

神经刺激仪引导定位坐骨神经-股神经阻滞对老年全髋置换术患者术后认知功能障碍的影响

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【摘要】目的:探讨神经刺激仪引导定位坐骨神经-股神经阻滞对老年全髋置换术患者术后认知功能障碍、血流动力学等的影响,为老年全髋置换术患者制定合理麻醉方案提供参考。**方法:**以2015年1月~2017年1月西安高新医院收治的86例老年全髋置换术患者为对象,依据麻醉方案不同分为对照组(实施硬膜外麻醉, $n=45$)和观察组(实施神经刺激仪引导定位坐骨神经-股神经阻滞麻醉, $n=41$)。观察两组不同时间点[入室后(T0)、手术即刻(T1)、手术开始后30 min(T2)、手术结束后(T3)]的血流动力学指标[平均动脉压(MAP)、心率]变化,比较两组麻醉效果(镇痛维持时间、达到最高阻滞平面时间)、认知功能障碍[简易智能量表(MMSE)评估]、不良反应发生情况。**结果:**T0时,两组的MAP、心率和术前MMSE评分相比较无明显差异($P>0.05$)。与T0相较,T1、T2、T3时,两组MAP均明显降低;T1、T2时,仅对照组心率明显降低($P<0.05$)。对照组各时点MAP、心率变化幅度较观察组明显大($P<0.05$)。与对照组相比较,观察组的镇痛维持时间明显长,达最高阻滞平面时间明显短($P<0.05$);术后1、7 d,观察组MMSE评分均较对照组明显高($P<0.05$);观察组不良反应总发生率为21.95%,明显低于对照组的44.44%($P<0.05$)。**结论:**神经刺激仪引导定位坐骨神经-股神经阻滞对老年全髋置换术患者的麻醉效果佳,有效减轻患者术后认知功能障碍,对血流动力学干扰少且安全性好。

【关键词】老年患者;全髋置换术;神经刺激仪;坐骨神经-股神经阻滞;认知功能障碍

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Effect of nerve stimulator-guided sciatic nerve-femoral nerve block on cognitive impairment in elderly patients after total hip arthroplasty

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Abstract: Objective To investigate the effects of nerve stimulator-guided sciatic nerve-femoral nerve block on cognitive impairment and hemodynamics in elderly patients after total hip arthroplasty for providing some references for the development of a reasonable anesthesia regimen for elderly patients receiving total hip arthroplasty. **Methods** A total of 86 elderly patients undergoing total hip arthroplasty in Xi'an Gaoxin Hospital from January 2015 to January 2017 were selected as the subjects. According to different anesthesia regimens, the patients were divided into control group (given epidural anesthesia, $n=45$) and observation group (given nerve stimulator-guided sciatic nerve-femoral nerve block anesthesia, $n=41$). The changes of hemodynamic indexes, including mean arterial pressure (MAP) and heart rate, in the two groups at different time points [entering the operating room (T0), the beginning of operation (T1), 30 minutes after the beginning of operation (T2), the end of operation (T3)] were analyzed. The anesthetic effects (duration of analgesia, time to the highest block level), cognitive impairment [minimal state examination (MMSE)] and adverse reactions were compared between two groups. **Results** No significant differences were found in MAP, heart rate and preoperative MMSE score between two groups at T0 ($P>0.05$). The MAP of both two groups was significantly decreased at T1, T2 and T3 as compared with T0. At T1 and T2, only the heart rate of control group was decreased significantly ($P<0.05$). The changes of MAP and heart rate in control group at different time points were significantly greater than those in observation group ($P<0.05$). The duration of analgesia was significantly longer and the time to the highest block level was shorter in observation group as compared with control group ($P<0.05$). The MMSE scores in observation group at 1 day and 7 days after finishing operation were significantly higher than those in control group ($P<0.05$). The total incidence of adverse reactions in observation group was 21.95%, significantly lower than 44.44% in control group ($P<0.05$). **Conclusion**

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Nerve stimulator-guided sciatic nerve-femoral nerve block not only has remarkable anesthetic effects for elderly patients undergoing total hip arthroplasty, but also effectively reduces postoperative cognitive impairment, with high safety and little effects on hemodynamics.

