

doi: 10.13241/j.cnki.pmb.2021.05.017

腰丛 - 坐骨神经阻滞联合喉罩全麻对老年全髋关节置换术患者血流动力学和术后认知功能的影响 *

李巧云 张海华 许福生 刘金花 许 荔

(中国人民解放军联勤保障部队第 910 医院麻醉科 福建 泉州 362008)

摘要 目的:探讨腰丛 - 坐骨神经阻滞联合喉罩全麻对老年全髋关节置换术患者血流动力学和术后认知功能的影响。**方法:**选取 2017 年 6 月 ~2019 年 4 月期间我院收治的择期行全髋关节置换术的老年患者 121 例。采用随机数字表法分为 A 组(n=60, 喉罩全麻)和 B 组(n=61, 腰丛 - 坐骨神经阻滞联合喉罩全麻), 比较两组患者围术期指标、血流动力学指标、简易智能状态量表(MMSE)评分及不良反应情况。**结果:**两组患者麻醉诱导后(T2)- 术后 1 h(T5)时间点心率(HR)、平均动脉压(MAP)、血氧饱和度(SpO₂)均呈先降低后升高趋势($P<0.05$); B 组 T2~ 手术结束即刻(T4)时间点 SpO₂、MAP、HR 高于 A 组($P<0.05$)。两组术后 1 d、术后 3 d、术后 7 d MMSE 评分均呈先降低后升高趋势, 但 B 组 MMSE 评分高于 A 组($P<0.05$)。两组术中出血量比较差异无统计学意义($P>0.05$), B 组麻醉维持时间长于 A 组, 术后苏醒时间、呼吸功能恢复时间则短于 A 组($P<0.05$)。两组不良反应发生率对比未见统计学差异($P>0.05$)。**结论:**老年全髋关节置换术患者术中给予腰丛 - 坐骨神经阻滞联合喉罩全麻, 可有效改善围术期指标, 稳定患者血流动力学, 减少术后认知功能损害。

关键词:腰丛 - 坐骨神经阻滞; 喉罩全麻; 老年; 全髋关节置换术; 血流动力学; 认知功能

中图分类号:R687; R614 **文献标识码:**A **文章编号:**1673-6273(2021)05-885-04

Effects of Lumbar Plexus Sciatic Nerve Block Combined with Laryngeal Mask General Anesthesia on Hemodynamics and Postoperative Cognitive Function in Elderly Patients Undergoing Total Hip Replacement*

LI Qiao-yun, ZHANG Hai-hua, XU Fu-sheng, LIU Jin-hua, XU Li

(Department of Anaesthesia, 910 Hospital of Joint Service Support Force of Chinese People's Liberation Army, Quanzhou, Fujian, 362008, China)

ABSTRACT Objective: To investigate the effect of lumbar plexus sciatic nerve block combined with laryngeal mask general anesthesia on hemodynamics and postoperative cognitive function in elderly patients undergoing total hip replacement. **Methods:** 121 elderly patients from June 2017 to April 2019 were selected for total hip replacement. The patients were divided into group A (n=60, laryngeal mask general anesthesia) and group B (n=61, lumbar plexus sciatic nerve block combined with laryngeal mask general anesthesia) were randomly divided into two groups. The perioperative indexes, hemodynamics indexes, Simple intelligent state scale (MMSE) scores and adverse reactions of the two groups were compared. **Results:** The Heart rate (HR), mean arterial pressure (map), blood oxygen saturation (SpO₂) of the two groups decreased first and then increased at after anesthesia induction (T2) - 1h after operation (T5) ($P<0.05$), and SpO₂, MAP and HR of the group B were higher than those of the group A ($P<0.05$). The MMSE scores of the two groups decreased first and then increased on the first day, the third day and the seventh day, but the MMSE scores of group B were higher than those of group A ($P<0.05$). There was no significant difference in the amount of bleeding between the two groups ($P>0.05$). There was no significant difference in the incidence of adverse reactions between the two groups ($P>0.05$). **Conclusion:** The elderly patients with total hip arthroplasty who received lumbar plexus sciatic nerve block combined with laryngeal mask general anesthesia can effectively improve the perioperative indexes, stabilize the hemodynamics of patients, and reduce the postoperative cognitive impairment.

