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全凭静脉麻醉复合椎旁神经阻滞对胸腔镜下肺病损切除术患者应激反应、血流动力学及术后镇痛的影响

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摘要 目的:研究全凭静脉麻醉复合胸椎旁神经阻滞(TPVB)对胸腔镜下肺病损切除术患者应激反应、血流动力学及术后镇痛的影响。**方法:**选择2016年6月至2017年12月在我院行胸腔镜下肺病损切除术的80例患者为研究对象。采用简单随机抽样方法,分为对照组(n=40)和观察组(n=40)。对照组行单纯全身麻醉,观察组在超声引导下行TPVB复合全身麻醉。比较两组麻醉前、术毕、术后24h的血糖、肾上腺素(E)、去甲肾上腺素(NE)及多巴胺(DA)的浓度,以及两组在麻醉时、手术开始时、手术开始后0.5h、手术开始后1h、术毕时的平均动脉压(MAP)和心率(HR),同时比较两组术后2h、6h、12h、24h静息及活动时的视觉模拟评分(VAS)及相关并发症的发生率。**结果:**两组患者在麻醉前及术毕的各应激反应指标比较无差异($P>0.05$),而术后24h比较,观察组低于对照组($P<0.05$);两组患者麻醉时的MAP、HR比较无差异($P>0.05$),除手术开始后1h和术毕的HR外,观察组各时间的MAP、HR均显著低于对照组($P<0.05$);除静息时24h外,观察组各时间静息时和活动时的VAS评分均低于对照组($P<0.05$);两组患者术后各并发症的发生率比较无统计学差异($P>0.05$)。**结论:**全凭静脉麻醉复合TPVB在胸腔镜下肺病损切除术中应激反应小,对血流动力学的波动影响小,术后镇痛效果良好,且安全有效。

关键词:胸椎旁神经阻滞;全凭静脉麻醉;肺病损切除术;应激反应;血流动力学;镇痛

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Effect of Total Intravenous Anesthesia Combine with Thoracic Paravertebral Nerve Block on Stress Response, Hemodynamics and Postoperative Analgesia in Patients Undergoing Thoracoscopic Lung Lesion Resection

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ABSTRACT Objective: To investigate the effects of total intravenous anesthesia combine with thoracic paravertebral nerve block (TPVB) on stress response, hemodynamics and postoperative analgesia in patients undergoing thoracoscopic lung lesion resection. **Methods:** 80 patients who underwent thoracoscopic lung lesion resection in our hospital were selected as the research objects from June 2016 to December 2017. Using simple random sampling method, the subjects were divided into observation group (n=40) and control group (n=40). The control group received simple general anesthesia, and the observation group received general anesthesia combined TPVB under the guidance of ultrasound. The concentration of blood glucose, adrenaline (E), norepinephrine (NE) and dopamine (DA) in the two groups were compared before anesthesia, after surgery and postoperative 24 h. The average arterial pressure (MAP), heart rate (HR) of the two groups at the time of anaesthesia, beginning of the operation, 0.5 h after the operation, 1 h after the operation, postoperative. And the visual analogue (VAS) and the incidence of related complications were compared between the two groups of 2 h, 6 h, 12 h, 24 h after the operation. **Results:** There were no differences in the indexes of stress response between the two groups before and after the anesthesia($P>0.05$), the observation group 24 h after the operation was lower than the control group ($P<0.05$). There were no differences in MAP and HR between the two groups ($P>0.05$). HR except for 1h after operation and postoperative, the MAP and HR of the observation group were significantly lower than those of the control group ($P<0.05$). Except for resting 24 h, the VAS scores at rest time and activity time in observation group were lower than those in control group($P<0.05$). There was no significant difference in incidence of complications between two groups ($P>0.05$). **Conclusion:** Total intravenous anesthesia combine with TPVB are applied in thoracoscopic lung lesion resection, stress response is small, hemodynamic fluctuations are stable, postoperative analgesia effect was good, safe and effective.

