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神经刺激仪定位下腰丛联合坐骨神经阻滞对下肢手术患者血液动力学及应激反应的影响 *

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摘要 目的:探讨神经刺激仪定位下腰丛联合坐骨神经阻滞对下肢手术患者血液动力学、应激反应的影响。**方法:**选取福建医科大学附属南平第一医院 2014 年 1 月-2015 年 6 月收治的单侧下肢手术患者 60 例,依据不同的麻醉方法分为对照组($n=29$)和研究组($n=31$),对照组给予硬膜外麻醉,研究组于神经刺激仪定位下行腰丛联合坐骨神经阻滞,对比两组患者的麻醉效果,同时对比患者在麻醉前(T_0)、麻醉后 5 min(T_1)、麻醉后 15 min(T_2)、麻醉后 30 min(T_3)、术毕(T_4)时的血液动力学指标以及术前(T_a)、术中(T_b)、术毕(T_c)时的应激反应情况,并对比两组不良反应发生情况。**结果:**研究组优良率为 96.77%,与对照组的 93.10%对比差异无统计学意义($P>0.05$)。研究组 T_1 、 T_2 、 T_3 、 T_4 时平均动脉压(MAP)、心率(HR)与 T_0 时比较,差异无统计学意义($P>0.05$),对照组 T_2 、 T_3 时 MAP 低于 T_0 时, T_1 、 T_2 、 T_3 、 T_4 时 HR 低于 T_0 时,且均低于研究组,差异有统计学意义($P<0.05$)。 T_a 、 T_c 时,两组血糖(GLU)、皮质醇(Cor)、儿茶酚胺(CA)水平比较差异无统计学意义($P>0.05$), T_b 时两组 GLU、Cor、CA 水平高于 T_a 时,但研究组低于对照组,差异有统计学意义($P<0.05$)。研究组不良反应发生率为 6.45%,低于对照组的 24.14%,差异有统计学意义($P<0.05$)。**结论:**神经刺激仪定位下腰丛联合坐骨神经阻滞应用于下肢手术患者效果较好,患者血液动力学稳定,且应激反应轻,不良反应少。

关键词:下肢手术;神经刺激仪;腰丛联合坐骨神经阻滞;血液动力学;应激反应

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Effect of Lumbar Plexus Combined with Sciatic Nerve Block on Hemodynamics and Stress Response in Patients with Lower Extremity Surgery by Nerve Stimulator*

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ABSTRACT Objective: To investigate the effect of lumbar plexus combined with sciatic nerve block on hemodynamics and stress response in patients with lower extremity surgery by nerve stimulator. **Methods:** Medical University from January 2014 to June 2015, were selected and were divided into control group ($n=29$) and study group ($n=31$) according to different anesthetic methods. The control group was given epidural anesthesia, and the study group was given lumbar plexus combined with sciatic nerve block by the nerve stimulator. The anesthetic effect of patients in the two groups was compared, meanwhile, the hemodynamic indexes of patients before anesthesia (T_0), 5 min after anesthesia (T_1), 15min after anesthesia (T_2), 30 min after anesthesia (T_3) and at the end of operation (T_4) were compared; the stress reaction before operation (T_a), intraoperative (T_b) and postoperative (T_c) were compared; the occurrence of adverse reactions in the two groups were compared. **Results:** The excellent rate of the study group was 96.77%, and there was no significant difference compared with 93.10% of the control group ($P>0.05$). The difference of mean arterial pressure (MAP) and heart rate (HR) at T_1 , T_2 , T_3 and T_4 in the study group was not statistically significant compared with T_0 ($P>0.05$). MAP at T_2 and T_3 of the control group was lower than T_0 , HR at T_1 , T_2 , T_3 and T_4 was lower than T_0 , which were lower than that of the study group, and the difference was statistically significant ($P<0.05$). There were no significant differences in the levels of blood glucose (GLU), cortisol (Cor) and catechin (CA) between the two groups at T_a , T_c ($P>0.05$). At T_b , the levels of GLU, Cor and CA in the two groups were higher than those at T_a , but the study group was lower than the control group, and the difference was statistically significant ($P<0.05$). The incidence of adverse reactions of the study group was 6.45%, which was lower than that of the control group (24.14%), and the difference was statistically significant ($P<0.05$). **Conclusion:** The effect of lumbar plexus combined with sciatic nerve block by nerve stimulator in the treatment of the patients with lower extremity surgery is better, and the patient has a stable hemodynamics, mild stress response and less adverse reactions.

