苏醒躁动及术后镇痛效果的影响

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摘要 目的:探讨全凭静脉麻醉(TIVA)对腔镜下甲状腺手术的苏醒躁动及术后镇痛效果的影响。**方法:**将 74 例接受腔镜下甲状腺手术的患者随机分为 TIVA 组与静吸复合麻醉(VICA)组,每组各 37 例。比较两组诱导麻醉前(T0)、切皮后 1 min(T1)、手术开始后 30 min(T3)、手术结束时(T3)及术后 30 min(T4)血糖(GLU)、血清皮质醇(COR)、白介素(IL-6)水平的变化、麻醉药物用量、术后自主呼吸恢复时间、苏醒时间、拔管时间、苏醒期躁动及术后镇痛效果。**结果:**T1 时刻,两组 GLU、COR、IL-6 水平均呈现出不同程度升高,而 TIVA 组 T1~T4 时刻各指标均较 VICA 组明显降低(P<0.05)。与 VICA 组比较,TIVA 组丙泊酚的术中使用量显著减少,术后自主呼吸恢复时间、苏醒时间及拔管时间均显著缩短(P<0.05),苏醒期躁动的发生率及躁动程度均较 VICA 组明显降低(P<0.05),术后 12、24 h 切口疼痛的 VAS 评分均明显高于 VICA 组(P<0.05)。**结论:**TIVA 应用于腔镜下甲状腺手术可减少机体的应激反应和全麻药剂量,改善苏醒期质量,但应根据患者的疼痛感受采取必要的镇痛措施。

关键词:全凭静脉麻醉;静脉吸入复合麻醉;腔镜甲状腺手术;苏醒躁动

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Influence of Total Intravenous Anesthesia on the Analgesia and Agitation for Thyroidectomy Micro Laparoscope

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ABSTRACT Objective: To explore the postoperative analgesia effect of total intravenous anesthesia (TIVA) under laparoscopic surgery combined with ropivacaine and its influence on the recovery for general anesthesia. **Methods:** 74 cases of patients for thyroidectomy micro laparoscope were randomly divided into two groups: TIVA group (n=37), venous inhalation combined anesthesia (VICA) group (n=37). The levels of blood glucose(GLU), serum cortisol (COR), interleukin-6 (IL-6), stress response, dosage of anesthetic drugs, postoperative respiratory recovery time, waking time, extubation time, agitation after waking up, and postoperative analgesia effect were compared before anesthesia induction (T0), at 1 min after skin incision (T1), at 30 min after the onset of operation (T3), at the end of surgery (T3) and at 30 min after surgery (T4) between two groups. **Results:** At T1 time point, the related parameters of stress reaction including levels of GLU, COR, IL-6 in both groups were increased, and each index of TIVA group at T1~T4 time point were significantly lower than those in the VICA group (P<0.05). Compared with VICA group, the intraoperative dosage of propofol was significantly decreased in TIVA group, the postoperative respiratory recovery time, recovery time and extubation time were significantly shortened (P<0.05). The incidence of agitation during waking up and degree of agitation were significantly decreased in TIVA group than those in VICA group (P<0.05). The VAS score of incision pain at 12 h, 24 h after operation in TIVA group were significantly higher than those in VICA group (P<0.05). **Conclusions:** TIVA for thyroidectomy micro laparoscope on analgesia and agitation can reduce the stress response and dosage of general anesthetics, improve the quality of awakening, but analgesia measures is needed according to patients' pain.

Key words: Total intravenous anesthesia; Venous inhalation combined anesthesia; Thyroidectomy micro laparoscope; Agitation

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前言

腔镜下甲状腺手术是治疗甲状腺良性肿瘤的重要术式,该术式以创伤小、颈部美观等优势而备受青睐,但因二氧化碳刺激、术中机械操作及切口疼痛等原因易引起机体的血流动力学波动[1-4]。随着手术量的不断增加,腔镜下甲状腺手术对麻醉提出了更高的要求,如何提高全身麻醉质量一直是困扰麻醉医师的棘手问题[5,6]。目前,临床上广泛应用的全身麻醉包括全凭静脉麻醉(TIVA)和静吸复合麻醉(VICA),其中 TIVA 在短效及超

