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# 连续胸椎旁神经阻滞联合全身麻醉对乳腺癌根治手术患者血流动力学、应激反应及生存质量的影响\*

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**摘要 目的:**探讨连续胸椎旁神经阻滞(TPVB)联合全身麻醉对乳腺癌根治手术患者血流动力学、应激反应及生存质量的影响。**方法:**选择2017年2月~2019年8月期间于我院行乳腺癌根治手术的乳腺癌患者125例,按照随机数字表法分为A组62例和B组63例,A组给予全身麻醉,B组给予TPVB联合全身麻醉,对比两组血流动力学、应激反应、生存质量、疼痛及不良反应。**结果:**两组插管前(T1)~拔管时(T4)时间点平均动脉压(MAP)、心率(HR)均较麻醉前(T0)升高,但B组T1~T4时间点MAP、HR低于A组( $P<0.05$ )。B组术后1d肾上腺素、血糖、去甲肾上腺素及多巴胺水平低于A组( $P<0.05$ )。两组术后6个月躯体角色、躯体功能、情感角色、社会功能、躯体疼痛、总体健康、活力以及心理健康评分均较术前升高( $P<0.05$ )。B组术后4h、术后12h、术后24h安静时视觉模拟评分法(VAS)评分、运动时VAS评分低于A组( $P<0.05$ )。两组不良反应总发生率对比未见统计学差异( $P>0.05$ )。**结论:**TPVB联合全身麻醉应用于乳腺癌根治手术患者,可减轻机体应激反应,维持血流动力学平稳,减轻术后疼痛,且不增加不良反应发生率,对生存质量无显著影响。

**关键词:**连续胸椎旁神经阻滞;全身麻醉;乳腺癌根治手术;血流动力学;应激反应;生存质量

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## Effects of Continuous Thoracic Paravertebral Nerve Block Combined with General Anesthesia on Hemodynamics, Stress Response and Quality of Life in Patients with Radical Mastectomy\*

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**ABSTRACT Objective:** To investigate the effect of continuous thoracic paravertebral nerve block (TPVB) combined with general anesthesia on hemodynamics, stress response and quality of life in patients with radical mastectomy. **Methods:** 125 patients with breast cancer undergoing radical mastectomy in our hospital from February 2017 to August 2019 were selected, and randomly divided into group A with 62 cases and group B with 63 cases. Group A was given general anesthesia, while group B was given TPVB combined with general anesthesia. Hemodynamics, stress response, quality of life, pain and adverse reactions were compared between the two groups. **Results:** The mean arterial pressure (MAP) and heart rate (HR) at before intubation (T1) ~ extubation (T4) time points in both groups were higher than those before anesthesia (T0), but MAP and HR at T1-T4 time points in group B were lower than those in group A ( $P<0.05$ ). The levels of epinephrine, blood glucose, norepinephrine and dopamine in group B were lower than those in group A ( $P<0.05$ ). The scores of physical role, physical function, emotional role, social function, physical pain, general health, vitality and mental health in the two groups at 6 months after operation were increased than those before operation ( $P<0.05$ ). The visual analogue scale (VAS) for quietness and VAS for movement in group B at 4 h, 12 h and 24 h after operation were lower than those in group A ( $P<0.05$ ). There was no significant difference in the total incidence rate of adverse reactions between two groups ( $P>0.05$ ). **Conclusion:** TPVB combined with general anesthesia in patients with radical mastectomy can reduce body stress response, maintain stable hemodynamics, reduce postoperative pain, and does not increase the incidence rate of adverse reactions, and its has no significant impact on the quality of life.

**Key words:** Continuous thoracic paravertebral nerve block; General anesthesia; Radical mastectomy; Hemodynamics; Stress response; Quality of life