Key words: Lower extremity surgery; Neurostimulator; Lumbar plexus combined with sciatic nerve block; Hemodynamics; Stress

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前言

对于行单侧下肢手术的患者,以往临床上多施予硬膜外麻醉,此麻醉虽然操作简单,但麻醉后可能会出现血管扩张,导致患者血流动力学发生变化,引发机体应激反应,并导致多种麻醉不良反应的发生,不但影响麻醉及手术效果,而且会增加患者的痛苦^[1,2]。区域阻滞麻醉对患者全身影响小,并发症少,麻醉恢复快,适用于行下肢手术患者^[3,4]。腰丛联合坐骨神经阻滞是临床常用区域阻滞麻醉的一种,近年来此麻醉于神经刺激仪定位下实施穿刺,定位精准,并发症少,且直接在神经干(丛)中注入局麻药物,循环影响小,因此患者血液动力学稳定、应激反应轻^[5,6]。当前,神经刺激仪定位下的腰丛联合坐骨神经阻滞已被广泛应用于下肢手术,关于此麻醉方式的研究报道较多,但多数研究仅仅考察血液动力学、不良反应等方面,关于应激反应的研究较少。为进一步对神经刺激仪定位下腰丛联合坐骨神经阻滞对下肢单侧手术患者血液动力学、应激反应的影响进行探讨,本研究对比分析硬膜外麻醉与神经刺激仪定位下予以腰丛联合坐骨神经阻滞对下肢手术患者麻醉效果、血液动力学、应激反应及不良反应情况,旨在为临床操作提供参考,现报道如下。

1 资料与方法

1.1 一般资料

选取福建医科大学附属南平第一医院 2014 年 1 月 -2015 年 6 月收治的单侧下肢手术患者 60 例,纳入标准:(1)已知非手术治疗无法恢复且符合手术适应症者;(2)可耐受手术者;(3)无麻醉禁忌症者;(4)患者或家属知情同意并签署知情同意书。排除标准:(1)合并严重心、肝、肾功能障碍者、恶性肿瘤者;(2)合并感染性疾病、败血症者;(3)运动感觉异常者。依据不同的麻醉方法分为对照组(n=29)和研究组(n=31),其中对照组男 15 例,女 14 例;年龄 23-67 岁,平均(45.32±6.52)岁;美国麻醉医师协会(the American society of anesthesiologists,ASA)分级Ⅱ级 17 例,Ⅲ级 12 例;手术类型:下肢骨折切开内固定 14 例,人工股骨头置换 7 例,膝关节手术 6 例,其他 2 例;受伤原因:车祸 15 例,跌倒 8 例,高空坠落 4 例,其他 2 例。研究组男 16 例,女 15 例;年龄 24-67 岁,平均(45.34±6.53)岁;ASA 分级:Ⅱ级 19 例,Ⅲ级 12 例;手术类型:下肢骨折切开内固定 15 例,人工股骨头置换 8 例,膝关节手术 6 例,其他 2 例;受伤原因:车祸 16 例,跌倒 7 例,高空坠落 5 例,其他 3 例。两组患者一般资料对比差异无统计学意义($P>0.05$),均衡可比。本研究经福建医科大学附属南平第一医院伦理委员会批准同意。

1.2 方法

两组患者术前均经静脉注射复方氯化钠(杭州民生药业有限公司,国药准字:H33020035,规格:500 mL)500 mL。对照组给予硬膜外麻醉:于 L2-3 或 L3-4 实施硬膜外穿刺,向头端将硬膜外导管置入,约 3 cm,予以 1%利多卡因(北京市永康药业

有限公司,国药准字:H11020558,规格:2 mL:40 mg)+0.375%罗哌卡因(广东华润顺峰药业有限公司,国药准字:H20050325,规格:75 mg),共 4 mL,观察 5 min,若无不适,分次予以 6-10 mL 利多卡因(1%)+罗哌卡因(0.375%)。研究组于神经刺激仪(购自德国 B-BRAUN,型号 Stimuplex)定位下实施腰丛联合坐骨神经阻滞,①腰丛阻滞:患者姿势取患肢在上的侧卧位,指导其收腹、屈膝,将 L4 旁开 4 cm 处视作穿刺点,消毒处理局部皮肤,将神经刺激仪正极连接于患者大腿皮肤,负极则与刺激针(购自德国 B-BRAUN,型号 StimuplexA 100mm)连接,以 1%的利多卡因实施局部麻醉,垂直刺入刺激针,找寻 L4 横突,碰到骨质后,往头侧或尾侧进针 1-2 cm,找寻腰丛神经,可见肱四头肌出现颤搐则表明已经靠近腰丛神经,将阈电流强度调为 0.3-0.5 mA,若肌颤仍存在,缓慢将 0.45%罗哌卡因注入,剂量为 20-25 mL,每注入 5 mL 均回抽观察,若无出血,再继续注入。②坐骨神经阻滞:体位不变,作一连线于股骨大转子与髂后上棘间,于其中点垂直作一条线,将线上 5 cm 作为穿刺点,对穿刺部位实施消毒、局部麻醉,垂直刺入刺激针,可见腓肠肌颤搐、足背屈或跖屈后,逐渐将阈电流调节至 0.3-0.5 mA,可见肌颤仍存在,将 0.45%的罗哌卡因缓慢注入,剂量为 20-25 mL。