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短效全麻药物的影响下取得了长足进步,不再是一种辅助麻醉[7-9],但关于这两种麻醉方法对于腔镜下甲状腺手术患者麻醉质量与维持循环稳定性方面的研究报道仍较少。本研究对腔镜下甲状腺手术患者分别采用 TIVA 和 VICA 的镇痛,旨在探讨二者对镇痛效果及苏醒躁动的影响,现报道如下。

1 资料与方法

1.1 一般资料

选择 2016 年 1 月 ~2017 年 6 月在上海市同仁医院接受腔镜下甲状腺腺瘤切除术的患者,共 74 例。入组标准:(1)美国麻醉师协会(ASA)分级 I~III 级;(2)年龄≤ 65 岁;(3)近 3 个月未使用镇静或镇痛药物;(4)排除认知功能障碍,明显呼吸、循环、神经系统疾病等。其中男 39 例,女 35 例;年龄 33~65 岁,平均(49.2± 4.4)岁;体质量指数(BMI)21.6~25.1 kg/m^2,平均(23.7± 1.6)kg/m^2。将所有患者按照随机数字法分为 TIVA 组和 VICA 组,各 37 例。两组患者年龄、性别构成比、ASA 分级、BMI 等比较差异无统计学意义(P>0.05)。本研究已通过医院伦理学委员会审查,获得患者或监护人均知情同意。

1.2 麻醉方法

术前禁食 8 h 以上,入室后开放右侧上肢静脉通道,连接飞利浦 MP40 型心电监护仪,常规监测心电图(ECG)、收缩压(SBP)、舒张压(DBP)、心率(HR)及血氧饱和度(SpO_2)等血流动力学参数。TIVA 组:诱导麻醉采用静脉注射维库溴铵 0.5 mg/kg、咪达唑仑 0.05 mg/kg、舒芬太尼 0.4 μg/kg、丙泊酚 1. 5~2.0 mg/kg。当意识丧失后行气管插管,连接麻醉机进行机械通气。参数设置:潮气量 (VT)8~10 mL/kg,呼吸频率 (RR)10~12 次/min,$PetCO_2$ 35~45 mmHg。麻醉维持采用丙泊酚 3~4 mg·kg^{-1}·h^{-1},瑞芬太尼 0.15 μg·kg^{-1}·min^{-1} 持续静脉泵注,并根据患者实际情况给予维库溴铵维持肌松。VICA 组:麻醉诱导同 TIVA 组,维持麻醉采用丙泊酚 4~6 mg·kg^{-1}·h^{-1} 持续静脉泵注,3%~4%七氟烷复合吸入,并根据患者实际情况给予维库溴铵维持肌松。

1.3 观察指标

(1)采集诱导麻醉前(T0)、切皮后 1 min(T1)、手术开始后 30 min(T3)、手术结束时(T3)及术后 30 min(T4)的五个时刻的外周静脉血各 2 mL,分别采用氧化酶法、放射免疫法、全自动生化分析仪测定血糖(GLU)、皮质醇(COR)、白介素 -6(IL-6)水平。(2)根据躁动程度对苏醒期躁动进行评分(0 分为无躁动,1 分轻度躁动为刺激时稍有躁动,2 分中度躁动为无刺激时偶有挣扎现象,但不需制动,3 分重度躁动为剧烈挣扎且需制动)。(3)记录两组患者术中丙泊酚用量、术后自主呼吸恢复时间(从停用麻醉药物至恢复自主呼吸的时间)、苏醒时间(从停用麻醉药物至可唤醒完成简单指令的时间)及拔管时间(从用麻醉药物至拔出气管导管的时间)等术后恢复指标。拔管指征:呼之可睁眼,咳嗽吞咽反射恢复,能基本听从指令,吞咽反射恢复,RR≥ 12 min,VT≥ 6 mL/kg,撤除呼吸机后 3 min 后 SpO_2>95%。(4)术后 1 h、12 h、24 h、48 h 的切口疼痛程度采用视觉模拟评分法(VAS)进行评估,0 分为无痛,10 分为难忍的剧烈疼痛。