Keywords: elderly patient; total hip arthroplasty; nerve stimulator; sciatic nerve-femoral nerve block; cognitive impairment

前言

全髋置换术是老年髋关节骨折患者常见治疗手段,被公认为改善老年患者髋关节功能的重要方案,然而老年患者术前常合并有高血压、糖尿病、冠心病等基础性疾病,临床对其麻醉方案的选择仍是重点研究对象^[1]。早期多运用椎管内麻醉,但因需扩髓、髓腔冲洗及骨水泥灌注等操作,大大增加了围术期并发症发生风险^[2];后期鉴于老年髋关节手术患者存在硬膜外血肿的风险较高,多采取全麻,但全麻对患者呼吸和循环系统以及各重要脏器功能有较大影响,术后常需采用静脉镇痛,且术后镇痛效果不够,影响其功能锻炼^[3-4]。近年来随医学水平和麻醉技术不断提升,神经刺激仪引导下的神经阻滞技术在临床上备受关注^[5],神经刺激仪引导下的神经阻滞技术具有定位精确、麻醉效果佳以及安全性好等明显优势^[6],现阶段神经刺激仪引导定位坐骨神经-股神经阻滞的麻醉方案在危重患者下肢手术中的应用逐渐增多,但有关神经刺激仪引导定位坐骨神经-股神经阻滞对老年全髋置换术患者术后认知功能障碍影响的研究并不多见,为此笔者对此展开临床对照性研究,探讨神经刺激仪引导定位坐骨神经-股神经阻滞对老年全髋置换术患者术后认知功能障碍等的影响。

1 资料与方法

1.1 一般资料

以2015年1月~2017年1月西安高新医院收治的86例老年全髋置换术患者为对象,患者及其家属对本研究内容和目的知情,自愿签署相关知情同意书。纳入标准:①年龄 ≥ 65 岁;②X线片及CT影像学检查确诊为单侧髋关节骨折;③首次行全髋关节置换术。排除标准:①合并脑梗死、高血压、冠心病及房室传导阻滞等疾病;②合并无法控制糖尿病及肾功能不全、凝血功能障碍者;③对本研究所用麻醉药物既往有过敏史。依据麻醉方案不同分为对照组(实施硬膜外麻醉)和观察组(实施神经刺激仪引导定位坐骨神经-股神经阻滞麻醉)。对照组45例,男、女各26、19例,年龄65~82(72.01 \pm 2.16)岁,体质量52~75(65.14 \pm 2.06) kg,手术时间66~113(81.26 \pm 2.61) min;观察组41例,男、女各25、

16例,年龄66~83(71.98 \pm 2.21)岁,体质量50~76(64.97 \pm 2.11) kg,手术时间65~114(80.67 \pm 2.59) min。两组上述基线资料相较无明显差异($P>0.05$),具有可比性。

1.2 研究方法

两组患者均行全髋关节置换术。①对照组:实施硬膜外麻醉。取患侧上侧卧位,屈膝收腹,以L2-L3棘突间隙为穿刺点,行硬膜外穿刺(旁正中入路),穿刺成功后将硬膜外管置入,同时注入3 mL的1%利多卡因,观察4 min,确保无异常现象后,再分次为其注入15~20 mL浓度为0.375%的罗哌卡因。②观察组:实施神经刺激仪引导定位坐骨神经-股神经阻滞麻醉。采用外周神经刺激仪(德国贝朗医疗有限公司,型号为Stimuplex)和刺激针(型号为Stimuplex 100 mm)定位,维持患者患侧向上侧卧位,椎旁阻滞,选患侧L1棘突旁约2.0 cm处行穿刺点,确保垂直进针,当突破感后回抽无血以及脑脊液,则为患者给予罗哌卡因(批号:MA1796)(0.4%);坐骨神经阻滞麻醉,阻滞时使健肢伸直,患侧屈曲,触及股骨大转子和髂后上棘两点并作连线,以连线中点再向内作垂直线,在该线4~5 cm处行穿刺点,使其垂直并略微向头侧倾斜以利于进针,一旦腓肠肌被诱发收缩后,可将电流调整至0.3~0.5 mA,当明显感觉肌群颤动,则给予5 mL浓度为0.4%的罗哌卡因,待重新进针后,以诱发足趾屈为准,再给予患者5 mL浓度为0.4%的罗哌卡因,给药方法同上;股神经阻滞麻醉,患者取仰卧位,患肢外展,以股动脉搏动外侧1 cm左右处行穿刺点,待穿刺点消毒后将其连接,刺激仪初始电流、频率分别设为1 mA、1 Hz,神经刺激针向头端(45°)刺入皮肤,待股四头肌出现明显收缩后,将刺激仪电流下调至0.3 mA,待观察到股四头肌收缩运动时,注入25 mL浓度为0.4%的罗哌卡因,先预注5 mL,再增大电流不见股四头肌运动,预示局麻药已在股神经四围浸润,后继续注药,神经阻滞10 min后,待出现支配区域感觉到运动功能减退即为阻滞成功。