1.3 观察指标

(1)麻醉效果^③:手术结束时对麻醉效果进行评定,术中完全无痛,无需应用辅助药物为优秀;术中时有疼痛,血压有一定波动,需予以血管活性药物为良好;术中轻微疼痛,经辅助药物应用后手术顺利完成为一般;术中疼痛剧烈需对麻醉方式进行更改为较差。优良率=优秀率+良好率。(2)血液动力学:分别于麻醉前(T0)、麻醉后 5 min(T1)、麻醉后 15 min(T2)、麻醉后 30 min(T3)、术毕(T4)测定两组患者平均动脉压(mean arterial pressure, MAP)、心率(heart rate, HR)。(3)应激反应:分别于术前(Ta)、术中(Tb)、术毕(Tc)测定两组患者血糖(glucose, GLU)、皮质醇(cortisol, Cor)、儿茶酚胺(catechin, CA)水平。(4)不良反应主要包括穿刺点疼痛、头痛、尿潴留等。

1.4 统计学方法

采用 SPSS20.0 软件进行统计分析,计量资料以($\bar{x} \pm s$)表示,实施 t 检验,计数资料以率或百分比表示,实施 χ^2 检验,检验标准设置为 $\alpha=0.05$ 。

2 结果

2.1 两组患者麻醉效果对比

研究组优良率为 96.77%,与对照组的 93.10%对比差异无统计学意义($P>0.05$),见表 1。

2.2 两组患者血液动力学对比

研究组 T1、T2、T3、T4 时 MAP、HR 与 T0 时比较,差异无统计学意义($P>0.05$),对照组 T2、T3 时 MAP 低于 T0 时,T1、T2、T3、T4 时 HR 低于 T0 时,且均低于研究组,差异有统计学意义($P<0.05$)。

2.3 两组患者应激反应对比

Ta、Tc 时, 两组 GLU、Cor、CA 水平比较差异无统计学意

义($P>0.05$), Tb 时两组 GLU、Cor、CA 水平高于 Ta 时, 但研究组低于对照组, 差异有统计学意义($P<0.05$), 见表 3。

表 1 两组患者麻醉效果对比[n(%)]

Table 1 Comparison of anesthetic effect of two groups [n (%)]

Groups	n	Excellent	Good	General	Fail	Excellent and good rate
Control group	29	17(58.62)	10(34.48)	1(3.45)	1(3.45)	27(93.10)
Study group	31	20(64.52)	10(32.26)	1(3.23)	0(0.00)	30(96.77)
χ^2	-					0.425
P	-					0.514

表 2 两组患者血液动力学对比($\bar{x}\pm s$)Table 2 Comparison of hemodynamic of two groups($\bar{x}\pm s$)

Groups	MAP(mmHg)					HR(beat/min)				
	T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
Control group(n=29)	103.01±11.85	99.87±8.92	96.78±5.64 ^a	91.22±6.87 ^a	99.67±7.02	78.22±7.81	75.04±2.35 ^a	74.97±2.54 ^a	73.31±1.49 ^a	74.89±1.18 ^a
	102.31±11.87	100.01±8.72	103.21±5.72	103.13±10.02	99.87±6.91	78.21±7.82	77.86±2.33	77.03±2.67	76.21±1.52	78.02±1.22
t	0.228	-0.061	-4.381	-5.333	-0.111	0.005	-4.665	-2.837	-7.456	-5.960
P	0.212	0.352	0.013	0.005	0.324	0.511	0.011	0.023	0.006	0.017

Note: compared with T0, ^a $P<0.05$.

表 3 两组患者应激反应对比($\bar{x}\pm s$)Table 3 Comparison of stress response of two groups($\bar{x}\pm s$)

Groups	GLU(mmol/L)			Cor(mmol/L)			CA(ng/L)		
	Ta	Tb	Tc	Ta	Tb	Tc	Ta	Tb	Tc
Control group(n=29)	5.23±0.97	7.86±1.21 ^a	5.33±0.57	321.01±12.69	342.56±8.76 ^a	325.68±8.57	354.22±12.29	396.75±8.21 ^a	356.73±3.87
	5.22±1.01	5.63±0.32 ^a	5.31±0.65	320.53±13.25	329.87±7.82 ^a	324.52±9.83	353.21±12.35	371.23±7.63 ^a	354.32±4.33
t	0.039	9.903	0.126	0.143	52.636	0.486	0.317	12.480	0.267
P	0.367	0.012	0.378	0.286	0.000	0.623	0.358	0.001	0.635

Note: compared with Ta, ^a $P<0.05$.