1.4 统计学分析

采用 SPSS20.0 版统计软件包进行分析处理,分类资料比较采用 χ^2 检验,等级资料比较采用秩和检验,计量资料比较采用成组 t 检验或方差分析,P<0.05 视为差异有统计学意义。

2 结果

2.1 两组不同时点血糖、血清 COR、IL-6 水平的变化比较

T0 时刻,TIVA 组和 VICA 组 GLU、血清 COR、IL-6 水平比较差异均无统计学意义(P>0.05);T1 时刻,两组各指标均呈现出不同程度升高,而 TIVA 组 T1~T4 时刻各指标均较 VICA 组明显降低,差异有统计学意义(P<0.05)。见表 1。

表 1 两组术中及术后不同时点血糖、血清 COR、IL-6 水平的变化比较($\bar{x}\pm s$)

Table 1 Comparison of the blood glucose, serum COR and IL-6 levels at different time points intraoperation and postoperation between two groups($\bar{x}\pm s$)

Indicators	Group(n=37)	T0	T1	T2	T3	T4
GLU	TIVA	5.3± 0.5	5.4± 0.4#	5.5± 0.6#	5.4± 0.5#	5.3± 0.5#
(mmol/L)	VICA	5.2± 0.4	6.8± 0.6*	7.2± 0.7*	6.7± 0.8*	6.1± 0.7*
COR	TIVA	181.7± 18.9	186.9± 15.3#	191.1± 18.4*#	194.2± 12.7*#	190.1± 17.3#
(ng/mL)	VICA	183.6± 15.3	202.1± 17.6*	226.4± 17.1*	248.9± 16.6*	232.8± 12.5*
IL-6	TIVA	1.6± 0.6	1.8± 0.5#	1.9± 0.4*#	2.1± 0.7*#	1.9± 0.5*#
(pg/mL)	VICA	1.7± 0.5	2.2± 0.5*	2.4± 0.8*	2.8± 0.6*	2.5± 0.7*

Note: Compared with T0 time point, *P<0.05; Compared with VICA group, #P<0.05.

2.2 两组患者术中用药量及麻醉苏醒情况的比较

与 VICA 组比较,TIVA 组丙泊酚的术中使用量显著减少,术后自主呼吸恢复时间、苏醒时间及拔管时间均显著缩短(P<0.05),见表 2。

表 2 两组患者术中用药量及麻醉苏醒情况比较($\bar{x}\pm s$)

Table 2 Comparison of the intraoperative drug dose and waking from anesthesia between two groups($\bar{x}\pm s$)

Group	N	Dose of propofol (mg·kg^{-1}·min^{-1})	Recovery time of spontaneous breath (min)	Time of waking up (min)	Extubation time (min)
TIVA group	37	7.12± 1.34	9.33± 2.07	10.75± 1.78	11.49± 1.80
VICA group	37	8.91± 1.12	12.79± 3.06	13.71± 2.16	14.43± 1.88
P		<0.05	<0.05	<0.05	<0.05

2.3 两组苏醒期躁动情况的比较

与 VICA 组比较,TIVA 组苏醒期躁动的发生率明显降低,躁动程度明显减轻,差异均有统计学意义(P<0.05),见表 3。

表 3 两组苏醒期躁动情况的比较

Table 3 Comparison of the agitation after waking up between two groups

Group	N	Case of agitation	0	1	2	3
TIVA group	37	2(5.7)	35	1	1	0
VICA group	37	8(22.9)	29	5	2	1
P		<0.05		<0.05		

2.4 两组术后疼痛程度的比较

两组切口疼痛在术后 12 h 达到峰值,TIVA 组术后 12、24 h 切口疼痛的 VAS 评分均明显高于 VICA 组,差异有统计学意义(P<0.05),两组术后 1 h、48 h 切口疼痛的 VAS 评分无显著性差异(P>0.05),见表 4。

表 4 两组患者术后疼痛程度的比较($\bar{x}\pm$ s)

Table 4 Comparison of the post-operative pain degree between two groups($\bar{x}\pm$ s)