Key words: Lumbar plexus sciatic nerve block; Laryngeal mask general anesthesia; Elderly; Total hip replacement; Hemodynamics; Cognitive function

Chinese Library Classification(CLC): R687; R614 **Document code:** A

Article ID: 1673-6273(2021)05-885-04

前言

全髋关节置换术是外科常见术式, 主要是采用模拟人体关节结构的材料置换病损的关节, 从而达到改善髋关节功能的目

* 基金项目: 福建省卫生与计划生育委员会青年科研项目(2016-2-243)

作者简介: 李巧云(1980-), 女, 本科, 主治医师, 研究方向: 临床麻醉, E-mail: liqiaoyun198001@163.com

(收稿日期: 2020-06-28 接受日期: 2020-07-23)

的^[1,2]。全髋关节置换术作为有创术式,术中不可避免的产生一定程度的应激反应;加之实施全髋关节置换术者多为老年群体,老年群体常合并多种慢性疾病,并伴有多器官功能退行性改变,多种因素使得围术期麻醉风险较大^[3-5]。全麻是全髋关节置换术常用的麻醉方式,全麻可分为气管插管和喉罩,相较于气管插管,喉罩具有置入相对简单、对气道刺激小、应激反应轻微等优势,现已广泛应用于全髋关节置换术的麻醉中,但喉罩全麻对手术区域的阻滞作用相对较弱,疗效仍有待加强。腰丛-坐骨神经阻滞可对手术区域的伤害性刺激产生一定的阻滞作用^[6-8]。鉴于此,本研究通过探讨喉罩全麻联合腰丛-坐骨神经阻滞对老年全髋关节置换术患者术后认知功能、血流动力学的影响,以期临床全髋关节置换术中麻醉方案的选择提供参考。

1 资料与方法

1.1 一般资料

选取2017年6月~2019年4月期间我院收治的择期行全髋关节置换术的老年患者121例。此次研究符合我院伦理委员会的相关规定,并已获得伦理委员会批准。纳入标准:(1)均为原发性骨关节炎患者且需行全髋关节置换术,符合手术指征者;(2)手术操作均由同一组医师完成;(3)美国麻醉医师协会(American Society of Anesthesiologists, ASA)^[9]分级为I-II级者;(4)年龄 ≥ 60 岁者;(5)知情本研究且签署同意书。排除标准:(1)伴有凝血功能障碍者;(2)合并感染、免疫缺陷者;(3)术前大出血或贫血者;(4)患有精神疾病或认知功能障碍者;(5)合并重要脏器功能障碍者。采用随机数字表法分为A组($n=60$,喉罩全麻)和B组($n=61$,腰丛-坐骨神经阻滞联合喉罩全麻),其中A组男29例,女31例,年龄60~82岁,平均 (71.48 ± 4.92) 岁;体质量指数 $20.9 \sim 25.7 \text{ kg/m}^2$,平均 $(23.39 \pm 0.87) \text{ kg/m}^2$;ASA分级:I级32例,II级28例。B组男33例,女28例,年龄62~84岁,平均 (70.96 ± 5.17) 岁;体质量指数 $21.3 \sim 26.3 \text{ kg/m}^2$,平均 $(23.53 \pm 0.81) \text{ kg/m}^2$;ASA分级:I级35例,II级26例。两组一般资料比较无差异($P>0.05$)。

1.2 方法

两组患者术前常规禁饮禁食,入室后肌注苯巴比妥钠(重庆药友制药有限责任公司,国药准字H50021537,规格:2 mL:0.2g)0.1 g、阿托品(华润双鹤药业股份有限公司,国药准字H11021897,规格:2 mL:硫酸阿托品0.5 mg,盐酸异丙嗪25 mg)0.5 g,开放静脉通路,常规监测患者心率(Heart rate, HR)、平均动脉压(Mean arterial pressure, MAP)、血氧饱和度(Blood oxygen saturation, SpO_2)等。两组患者均给予喉罩全麻,即静脉滴注舒芬太尼(宜昌人福药业有限责任公司,国药准字H20054171,规格:1 mL:50 μg)0.25~0.5 $\mu\text{g/kg}$ 、顺式阿曲库铵(浙江仙琚制药股份有限公司,国药准字H20090202,规格:5 mg)0.15 mg/kg、依托咪酯(江苏恩华药业股份有限公司,国药准字H32022992,规格:10 mL:20 mg)0.3 mg/kg,诱导成功后插入喉罩,并连接麻醉机行机械控制通气,调整呼吸机参数,其中氧流量2 L/min,呼吸频率9~12次/min,潮气量8~10 mL/kg,呼吸比1:2,麻醉维持:采用微量泵泵注丙泊酚(西安力邦制药有限公司,国药准字H20123318,规格:50 mL:1.0 g),泵入速度为6~10 mg/kg,并间断性注射顺苯阿曲库铵。B组在喉罩全麻前给予腰丛-坐