2.4 两组不良反应发生情况对比

差异有统计学意义($P<0.05$), 见表 4。

研究组不良反应发生率为 6.45%, 低于对照组的 27.59%,

表 4 两组不良反应发生情况对比[n(%)]

Table 4 Comparison of adverse reactions of two groups [n (%)]

Groups	n	Adverse reactions			Total incidence rate
		Puncture point pain	Headache	Urinary retention	
Control group	29	3(10.34)	3(10.34)	2(6.90)	8(27.59)
Study group	31	1(3.23)	1(3.23)	0(0.00)	2(6.45)
χ^2	-				4.818
P	-				0.028

3 讨论

现阶段, 下肢单侧手术常用的麻醉为硬膜外麻醉, 此麻醉

技术较为成熟, 但禁忌症较多, 易受低凝状态、低血容量等因素的影响, 麻醉风险较大^[9,10]。不仅如此, 下肢单侧手术患者大多为骨折, 在创伤影响下, 体位配合难度大, 椎管穿刺难度随之增

大,且部分患者脊柱可能存在增生、弯曲变形等,可导致麻醉风险增大^[11,12]。对下肢进行支配的神经主要来自于坐骨神经、腰丛,坐骨神经构成主要包括 L4-S3,腰丛主要包括 T12、L1-4^[13,14]。研究表明,联合阻滞腰丛、坐骨神经阻滞是下肢单侧手术的较为安全有效的麻醉方式^[15]。

本次研究结果显示,研究组优良率是 96.77%,与对照组的 93.10%对比差异无统计学意义($P>0.05$),提示在下肢单侧手术患者中,硬膜外麻醉、腰丛联合坐骨神经阻滞的麻醉效果相当。对照组 T2、T3 时 MAP 低于 T0 时,T1、T2、T3、T4 时 HR 低于 T0 时,且均低于研究组($P<0.05$),说明研究组所采用的麻醉方式对患者血液动力学影响较小,原因在于,下肢单侧手术实施硬膜外麻醉时,患者交感神经的传出纤维会被阻滞,提高副交感神经的兴奋性,受此影响,患者阻力血管与容量血管会扩张,导致血液动力学发生波动,致使患者的血压、心率降低^[16,17]。另外,硬膜外麻醉麻醉范围较大,可对全身循环造成影响,血压、心率随之受影响^[18]。而腰丛联合坐骨神经阻滞基于神经刺激仪精准定位,直接将局麻药物注入神经干(丛),不但能够对运动神经的纤维与感觉进行阻滞,而且可对副交感神经产生阻滞作用,避免其兴奋性提升,从而稳定血液动力学^[19,20]。同时,腰丛联合坐骨神经阻滞仅对患者侧实施阻滞,对全身循环的干扰较小,因此患者血压、心率更为稳定^[21]。有研究指出,手术创伤、麻醉引发的应激反应会使患者机体耐受力下降,导致术中、术后并发症发生的可能性增大^[22]。GLU、Cor、CA 为机体应激反应的敏感性指标,本次研究中,研究组术中 GLU、Cor、CA 水平均低于对照组($P<0.05$)。提示在下肢单侧手术患者,相较于硬膜外麻醉,腰丛联合神经阻滞对患者应激反应的影响更小。主要由于,实施硬膜外麻醉时,通过硬膜外腔注入局麻药物后,药物顺硬膜外间隙扩散,在蛛网膜绒毛增多、神经根受压、椎间孔狭窄等影响下,进入硬膜外间隙中的麻醉药物会扩散至头部,致使阻滞平面过高,影响患者循环功能,从而致使机体发生应激反应^[23]。而腰丛联合坐骨神经阻滞基于神经刺激仪精准定位,局麻药物直接进入神经干(丛),可对外周感觉、运动神经进行有效阻断,使手术刺激传导至中枢神经系统被阻断,从而减轻术中应激反应^[24]。同时,通过神经刺激仪实施腰丛联合坐骨神经阻滞定位对目标神经、穿刺针走位等情况进行清晰显示,可使血管、周围神经损伤等风险降低,进而改善应激反应^[25,26]。另外,研究组不良反应发生率低于对照组($P<0.05$)。硬膜外麻醉穿刺有一定难度,反复穿刺可能会引发穿刺点疼痛,且硬膜外麻醉会阻滞马尾神经,可导致头疼、尿潴留等不良反应发生的可能性增大,而基于神经刺激仪定位的腰丛联合坐骨神经阻滞定位准确,麻醉药物能精准进入目标神经,不良反应少^[27,28]。

综上所述,在下肢单侧手术患者中,神经刺激仪定位下腰丛联合坐骨神经阻滞不但麻醉效果确切,而且对患者血液动力学、应激反应影响小,无严重不良反应,可积极应用。

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(上接第 3924 页)

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