Group	N	1 h after operation	2 h a1fter operation	24 h after operation	48 h after operation
TIVA group	37	3.16± 0.42	3.78± 0.58	3.46± 0.43	2.27± 0.67
VICA group	37	3.24± 0.51	3.31± 0.56	3.09± 0.55	1.94± 0.50
P		>0.05	<0.05	<0.05	>0.05

3 讨论

腔镜甲状腺手术创伤不大，对机体内环境的影响较小,术后镇痛要求不高,但腔镜术中 CO_2 气腹易对血流动力学造成影响,需进行高质量的麻醉以减少对应激系统造成的刺激,稳定循环功能、减少并发症的发生。理想的麻醉方式能实现诱导平稳,镇痛良好,有效抑制应激反应,且对循环及呼吸抑制轻,术后苏醒迅速,无药物残留作用[10-12]。过去观点认为静脉麻醉因其可控性差、药物蓄积程度高以及麻醉深度难以评估等不足,一定程度上限制了其临床应用,往往作为吸入性麻醉的辅助麻醉方法[13-15]。近年来,随着以丙泊酚为代表的短效、超短效全麻药物的问世与靶控输注技术的发展,TIVA 的可控性明显改善,为静脉麻醉提供了新的研究方向[16-18]。

TIVA 指在静脉麻醉诱导后，术中仅依靠静脉输注麻醉药物维持麻醉,其所用麻醉药物主要为丙泊酚、瑞芬太尼。丙泊酚起效快、持续时间短、苏醒迅速,同时可在一定程度上减少手术期间各种应激所致全身反应。瑞芬太尼是μ 阿片受体激动药,其药效与丙泊酚同步,但剂量过大容易引起低血压与心动过缓[19,20]。本研究中,从术中 T1 时刻起,TIVA 组和 VICA 组受应激反应的影响,GLU、IL-6 及 COR 水平表现出升高趋势,而 TIVA 组 T1~T4 时刻各指标均较 VICA 组明显降低,提示 TIVA 能够更有效阻断手术伤害性刺激的神经传导，减轻术中应激反应,有助于患者顺利度过围手术期，而 VICA 组应激反应相对较大,可能与其麻醉深度控制不当与插管刺激作用有关,易导致术中并发症的发生[21-23]。既往研究显示 VICA 术中使用麻醉药物的药效学、药动学存在明显差异,导致其麻醉调控不同步,患者中枢系统恢复的时间亦不一致[24,25]。

进一步分析结果显示与 VICA 组比较,TIVA 组丙泊酚的术中使用量显著减少,术后自主呼吸恢复时间、苏醒时间及拔管时间均显著减少,与王琳等[26]研究结果一致,说明 TIVA 对腔镜下甲状腺手术的麻醉质量较好,可减少丙泊酚的镇静催眠药物剂量,从而促进患者的术后苏醒,而 VICA 组随着丙泊酚用量的增加,麻醉苏醒时间明显延长,同时为了缓解苏醒期躁动,VICA 组通过增加丙泊酚剂量加大麻醉深度，从而增加了麻醉药物的用药风险[27,28]。Sun 等[29]研究表明吸入性麻醉药对迷走神经的抑制作用较强,导致中枢过度兴奋,患者可产生不自主的四肢运动,同时躁动的发生可能与七氟烷低浓度的残留诱发痛觉过敏有关。

在术后镇痛方面，两组患者切口疼痛在术后 12 h 达到峰值,TIVA 组术后 12、24 h 切口疼痛的 VAS 评分均明显高于 VICA 组。由此可见,靶控输注的 TIVA 患者术后更快出现疼痛感,术后镇痛效果不如 VICA,但术后 48 h 两种方法的镇痛效果无明显差异,故 TIVA 患者术后应适当采取镇痛措施,以缓解切口疼痛,提高苏醒质量[30]。

综上所述,TIVA 和 VICA 均有给药简单,便于护理,不受体位和空间限制等特点,但 TIVA 应用于腔镜下甲状腺手术可发挥更好的镇静效果,可减少机体的应激反应和全麻药剂量,改善苏醒期质量,但应根据患者的疼痛感受采取必要的镇痛措施。

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