骨神经阻滞,患肢连接神经刺激器正极,输出频率为2 Hz,电流为1 mA,在观察到大腿肌肉收缩后,逐渐降低刺激电流强度到 $<0.3 \text{ mA}$,腰丛及坐骨神经分别注入0.5%罗哌卡因(广东嘉博制药有限公司,国药准字H20173193,规格:20 mL:150 mg)30 mL,麻醉符合要求后进行喉罩全麻。

1.3 检测指标

(1)记录两组麻醉前(T1)、麻醉诱导后(T2)、切皮即刻(T3)、手术结束即刻(T4)与术后1 h(T5)的 SpO_2 、MAP、HR。(2)记录两组术中出血量、麻醉维持时间、术后苏醒时间、呼吸功能恢复时间。(3)记录两组围术期不良反应情况。(4)于术前1 d、术后1 d、术后3 d、术后7 d采用简易智能状态量表(Minimetal state examination, MMSE)^[10]评价患者认知功能。MMSE包括18个条目共30个评条,总分30分,分数越高,认知功能越好。

1.4 统计学方法

采用SPSS24.0处理数据,计量资料以 $(\bar{x} \pm s)$ 表示,实施t检验,计数资料以率(%)表示,实施 χ^2 检验,将 $\alpha=0.05$ 作为检验标准。

2 结果

2.1 两组患者血流动力学指标比较

两组患者T1时间点 SpO_2 、MAP、HR比较差异无统计学意义($P>0.05$);两组患者T2~T5时间点 SpO_2 、MAP、HR均呈先降低后升高趋势($P<0.05$);B组T2~T4时间点 SpO_2 、MAP、HR高于A组($P<0.05$);详见表1。

2.2 两组围术期指标比较

两组术中出血量比较差异无统计学意义($P>0.05$);B组麻醉维持时间长于A组,术后苏醒时间、呼吸功能恢复时间则短于A组($P<0.05$);详见表2。

2.3 两组患者MMSE评分比较

两组术前1 d MMSE评分比较差异无统计学意义($P>0.05$);两组术后1 d、术后3 d、术后7 d MMSE评分均呈先降低后升高趋势,但B组MMSE评分高于A组($P<0.05$);详见表3。

2.4 两组不良反应发生率比较

A组围术期出现恶心呕吐1例、低血压1例、呼吸抑制1例、尿潴留1例,不良反应发生率为6.67%(4/60);B组围术期出现恶心呕吐1例、低血压1例、呼吸抑制1例,不良反应发生率为4.92%(3/61);两组不良反应发生率对比未见统计学差异($\chi^2=0.172, P=0.681$)。

3 讨论

原发性骨关节炎是目前临床最为常见的关节退行性疾病,老年患者的发病率可达34%~51%,给老年患者的生活质量带来严重影响^[11,12]。全膝关节置换术是原发性骨关节炎的终末期首选治疗方案,该术式目前已较为成熟,可大幅度减轻患者疼痛,恢复患者关节功能^[13-16]。但由于老年人群基础疾病较多,其心肺功能、凝血功能等均随着年龄的增长而降低,故而对手术及麻醉的耐受力远低于年轻群体,加之神经系统的调控力随之变差,导致其对手术的麻醉承受度减弱^[17,18]。喉罩全麻因其操

表 1 两组患者血流动力学指标比较($\bar{x} \pm s$)Table 1 Comparison of hemodynamic indexes between the two groups($\bar{x} \pm s$)