Key words: Thoracic paravertebral nerve block; Total intravenous anesthesia; Lung lesion resection; Stress response; Hemodynamic fluctuations; Analgesia

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前言

肺病损切除术是普胸手术中常见的手术之一,广泛应用于治疗肺癌、支气管扩张、肺结核等肺部疾病^[1-3]。胸腔镜下切除术具有创伤小、并发症及出血量少、预后好等优点,受到临床工作者及患者的普遍认可,但胸腔镜下切除术与传统开胸手术相似,也会致使患者出现剧烈疼痛及一定的应激反应,引起患者血流动力学的波动,并可能导致支气管胸膜瘘、气胸、血肿等并发症的发生,因此如何消除或缓解这些不良反应成为学者们关注的焦点^[4,5]。随着“快通道”外科的发展,区域阻滞越来越受到人们的重视^[6],胸椎旁神经阻滞(thoracic paravertebral nerve block, TPVB)通过阻滞手术侧躯体,具有良好的镇痛效果,对机体的正常生理影响较轻,因此在各类开胸手术中 TPVB 复合全凭静脉麻醉方式逐渐取代单纯的全凭静脉麻醉^[7-9]。本研究通过观察全凭静脉麻醉复合 TPVB 对胸腔镜下肺病损切除术患者应激反应、血流动力学及术后镇痛的影响,旨在探讨 TPVB 的临床麻醉效果,现报道如下。

1 资料与方法

1.1 研究对象

选择 2016 年 6 月至 2017 年 12 月在我院行胸腔镜下肺病损切除术的 80 例患者为研究对象。纳入标准:(1)ASA 分级为 I-II 级;(2)术前心肺肝肾、免疫、凝血等功能正常者。排除标准:(1)围手术期进行过激素类药物治疗的患者;(2)患有慢性疼痛及酒精、药物滥用史者;(3)严重高血压、糖尿病及心脏病患者;(4)对治疗方案不配合者。按照简单随机抽样方法,将研究对象分为观察组和对照组各 40 例。两组患者的年龄、性别、BMI、手术时间等一般资料比较,差异均无统计学意义($P>0.05$),具有可比性。见表 1。本研究方案经我院医学伦理委员会审核批准,所有研究对象均知情同意。

1.2 研究方法

两组患者入室后开放外周静脉,行桡动脉穿刺置管,常规监测心电图、血氧饱和度和血压。对照组取仰卧位行单纯全身麻醉,观察组取健侧卧位、弓背屈曲的体位在超声引导下 TPVB 复合全身麻醉,操作方法为:将便携式超声诊断仪设置为 7.5MHz 的线阵探头,置于术侧 T5~6 胸椎旁,平行于背中线,并旁开背正中线 2.0~3.0 cm,在超声影像实时观察下稍向头侧刺入皮肤至椎旁间隙,确认插入后注射 20 mL 0.375% 的罗哌卡因。采用针刺法测试阻滞平面,结果满意则进行全麻诱导。

两组均以面罩吸氧,静脉输入 0.05~0.1 mg/kg 咪达唑仑、1 mg/kg 丙泊酚、0.2 mg/kg 顺式阿曲库铵、0.2 mg 芬太尼诱导麻醉,意识消失、肌松完善后置入双腔支气管导管。确认置入位置及深度后接入麻醉剂控制呼吸,相关参数设置为:吸入氧浓度 60%,流量 1.0 L/min,潮气量为 6~8 mL/kg,呼吸频率为 12~14 次/min,吸呼比为 1:2,呼气末二氧化碳分压 40~50 mmHg, BIS 值为 40~50。麻醉维持采用静吸复合麻醉,即泵注 50~100 μ g/(kg·min)的丙泊酚和 0.3 μ g/(kg·min)的瑞芬太尼+间断静注 0.6~1.2 mg/kg 顺苯磺酸阿曲库铵+吸入 0.8~1.0 MAC 的七氟醚。术中严密监视血压值及心率,必要时静注去氧肾上腺素和阿托品;手术结束前 15 min 停止吸入七氟醚;术毕静脉输入 8 mg 昂丹司琼,并接入患者自控静脉镇痛泵,泵入 1.5 mg/kg 的布托啡诺+8 mg/100 mL 的昂丹司琼,背景剂量为 2 mL,患者自控镇痛 1 mL,锁定时间为 15 min。将患者送入麻醉后监测治疗室,待完全清醒及血气指标合格后拔管,记录两组患者的麻醉时间、麻醉药的用量、手术时间及出血量。