1.3 观察指标

①两组不同时间点血流动力学指标比较:入室后(T0)、手术即刻(T1)、手术开始后30 min(T2)、手术结束后(T3)采用西安高新医院的多功能监护仪连

续监测两组的平均动脉压(MAP)和心率变化。②两组麻醉效果比较:比较两组镇痛维持时间(从麻醉阻滞开始达镇痛效果到麻醉镇痛效果消失时的时间)和达到最高阻滞平面时间(从麻醉阻滞开始时直至达到最高阻滞平面的时间)。③两组认知功能障碍改善情况比较:采用简易智能量表(MMSE)评估两组认知功能,MMSE满分30分,分值越低表明患者认知功能障碍越严重,两组分别于术前及术后1、7 d进行评分。④两组不良反应发生情况:统计并记录两组药物不良反应发生率。

1.4 统计学处理

应用SPSS 19.0统计学软件进行数据分析,计数资

料采取率(%)表示,组间比较采用 χ^2 检验。计量资料用均数 \pm 标准差表示,组间比较采用独立样本 t 检验。组内不同时间点血流动力学指标比较采用重复测量方差分析 F 检验,以 $P<0.05$ 为差异有统计学意义。

2 结果

2.1 两组不同时间点血流动力学指标比较

T0时,两组MAP、心率相较无明显差异($P>0.05$);T1、T2、T3时,观察组和对照组MAP较T0时明显降低;T1、T2时,仅对照组心率较T0时明显降低($P<0.05$),且各时点对照组各项指标变化幅度较观察组明显大($P<0.05$),详细数据见表1。

表1 两组不同时间点血流动力学指标比较($\bar{x}\pm s$)

Tab.1 Comparison of hemodynamic parameters between two groups at different time points ($Mean\pm SD$)

Group	Time point	Mean arterial pressure/mmHg	Heart rate (beats/min)
Observation ($n=41$)	T0	95.24 \pm 10.19	81.27 \pm 8.90
	T1	84.25 \pm 9.59 ^{①②}	80.28 \pm 7.25 ^②
	T2	87.90 \pm 10.00 ^{①②}	81.25 \pm 8.89 ^②
	T3	89.87 \pm 11.12 ^{①②}	79.85 \pm 9.87
	F value	12.638	0.415
P value		<0.05	>0.05
Control ($n=45$)	T0	96.08 \pm 11.02	81.16 \pm 8.89
	T1	74.81 \pm 9.37 ^①	73.59 \pm 6.71 ^①
	T2	79.51 \pm 10.51 ^①	75.01 \pm 6.95 ^①
	T3	80.52 \pm 10.97 ^①	80.13 \pm 8.04
	F value	53.591	16.233
P value		<0.01	<0.01

T0: Entering the room; T1: Beginning of operation; T2: Thirty minutes after the beginning of operation;

T3: End of operation; Compared with T0, ^① $P<0.05$; Compared with control group, ^② $P<0.05$

2.2 两组麻醉效果比较

与对照组相较,观察组镇痛维持时间明显长,达最高阻滞平面时间明显短,差异有统计学意义($P<0.05$),详细数据见表2。

2.3 术前术后两组MMSE评分变化

术前两组MMSE评分相较无明显差异($P>0.05$);术后1、7 d观察组MMSE评分较对照组明显高($P<0.05$),详细数据见表3。

2.4 两组不良反应发生情况

观察组不良反应总发生率为21.95%,明显低于对照组的44.44%,差异有统计学意义($P<0.05$),详细数据见表4。

表2 两组麻醉效果比较($\bar{x}\pm s$)

Tab.2 Comparison of anesthetic effects between two groups ($Mean\pm SD$)

Group	Duration of analgesia/h	Time to the highest block level/min
Observation ($n=41$)	6.59 \pm 1.38	8.49 \pm 1.28
Control ($n=45$)	3.51 \pm 1.12	14.49 \pm 2.39
t value	11.408	14.309
P value	<0.01	<0.01

3 讨论

近年来随全髋关节置换术在老年患者中的应用

表3 术前术后两组MMSE评分变化($\bar{x} \pm s$)

Tab.3 Changes of MMSE scores in two groups before and after operation (Mean±SD)