Groups	Time	SpO ₂ (%)	MAP(mmHg)	HR(n/min)
Group A(n=60)	T1	131.26±9.13	83.39±8.23	79.18±6.14
	T2	119.35±8.02 ^a	74.11±7.18 ^a	71.91±6.05 ^a
	T3	112.24±7.42 ^{ab}	69.26±7.78 ^{ab}	65.09±6.27 ^{ab}
	T4	118.19±6.33 ^{ac}	74.84±7.65 ^{ac}	70.13±6.41 ^{ac}
	T5	128.14±9.54 ^{bcd}	82.18±9.95 ^{bcd}	77.82±7.58 ^{bcd}
Group B(n=61)	T1	130.28±8.23	84.35±7.73	79.22±6.47
	T2	124.36±7.26 ^{ac}	79.52±8.42 ^{ac}	75.29±5.71 ^{ac}
	T3	117.67±9.87 ^{abc}	73.83±7.31 ^{abc}	71.17±6.62 ^{abc}
	T4	123.81±8.15 ^{acc}	78.53±8.54 ^{acc}	74.41±5.87 ^{acc}
	T5	128.93±10.36 ^{bcd}	83.13±8.27 ^{bcd}	78.96±6.02 ^{bcd}

Note: compared with T1 time point, ^a $P<0.05$; compared with T2 time point, ^b $P<0.05$; compared with T3 time point, ^c $P<0.05$; compared with T4 time point, ^d $P<0.05$; compared with group A, ^e $P<0.05$.

表 2 两组围术期指标比较($\bar{x} \pm s$)Table 2 Comparison of perioperative indexes between the two groups($\bar{x} \pm s$)

Groups	Intraoperative hemorrhage (mL)	Duration of anesthesia(min)	Postoperative recovery time (min)	Recovery time of respiratory function(min)
Group A(n=60)	731.95±21.26	345.93±19.34	22.48±2.78	19.84±2.99
Group B(n=61)	728.16±19.21	423.88±24.32	15.27±2.69	14.91±2.01
t	1.029	19.494	14.499	10.660
P	0.305	0.000	0.000	0.000

表 3 两组患者 MMSE 评分比较($\bar{x} \pm s$)Table 3 MMSE score comparison between the two groups($\bar{x} \pm s$)

Groups	1d before operation	1d after operation	3d after operation	7d after operation
Group A(n=60)	28.89±0.96	22.27±0.42 ^a	24.43±0.74 ^{ab}	26.52±0.54 ^{abc}
Group B(n=61)	28.85±0.87	25.13±0.56 ^a	26.97±0.82 ^{ab}	27.94±0.68 ^{abc}
t	0.240	311.741	10.840	12.707
P	0.811	0.000	0.000	0.000

Note: compared with 1d before operation, ^a $P<0.05$; compared with 1d after operation, ^b $P<0.05$; compared with 3d after operation, ^c $P<0.05$.

作简单,可快速建立人工气腹,不伤及咽喉与气管黏膜,放置成功率高,故比较适合老年群体。但是该项麻醉仍无法彻底阻止手术区域的刺激,无法最大化的减少机体应激。腰丛-坐骨神经阻滞可以从脊髓水平抑制伤害性刺激反射弧的形成,从而更好的抑制神经系统的应激反应^[19,20]。但有关腰丛-坐骨神经阻滞在全膝关节置换术的应用尚需进一步的样本量以证实,就此展开分析。

本次研究结果中,两组患者的血流动力学均存在不同程度的波动,但B组的血流波动明显更轻,提示老年全膝关节置换术患者术中给予腰丛-坐骨神经阻滞联合喉罩全麻,可有效稳定患者血流动力学。分析其原因,喉罩对喉头及气管的机械性刺激小,操作简便,全麻则可产生中枢神经系统的阻滞,而腰丛-坐骨神经阻滞可通过将药物直接注射到神经干(丛),对交感神经影响较轻,不会造成内脏血管的扩张,可减轻患者手术