1.3 观察指标

采用放射免疫法检测两组患者在麻醉前、术毕、术后 24 h 的血糖、肾上腺素(epinephrine, E)、去甲肾上腺素(norepinephrine, NE)及多巴胺(dopamine, DA)的浓度,比较两组的应激反应情况;分别记录两组患者在麻醉时、手术开始时、手术开始后 0.5 h、手术开始后 1 h、术毕等时间点的平均动脉压(mean arterial pressure, MAP)和心率(heart rate, HR),比较两组患者的血流动力学指标差异;比较两组患者术后 2 h、6 h、12 h、24 h 行静息及活动(咳嗽)时的疼痛视觉模拟评分(visual analogue scale, VAS)^[10],VAS 分数越高,疼痛等级越高,其中 0 分为无痛,10 分为剧痛;观察两组患者术后穿刺部位出现血肿、气胸、恶心、呕吐、嗜睡等并发症的情况,比较两组并发症的发生率。

1.4 统计学方法

数据分析在 SPSS21.0 统计软件中进行。计量资料以($\bar{x} \pm s$)表示,实施 t 检验,计数资料以[n(%)]表示,实施 χ^2 检验,检验水准为 $\alpha=0.05$ 。

2 结果

2.1 两组患者手术一般情况比较

两组患者的年龄、性别、BMI、手术时间、麻醉时间及出血量比较,差异均无统计学意义($P>0.05$),见表 1。

表 1 两组患者一般资料比较

Table 1 Comparison of general data between the two groups

Groups	Age (years old)	Gender		BMI(kg/m ²)	Operation time (min)	Anesthesia time (min)	Haemorrhage (mL)
		Male	Female				
Observation group(n=40)	51.06± 6.84	23	17	21.03± 2.16	51.57± 6.24	62.41± 7.22	152.04± 46.21
Control group(n=40)	52.61± 7.29	19	21	20.91± 2.30	54.01± 7.11	60.92± 7.09	154.27± 47.68
t/x ²	-0.981	0.802		0.241	-1.631	0.931	-0.212
P	0.330	0.370		0.810	0.107	0.355	0.833

2.2 两组患者的应激反应指标比较

除术毕血糖外, 两组患者在术毕和术后 24 h 的各应激反应指标与麻醉前比较, 差异均有统计学意义($P<0.05$); 观察组

麻醉前及术毕的各应激反应指标与对照组比较, 差异无统计学意义 ($P>0.05$), 而术后 24 h 的指标比较, 观察组低于对照组 ($P<0.05$), 见表 2。

表 2 两组患者的应激反应指标比较($\bar{x} \pm s$)Table 2 Comparison of stress response between the two groups($\bar{x} \pm s$)

Groups	Times	Blood glucose (mmol/L)	E(pg/ml)	DA(pg/ml)	NE(pg/ml)
Observation group (n=40)	Before anaesthesia	5.41 $\pm$ 0.45	169.15 $\pm$ 63.41	35.24 $\pm$ 17.53	199.41 $\pm$ 59.35
	After operation	5.62 $\pm$ 1.01	81.71 $\pm$ 50.12 ^a	63.94 $\pm$ 22.82 ^a	153.31 $\pm$ 25.64 ^a
	Postoperative 24 h	7.62 $\pm$ 1.55 ^{at}	142.53 $\pm$ 39.61 ^{at}	56.12 $\pm$ 29.77 ^{at}	312.88 $\pm$ 41.96 ^{at}
Control group(n=40)	Before anaesthesia	5.42 $\pm$ 0.81	171.57 $\pm$ 61.05	38.60 $\pm$ 18.99	191.73 $\pm$ 69.99
	After operation	5.78 $\pm$ 1.35	78.36 $\pm$ 45.88 ^a	62.40 $\pm$ 23.18 ^a	151.04 $\pm$ 29.70 ^a
	Postoperative 24 h	9.00 $\pm$ 1.60 ^a	209.35 $\pm$ 80.36 ^a	87.19 $\pm$ 35.05 ^a	464.29 $\pm$ 51.00 ^a

Note: Compared with before anaesthesia, ^a $P<0.05$; Compared with control group, ^{at} $P<0.05$.