Group	Before operation	1 day after finishing operation	7 days after finishing operation	F value	P value
Observation (n=41)	26.84±2.26	23.82±2.08 ^①	25.84±2.36 ^①	19.889	<0.05
Control (n=45)	27.02±2.28	20.08±2.00	23.01±2.18	120.128	<0.05

MMSE: Mini-mental state examination; Compared with control group, ^① P<0.05

表4 两组不良反应发生情况[例数(%)]

Tab.4 Incidence of adverse reactions in both groups [cases(%)]

Group	Nausea and vomiting	Respiratory depression	Bradycardia	Total incidence
Observation (n=41)	5(12.20)	2(4.88)	2(4.88)	9(21.95)
Control (n=45)	12(26.67)	5(11.11)	3(6.67)	20(44.44)
χ^2 value	-	-	-	4.857
P value	-	-	-	<0.05

不断普及,临床对老年全髋关节置换术患者的麻醉方案选择存在诸多争议,老年髋关节骨折患者心血管代偿能力较差,常合并多种心脑血管及神经系统疾病,对麻醉药物耐受性差,麻醉风险较大^[7-8]。早期临床多运用椎管内麻醉或硬膜外麻醉为老年下肢骨折患者实施麻醉,但椎管内麻醉可对老年患者血流动力学产生较大影响,麻醉效果不佳且不良事件发生风险高,而硬膜外麻醉虽对患者呼吸功能影响略小,同时具有平面易于控制及术中出血量少等优势,但老年患者常伴随心肺功能低下、凝血障碍性疾病等,硬膜外阻滞平面较广,因而患者出现血压骤升急降风险较高^[9-10]。现代医学表明外周神经阻滞作用于神经的外周区域水平,可借助手术中的上行性传导阻滞减轻应激反应,发挥较完善的麻醉效果。

既往辛学东等^[11]的研究表明神经刺激仪引导下神经阻滞可指导麻醉医师精确定位,对于老年全髋关节置换术病人,不仅麻醉效果佳且对患者生理功能干扰小;于澎等^[12]的研究则证实超声引导联合神经刺激仪辅助下神经阻滞麻醉,可较好地稳定患者血流动力学,且不良反应发生率低,在老年全髋关节置换术患者中有较高临床应用优势。可见目前临床有关神经刺激仪引导定位下坐骨神经等阻滞在老年全髋关节置换术患者中的应用早已有研究涉及,但尚未有研究涉及神经刺激仪引导定位坐骨神经-股神经阻滞对老年全髋置换术患者术后认知功能障碍的影响。本研究在既往文献基础上展开临床对照性研究,发现麻醉后观察组MAP和心率的变化幅度明显小于对照组,且与对照组相较,观察组的镇痛维持时间明显长,达最高阻滞平面时间明显短,术后1、7 d

观察组MMSE评分明显高,不良反应发生率明显低,这初步证实了神经刺激仪引导定位坐骨神经-股神经阻滞在老年全髋置换术患者中的应用不仅对患者血流动力学影响小且麻醉佳,同时可减轻患者术后认知功能障碍程度并减少不良反应发生^[13]。观察组患者实施麻醉时借助神经刺激仪施行神经辅助定位,这是利用穿刺针触及神经鞘后(不触及神经干)诱发神经支配的肌纤维收缩,准确判断预期阻滞的神经,其较传统异感定位法具有神经血管损伤小和神经阻滞成功率高的优势^[14-15]。同时,本研究中观察组采用神经刺激仪引导定位下进行坐骨神经-股神经阻滞,联合了坐骨神经-股神经阻滞,可较好地现实对臀上皮神经和股外侧皮神经的阻滞^[16],减少对老年患者局麻药物用量,减少对神经及血管的损伤,因而更好地稳定患者血流动力学^[17],手术创伤前进行有效的坐骨神经及股神经阻,减少患者术中疼痛,并降低中枢敏感化,延长患者镇痛时间,缩短达最高阻滞平面时间,此外还减少局麻药物中毒,减轻术后患者认知功能障碍^[18-19]。本研究发现观察组不良反应发生率明显低于对照组,提示神经刺激仪引导定位坐骨神经-股神经阻滞在老年全髋置换术患者中的安全性较常规麻醉方案高,这与既往文献报告观点相似^[20]。

综上所述,神经刺激仪引导定位坐骨神经-股神经阻滞应用于老年患者的全髋置换术,对患者血流动力学及术后认知功能影响小,为老年全髋置换术患者提供一种安全有效麻醉方案。

【参考文献】

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