刺激的传入量,极大程度降低患者应激反应,减少了血流波动^[21-23]。应激反应除了可引起机体血流波动外,还可引起患者认知功能的损害。当机体受到刺激时,神经-内分泌系统的主要变化为蓝斑-交感-肾上腺髓质系统-垂体-肾上腺皮质轴的强烈兴奋,继而引起患者术后认知功能障碍^[24,25]。本研究中两组术后1d、术后3d、术后7d MMSE评分均呈先降低后升高趋势,但B组MMSE评分高于A组,提示腰丛-坐骨神经阻滞联合喉罩全麻可有效减轻机体认知功能损害。这可能是因为腰丛-坐骨神经阻滞可有效抑制手术区域的神经冲动向中枢神经传递,同时还可完全松弛手术区域肌肉,术中再根据患者具体麻醉情况追加麻醉药物,多方面的因素有利于减轻机体认知功能损害^[26-28]。另B组的各项围术期指标均优于A组,可能是因为腰丛-坐骨神经阻滞联合喉罩全麻可有效维持血流动力学平稳,达到良好的麻醉效果,为手术的顺利进行提供基本保障,

从而改善各项指标情况^[29,30]。同时两组不良反应发生率对比无差异,可见腰丛-坐骨神经阻滞联合喉罩全麻安全性较好,不会增加不良反应发生率。

综上所述,老年全髋关节置换术患者术中给予腰丛-坐骨神经阻滞联合喉罩全麻,可有效改善围术期指标,稳定患者血流动力学,减少术后认知功能损害,且安全性较高。

参考文献(References)