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## 前言

乳腺癌是全球女性发病率和死亡率较高的恶性肿瘤之一,随着人们保健意识的提高,乳腺癌的早期检出率不断上升<sup>[1]</sup>。乳腺癌根治术是治疗早期乳腺癌患者最有效的治疗方案,可有效阻止疾病进展<sup>[2]</sup>。但由于乳腺癌根治术的手术范围较大,同时还对腋窝淋巴结进行清扫,导致患者在术中承受巨大的痛苦,机体产生强烈的应激反应<sup>[3,4]</sup>。全身麻醉是乳腺癌根治术的常用麻醉方式,但其无法完全阻断外周刺激向中枢神经系统传导,同时也无法最大化的抑制机体应激反应<sup>[5,6]</sup>。近年来,连续胸椎旁神经阻滞(TPVB)逐步得到重视,其可提供有效的围手术期镇痛<sup>[7]</sup>。本研究通过探讨TPVB联合全身麻醉对乳腺癌根治手术患者血流动力学、应激反应及生存质量的影响,以期为乳腺癌根治手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

选取我院于2017年2月~2019年8月期间行乳腺癌根治手术的125例乳腺癌患者,纳入标准:(1)ASA分级I~II级;(2)经病理学检查确诊为乳腺癌;(3)患者及其家属知情本研究且签署同意书;(4)具有乳腺癌根治手术相关指征,择期完成手术;(5)手术均由同一组医师团队完成。排除标准:(1)意识障碍、精神疾病者;(2)合并其他恶性肿瘤者;(3)复发性乳腺癌;(4)存在急性感染、糖尿病及免疫系统、神经系统疾病者;(5)心、肝、肺、肾等脏器功能异常者;(6)胸椎旁阻滞禁忌症者;(7)对酰胺类局麻药或阿片类药物过敏者。按照随机数字表法分为A组62例和B组63例,其中A组年龄31~69岁,平均(45.82±6.97)岁;体质指数20~26 kg/m<sup>2</sup>,平均(23.37±1.12) kg/m<sup>2</sup>;美国麻醉医师协会(ASA)分级II级29例,I级33例;病理类型:浸润性导管癌24例,浸润性小叶癌20例,导管原位癌18例。B组年龄33~68岁,平均(45.67±5.32)岁;体质指数20~25 kg/m<sup>2</sup>,平均(23.41±0.96) kg/m<sup>2</sup>;美国麻醉医师协会分级II级28例,I级35例;病理类型:浸润性导管癌25例,浸润性小叶癌21例,导管原位癌17例。对比两组一般资料无差异( $P>0.05$ ),资料均衡可比。

### 1.2 方法

两组患者术前行全身检查,确认手术日期,术前常规禁食8 h,入室后开放静脉通道,常规监测脉搏平均动脉压(MAP)、心率(HR)等,同时静脉给予咪达唑仑(江苏九旭药业有限公司,国药准字H20153019,规格:3 mL:15 mg)2 mg。A组给予全身麻醉诱导,依次静脉滴注丙泊酚(广东嘉博制药有限公司,国药准字H20133360,规格:50 mL:500 mg)1~2 mg/kg、芬太尼(宜昌人福药业有限责任公司,国药准字H42022076,规格:2 mL:0.1 mg)3~4 μg/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(以顺式阿曲库铵计)]0.2 g/kg,诱导成功后气管插管,麻醉维持给予1%丙泊酚持续微量泵注,给予七氟烷(上海恒瑞医药有限公司,国药准字H20173007,规格:250 mL)吸入及芬太尼间断静脉注射。而B组则先给予TPVB,再行全身麻醉。TPVB操作方法如下:取俯卧位,穿刺点选取第五胸椎棘突上缘2 cm处,1%利多卡因(西安风华药业有限公司,国药准字H61020861,规格:5 mL:0.1 g)

对穿刺点附近皮肤进行局部浸润,将东芝SAL-32B型超声仪探头置于胸横突平面,寻找横突结构并做好标记。设置周围神经刺激器的初始电流参数为6 V、3 mA、2 Hz,采用上海普益医疗器械有限公司生产的穿刺针进行穿刺,垂直皮肤进针当针尖滑过横突之后可继续进针1 cm,感觉到肋间肌有所收缩时,将电流调整至0.3~0.6 mA,若仍可感受到肋间肌收缩,回抽无气体或血液之后注入罗哌卡因(广东嘉博制药有限公司,国药准字H20133181,规格:10 mL:50 mg(按盐酸罗哌卡因计))2~2.5 mg/kg,固定好穿刺针,测定并记录阻滞平面,起效15 min后则进行全身麻醉诱导。麻醉维持方案同A组。