2.3 两组患者的血流动力学指标比较

两组患者麻醉时的 MAP、HR 比较, 差异无统计学意义 ($P>0.05$); 除对照组手术开始时和手术开始后 0.5 h 的 HR 外,

两组患者在手术开始时~术毕的 MAP、HR 均显著低于麻醉时 ($P<0.05$); 除手术开始后 1 h 和术毕的 HR 外, 观察组各时间点的 MAP、HR 均显著低于同时间点对照组 ($P<0.05$), 见表 3。

表 3 两组患者的血流动力学指标比较($\bar{x} \pm s$)Table 3 Comparison of hemodynamic indexes between the two groups($\bar{x} \pm s$)

Groups	Times	MAP(mmHg)	HR(BPM)
Observation group(n=40)	At the time of anaesthesia	89.09 $\pm$ 5.31	70.84 $\pm$ 6.90
	At the beginning of the operation	71.10 $\pm$ 8.91 ^{at}	65.18 $\pm$ 8.16 ^{at}
	0.5 h after the operation	72.93 $\pm$ 6.23 ^{at}	65.24 $\pm$ 7.25 ^{at}
	1 h after the operation	77.20 $\pm$ 7.09 ^{at}	64.32 $\pm$ 7.09 ^a
	Postoperative	78.42 $\pm$ 7.07 ^{at}	63.68 $\pm$ 9.15 ^a
Control group(n=40)	At the time of anaesthesia	90.93 $\pm$ 7.13	71.96 $\pm$ 10.48
	At the beginning of the operation	84.54 $\pm$ 7.80 ^a	70.48 $\pm$ 9.46
	0.5 h after the operation	82.46 $\pm$ 8.01 ^t	69.72 $\pm$ 6.81
	1 h after the operation	83.26 $\pm$ 9.98 ^a	65.13 $\pm$ 7.87 ^a
	Postoperative	80.57 $\pm$ 10.11 ^a	62.28 $\pm$ 9.65 ^a

Note: Compared with before anaesthesia, ^a $P<0.05$; Compared with control group, ^{at} $P<0.05$.

2.4 两组患者术后镇痛指标比较

两组各时间点的 VAS 评分随时间的推移呈不断下降趋

势; 除静息时 24 h 外, 观察组各时间点静息时和活动时的 VAS 评分均低于同时间点对照组 ($P<0.05$), 见表 4。

表 4 两组患者术后不同状态的 VAS 评分比较(分, $\bar{x} \pm s$)Table 4 Comparison of VAS scores between the two groups after operation(scores, $\bar{x} \pm s$)

Groups	Times	Rest time	Active time
Observation group(n=40)	2 h	1.32 $\pm$ 0.52 ^a	2.23 $\pm$ 0.62 ^a
	6 h	1.24 $\pm$ 0.45 ^a	1.81 $\pm$ 0.52 ^{at}
	12 h	1.12 $\pm$ 0.36 ^{at}	1.69 $\pm$ 0.53 ^{at}
	24 h	1.09 $\pm$ 0.43 ^a	1.31 $\pm$ 0.46 ^{at}
Control group(n=40)	2 h	2.51 $\pm$ 0.61	3.40 $\pm$ 0.67
	6 h	2.03 $\pm$ 0.57 ^a	3.14 $\pm$ 0.47 ^a
	12 h	1.52 $\pm$ 0.54 ^a	2.68 $\pm$ 0.62 ^a
	24 h	1.29 $\pm$ 0.58 ^a	1.75 $\pm$ 0.53 ^a

Note: Compared with 2 h, ^a $P<0.05$; Compared with control group, ^{at} $P<0.05$.