- [1] Uusalo P, Jätinvuori H, Löytyniemi E, et al. Intranasal Low-Dose Dexmedetomidine Reduces Postoperative Opioid Requirement in Patients Undergoing Hip Arthroplasty Under General Anesthesia[J]. J Arthroplasty, 2019, 34(4): 686-692.e2
- [2] Esposito CI, Miller TT, Lipman JD, et al. Biplanar Low-Dose Radiography Is Accurate for Measuring Combined Anteversion After Total Hip Arthroplasty[J]. HSS J, 2020, 16(1): 23-29
- [3] Sypień P, Łęgosz P, Małdyk P. Use of Three-dimensional Printing and Patient-matched Implant in Total Hip Arthroplasty - a Case Study[J]. Ortop Traumatol Rehabil, 2019, 21(3): 207-211
- [4] Lee C, Lee J, Lee G, et al. Pregabalin and Dexmedetomidine Combined for Pain After Total Knee Arthroplasty or Total Hip Arthroplasty Performed Under Spinal Anesthesia [J]. Orthopedics, 2018, 41(6): 365-370
- [5] 胡亚丽,代娟,石磊,等.自我效能联合加速康复外科干预在老年全髋关节置换围手术期病人中的应用研究 [J]. 实用老年医学, 2019, 33(11): 1131-1134
- [6] Donauer K, Bomberg H, Wagenpfeil S, et al. Regional vs. General Anesthesia for Total Knee and Hip Replacement: An Analysis of Postoperative Pain Perception from the International PAIN OUT Registry[J]. Pain Pract, 2018, 18(8):1036-1047
- [7] Johnson RL, Kopp SL, Burkle CM, et al. Neuraxial vs general anaesthesia for total hip and total knee arthroplasty: a systematic review of comparative-effectiveness research [J]. Br J Anaesth, 2016, 116(2): 163-176
- [8] Amundson AW, Panchamia JK, Jacob AK. Anesthesia for Same-Day Total Joint Replacement[J]. Anesthesiol Clin, 2019, 37(2): 251-264
- [9] 李响. 美国麻醉医师协会分级在老年肝癌患者外科治疗风险评估中的作用[J]. 实用老年医学, 2015, 29(9): 755-758
- [10] 徐钊,常建华,宋文英,等.不同剂量右美托咪定麻醉对老年食管癌根治术患者血清因子及简易智能状态量表评分的影响[J]. 实用临床医药杂志, 2019, 23(21): 83-87
- [11] 姜军,任中华,吕厚山.腰椎退行性病变与原发髋关节骨关节炎发病的关系[J]. 中华医学杂志, 2010, 90(7): 466-468
- [12] Bowden JL, Egerton T, Hinman RS, et al. Protocol for the process and feasibility evaluations of a new model of primary care service delivery for managing pain and function in patients with knee osteoarthritis (PARTNER) using a mixed methods approach[J]. BMJ Open, 2020, 10(2): e034526
- [13] 段虹昊,肖琳,李辉,等.全膝关节置换术与单髁置换术治疗老年膝关节骨关节炎的疗效比较[J]. 现代生物医学进展, 2017, 17(13): 2463-2465, 2511
- [14] Pfizner T, Perka C, von Roth P. Unicompartmental vs. Total Knee Arthroplasty for Medial Osteoarthritis[J]. Z Orthop Unfall, 2017, 155(5): 527-533
- [15] Aujla RS, Esler CN. Total Knee Arthroplasty for Osteoarthritis in Patients Less Than Fifty-Five Years of Age: A Systematic Review[J]. J Arthroplasty, 2017, 32(8): 2598-2603.e1
- [16] Johal S, Nakano N, Baxter M, et al. Unicompartmental Knee Arthroplasty: The Past, Current Controversies, and Future Perspectives [J]. J Knee Surg, 2018, 31(10): 992-998
- [17] Memtsoudis SG, Wilson LA, Bekeris J, et al. Anaesthesia provider volume and perioperative outcomes in total joint arthroplasty surgery [J]. Br J Anaesth, 2019, 123(5): 679-687
- [18] Li S, Qu B, Ma W, et al. Perioperative anaesthesia and coagulation management of haemophilia patients receiving total hip and knee replacement arthroplasty: Experience from a case series [J]. J Orthop Surg (Hong Kong), 2019, 27(3): 2309499019874931
- [19] Stambough JB, Bloom GB, Edwards PK, et al. Rapid Recovery After Total Joint Arthroplasty Using General Anesthesia[J]. J Arthroplasty, 2019, 34(9): 1889-1896
- [20] Bareka M, Hantes M, Arnaoutoglou E, et al. Superior perioperative analgesia with combined femoral-obturator-sciatic nerve block in comparison with posterior lumbar plexus and sciatic nerve block for ACL reconstructive surgery[J]. Knee Surg Sports Traumatol Arthrosc, 2018, 26(2): 478-484
- [21] Jaffe JD, Morgan TR, Russell GB. Combined Sciatic and Lumbar Plexus Nerve Blocks for the Analgesic Management of Hip Arthroscopy Procedures: A Retrospective Review [J]. J Pain Palliat Care Pharmacother, 2017, 31(2): 121-125
- [22] Tempestini-Horliana ACR, Lamers ML, Yonamine M, et al. Late hyaluronidase injection in local anesthesia: Morphofunctional evaluation in rat sciatic nerve block [J]. Indian J Dent Res, 2019, 30(5): 692-696
- [23] McLeod GA, McKendrick M, Taylor A, et al. An initial evaluation of the effect of a novel regional block needle with tip-tracking technology on the novice performance of cadaveric ultrasound-guided sciatic nerve block[J]. Anaesthesia, 2020, 75(1): 80-88
- [24] Izvoltskaia M1, Sharova V2, Zakharova L. Prenatal Programming of Neuroendocrine System Development by Lipopolysaccharide: Long-Term Effects[J]. Int J Mol Sci, 2018, 19(11): pii: E3695
- [25] Abruzzese GA, Crisosto N, De Grava Kempinas W. Developmental programming of the female neuroendocrine system by steroids [J]. J Neuroendocrinol, 2018, 30(10): e12632
- [26] Warrit K, Griffenhagen G, Goh C, et al. Comparison of ultrasound-guided lumbar plexus and sciatic nerve blocks with ropivacaine and sham blocks with saline on perianesthetic analgesia and recovery in dogs undergoing tibial plateau leveling osteotomy surgery[J]. Vet Anaesth Analg, 2019, 46(5): 673-681
- [27] 代晨旭,蔡宁,官双双,等.腰丛联合坐骨神经阻滞与股-闭孔-坐骨神经阻滞在全膝关节置换术的临床效果比较[J]. 解放军预防医学杂志, 2019, 37(8): 55-56
- [28] 秦爱敏,马春宇,张增梅,等.腰丛-坐骨神经阻滞对高龄全髋关节置换术后转归的影响[J]. 中华实验外科杂志, 2019, 36(1): 157-159
- [29] 张世强,刘宏飞,马宏.喉罩全麻复合腰丛-坐骨神经阻滞应用于老年患者全膝关节置换术的临床观察 [J]. 河北医学, 2017, 23(11): 1833-1836
- [30] Shi ZY, Jiang CN, Shao G. Application of lower limb nerve block combined with slow induction of light general anesthesia and tracheal induction in elderly hip surgery [J]. Medicine (Baltimore), 2018, 97(40): e12581