### 1.3 观察指标

(1)记录两组患者麻醉前(T<sub>0</sub>)、插管前(T<sub>1</sub>)、气管插管即刻(T<sub>2</sub>)、切皮时(T<sub>3</sub>)、拔管时(T<sub>4</sub>)的MAP、HR。(2)于术前、术后1 d采集患者空腹静脉血,采血量5 mL,经常规离心处理及分离血清后置于冰箱中待测。检测肾上腺素、血糖、去甲肾上腺素及多巴胺水平,均采用放射免疫法检测,试剂盒购自北京福瑞生物工程公司,严格按试剂盒说明书操作。(3)采用视觉模拟评分法(VAS)<sup>[8]</sup>评测两组术后4 h、12 h及24 h的安静、运动时疼痛程度。VAS评分0~10分,分数越高,疼痛程度越重。(4)记录两组围术期间不良反应发生情况。(5)以门诊复查的形式随访6个月,采用健康调查简表(SF-36)<sup>[9]</sup>评价患者术前、术后6个月的生存质量。该量表包括8个维度,分别为躯体角色、躯体功能、情感角色、社会功能、躯体疼痛、总体健康、活力以及心理健康。每个维度评分范围为100分,分值越高,生存质量越高。

### 1.4 统计学处理

数据经SPSS23.0软件处理,计量资料采用( $\bar{x} \pm s$ )表示,行t检验,计数资料以[n(%)]表示,行 $\chi^2$ 检验,检验标准为 $\alpha=0.05$ 。

## 2 结果

### 2.1 两组血流动力学对比

两组T<sub>0</sub>时间点MAP、HR组间对比差异无统计学意义( $P>0.05$ ),两组T<sub>1</sub>~T<sub>4</sub>时间点MAP、HR均较T<sub>0</sub>升高,但B组T<sub>1</sub>~T<sub>4</sub>时间点MAP、HR低于A组( $P<0.05$ ),见表1。

### 2.2 两组应激反应指标对比

两组术前肾上腺素、血糖、去甲肾上腺素及多巴胺水平组间对比差异无统计学意义( $P>0.05$ ),两组术后1 d肾上腺素、血糖、去甲肾上腺素及多巴胺水平均较术前升高,但B组术后1 d肾上腺素、血糖、去甲肾上腺素及多巴胺水平低于A组( $P<0.05$ ),见表2。

### 2.3 两组生存质量对比

两组术前躯体角色、躯体功能、情感角色、社会功能、躯体疼痛、总体健康、活力以及心理健康评分组间对比差异无统计学意义( $P>0.05$ ),两组术后6个月躯体角色、躯体功能、情感角色、社会功能、躯体疼痛、总体健康、活力以及心理健康评分均较术前升高( $P<0.05$ ),但组间比较差异无统计学意义( $P>0.05$ ),见表3。

### 2.4 两组疼痛情况对比

两组4 h、术后12 h、术后24 h安静时VAS评分、运动时VAS评分呈升高趋势( $P<0.05$ ),B组术后4 h、术后12 h、术后24 h安静时VAS评分、运动时VAS评分较A组更低( $P<0.05$ ),见表4。

表 1 两组血流动力学对比( $\bar{x} \pm s$ )Table 1 Comparison of hemodynamics between the two groups( $\bar{x} \pm s$ )

| Groups        | Time points    | MAP(mmHg)                  | HR( beats/min )             |
|---------------|----------------|----------------------------|-----------------------------|
| Group A(n=62) | T <sub>0</sub> | 87.69± 7.47                | 70.42± 6.51                 |
|               | T <sub>1</sub> | 96.75± 6.52 <sup>a</sup>   | 82.41± 7.34 <sup>a</sup>    |
|               | T <sub>2</sub> | 102.39± 7.27 <sup>ab</sup> | 89.64± 6.21 <sup>ab</sup>   |
|               | T <sub>3</sub> | 97.44± 8.23 <sup>ac</sup>  | 86.03± 7.18 <sup>abc</sup>  |
|               | T <sub>4</sub> | 99.33± 6.27 <sup>ab</sup>  | 88.71± 5.04 <sup>abd</sup>  |
| Group B(n=63) | T <sub>0</sub> | 87.72± 7.05                | 70.23± 6.36                 |
|               | T <sub>1</sub> | 91.27± 6.52 <sup>ac</sup>  | 75.49± 7.62 <sup>ac</sup>   |
|               | T <sub>2</sub> | 96.43± 7.16 <sup>abc</sup> | 81.87± 6.03 <sup>abc</sup>  |
|               | T <sub>3</sub> | 94.76± 6.23 <sup>abc</sup> | 78.53± 6.17 <sup>abcc</sup> |
|               | T <sub>4</sub> | 95.82± 7.15 <sup>abc</sup> | 80.34± 7.11 <sup>abc</sup>  |