2.5 两组患者术后并发症发生率比较

义($P>0.05$),见表5。

两组患者术后各并发症的发生率比较,差异均无统计学意

表5 两组患者术后并发症发生率比较[n(%)]

Table 5 Comparison of complications between the two groups after operation[n(%)]

Groups	Hematoma at the puncture site	Pneumothorax	Nausea	Vomit	Sleepiness	Incidence rate
Observation group(n=40)	3(7.50)	0(0.00)	6(15.00)	4(10.00)	3(7.50)	16(40.00)
Control group(n=40)	1(2.50)	0(0.00)	4(10.00)	2(5.00)	2(5.00)	9(22.50)
χ^2						2.851
P						0.091

3 讨论

随着空气污染的加重,我国肺癌、肺栓塞等肺部疾病的发生率不断上升^[1]。胸腔镜下肺病损切除术是普胸科的常见手术方法,但手术中出现的各种不良反应逐渐引起学者的重视和广泛研究^[12,13]。近年来区域阻滞方法不断更新、发展,其安全有效的麻醉效果得到医患的充分肯定,特别是超声显像定位技术的辅助应用更为其应用创造了条件,不仅简化了操作,使其定位更为准确,还显著提高了麻醉的成功率,减少了并发症的发生^[14,15]。目前胸外科手术中应用较多的是全麻复合胸段硬膜外阻滞,但胸段硬膜外阻滞具有显著的局限性,不仅对患者的血流动力学影响较大,而且还会减弱单肺通气时的缺氧性肺保护作用,且具有较多的并发症,极大地影响了其临床应用效果^[16-18]。近年来TPVB在开胸及乳腺手术、慢性胸壁疼痛的治疗等方面取得了满意效果^[19-21],而全麻复合TPVB对胸腔镜下肺病损切除术患者的生理影响如何,成为学者们关注的焦点。本研究以患者的应激反应、血流动力学、镇痛效果及并发症等方面评估全麻复合TPVB的麻醉效果,期望为TPVB的临床应用提供线索。

由于手术创伤、患者的焦虑和恐惧、术后疼痛等原因,患者易出现交感神经兴奋、垂体-肾上腺皮质分泌增多等应激反应,表现为血糖增高、E、NE、DA分泌增高、心跳加快、血压升高等^[22,23]。有研究表明^[24],强烈的应激反应与疼痛刺激可促进炎症因子的释放,甚者引起炎症反应综合征,影响患者的预后。因此降低患者的应激及疼痛反应对于降低术后并发症、改善预后具有重要意义。虽然相比手术刺激,麻醉侵袭引起的应激反应更弱,但是通过减轻手术医师的手术刺激来降低患者的应激反应很难做到,因此采用合适的麻醉药物和麻醉方式对于降低患者应激反应具有重要的作用。本研究结果显示,除术毕血糖外,两组患者在术毕和术后24h的各应激反应指标与麻醉前比较,均有统计学差异,且术后24h观察组各应激反应指标低于对照组。说明两种方法均可降低患者的应激反应,TPVB对于减轻患者术后24h的应激反应效果显著。其原因主要在于全麻一般使用的均为短效麻醉药,术后麻醉效果消失快;而TPVB使用的为长效的罗哌卡因,效果持续时间长^[25-27]。此外,除对照组手术开始时和手术开始后0.5h的HR外,两组患者在手术开始时~术毕的MAP、HR值均显著低于麻醉时;除手术开始后1h和术毕的HR外,观察组各时间点的MAP、HR值均显著低于同时时间点对照组。说明两种方法均对患者的血流动力学具

有抑制作用,而TPVB可显著增强全麻的镇静效果。这亦可能与TPVB的麻醉镇静时间更长久且麻醉深度更稳定有关。同时,观察组与对照组各时间点的VAS评分随时间的推移呈不断下降趋势;除静息时24h外,观察组各时间点静息时和活动时的VAS评分均低于同时时间点对照组。说明两种麻醉方法均可有效降低减轻患者的疼痛刺激,而TPVB对患者疼痛的减轻作用更显著。其原因可能在于TPVB可对脊神经前支(肋间神经)、后支、脊膜返支、交通支、胸交感神经链达到完善的阻滞,阻断交感神经和躯体感觉的传导,从而产生镇痛作用^[28-30]。两组患者术后各并发症的发生率比较无差异,说明TPVB不会增加全麻时并发症的发生。

综上所述,采用全麻复合TPVB对胸腔镜下肺病损切除术患者进行麻醉,可有效降低患者术中和术后的应激反应,且对血流动力学的波动影响较小,还具有显著的镇痛效果,且不增加不良反应的发生。

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