Note: compared with T<sub>0</sub> time point, <sup>a</sup>*P*<0.05; compared with T<sub>1</sub> time point, <sup>b</sup>*P*<0.05; compared with T<sub>2</sub> time point, <sup>c</sup>*P*<0.05; compared with T<sub>3</sub> time point, <sup>d</sup>*P*<0.05; compared with group A, <sup>e</sup>*P*<0.05.

表 2 两组应激反应指标对比( $\bar{x} \pm s$ )Table 2 Comparison of stress response indexes between the two groups( $\bar{x} \pm s$ )

| Groups        | Time points         | Epinephrine(pg/mL)          | Blood glucose (mmol/L)   | Norepinephrine (pg/mL)      | Dopamine(pg/mL)           |
|---------------|---------------------|-----------------------------|--------------------------|-----------------------------|---------------------------|
| Group A(n=62) | Before operation    | 167.22± 21.46               | 6.57± 0.64               | 191.93± 22.57               | 35.37± 2.54               |
|               | 1 d after operation | 210.43± 32.74 <sup>a</sup>  | 9.12± 0.57 <sup>a</sup>  | 261.32± 31.30 <sup>a</sup>  | 49.18± 2.43 <sup>a</sup>  |
| Group B(n=63) | Before operation    | 166.87± 26.22               | 6.64± 0.49               | 192.28± 28.71               | 35.02± 3.57               |
|               | 1 d after operation | 187.26± 31.20 <sup>ab</sup> | 8.23± 0.58 <sup>ab</sup> | 227.62± 29.74 <sup>ab</sup> | 42.11± 3.47 <sup>ab</sup> |

Note: compared with before operation, <sup>a</sup>*P*<0.05; compared with group A, <sup>b</sup>*P*<0.05.

表 3 两组生存质量对比( $\bar{x} \pm s$ , 分)Table 3 Comparison of quality of life between the two groups( $\bar{x} \pm s$ , score)

| Groups         | Time points              | Physical role            | Mental health            | Vitality                 | General health           | Physical pain            | Docial function          | Emotional role           | Physical function        |
|----------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Group A (n=62) | Before operation         | 48.53± 7.17              | 51.88± 8.29              | 58.34± 7.92              | 57.62± 6.88              | 56.34± 7.21              | 52.23± 7.64              | 52.15± 6.32              | 53.18± 7.56              |
|                | 6 months after operation | 82.57± 7.13 <sup>a</sup> | 84.28± 6.74 <sup>a</sup> | 87.03± 8.27 <sup>a</sup> | 82.48± 8.54 <sup>a</sup> | 85.15± 9.68 <sup>a</sup> | 85.79± 7.82 <sup>a</sup> | 87.42± 8.24 <sup>a</sup> | 84.76± 6.13 <sup>a</sup> |
| Group B (n=63) | Before operation         | 48.93± 6.41              | 52.07± 7.61              | 58.86± 7.35              | 57.13± 6.38              | 56.90± 5.13              | 51.93± 6.14              | 52.39± 7.47              | 53.83± 8.24              |
|                | 6 months after operation | 82.68± 7.47 <sup>a</sup> | 84.39± 7.42 <sup>a</sup> | 88.51± 6.39 <sup>a</sup> | 82.68± 7.36 <sup>a</sup> | 85.81± 8.15 <sup>a</sup> | 85.12± 7.13 <sup>a</sup> | 87.91± 8.52 <sup>a</sup> | 85.32± 7.51 <sup>a</sup> |

Note: compared with before operation, <sup>a</sup>*P*<0.05.

表 4 两组疼痛情况对比( $\bar{x} \pm s$ , 分)Table 4 Comparison of pain between the two groups( $\bar{x} \pm s$ , score)

| Groups        | Time points          | VAS for quietness         | VAS for movement          |
|---------------|----------------------|---------------------------|---------------------------|
| Group A(n=62) | 4 h after operation  | 2.73± 0.48                | 3.27± 0.41                |
|               | 12 h after operation | 3.24± 0.35 <sup>a</sup>   | 3.87± 0.39 <sup>a</sup>   |
|               | 24 h after operation | 3.69± 0.44 <sup>ab</sup>  | 4.51± 0.41 <sup>ab</sup>  |
| Group B(n=63) | 4 h after operation  | 1.45± 0.36 <sup>c</sup>   | 1.96± 0.35 <sup>c</sup>   |
|               | 12 h after operation | 2.06± 0.35 <sup>ac</sup>  | 2.47± 0.38 <sup>ac</sup>  |
|               | 24 h after operation | 2.51± 0.39 <sup>abc</sup> | 2.98± 0.36 <sup>abc</sup> |

Note: compared with 4 h after operation, <sup>a</sup>*P*<0.05; compared with 12 h after operation, <sup>b</sup>*P*<0.05; compared with group A, <sup>c</sup>*P*<0.05.

## 2.5 两组不良反应情况

见表 5。

对比两组不良反应总发生率,差异无统计学意义( $P>0.05$ ),

表 5 两组不良反应对比 [n(%)]

Table 5 Comparison of adverse reactions between the two groups [n(%)]

| Groups        | Vomit   | Nausea  | Shiver  | Urinary retention | Total incidence rate |
|---------------|---------|---------|---------|-------------------|----------------------|
| Group A(n=62) | 2(3.23) | 3(4.84) | 2(3.23) | 1(1.61)           | 8(12.90)             |
| Group B(n=63) | 1(1.59) | 2(3.17) | 1(1.59) | 1(1.59)           | 5(7.94)              |
| $\chi^2$      |         |         |         |                   | 0.827                |
| $P$           |         |         |         |                   | 0.623                |

## 3 讨论

乳腺癌根治手术患者常因麻醉药物的应用、手术损伤、术后疼痛及不良情绪而引发机体强烈的应激反应,进而导致肾上腺素、血糖及去甲肾上腺素升高、交感神经兴奋等一系列表现,引起机体血流波动,可加重机体组织损伤<sup>[10-12]</sup>。因此合理的麻醉方式能够维持血流动力学平稳、降低应激反应,从而有助于提高手术治疗效果。全身麻醉通过将麻醉药注射进入人体,产生中枢神经系统的暂时抑制。但此麻醉方案随着手术完成后麻药消退,患者各项神经传导功能恢复,而使得患者感受到强烈的疼痛,影响患者术后康复,麻醉效果仍有待加强<sup>[13-15]</sup>。近年来,围术期多模式镇痛逐渐受到麻醉医师的关注和广泛应用,临床尝试将不同作用机制的麻醉镇痛药物及不同镇痛措施应用于外科手术中。TPVB 是指将局麻药注射到椎旁间隙的一种局部麻醉技术,对手术过程中产生的痛觉活动进行阻滞,从而达到镇痛的麻醉效果<sup>[16-18]</sup>。

本次研究结果显示,相较于单纯的全身麻醉,TPVB 联合全身麻醉应用于乳腺癌根治手术患者,缓解术后疼痛的效果更佳。阻滞方案所用的局麻药物为罗哌卡因,罗哌卡因具有局部吸收少、持续时间长、镇痛效果显著等优势<sup>[19]</sup>。TPVB 通过将罗哌卡因注射于椎旁间隙,对胸椎旁侧肋间神经、交感神经及脊神经进行阻滞,产生超前镇痛效果,阻断外周手术性创伤向中枢传导,有效控制围术期疼痛,可补充全身麻醉的镇痛不足<sup>[20,21]</sup>。且 TPVB 对循环系统功能影响小,交感神经阻滞程度弱且范围局限,无明显的血管扩张,利于维持机体正常循环功能,故而血流动力学相对更为平稳<sup>[22,23]</sup>。应激反应是指机体由于受到伤害性的刺激造成以交感神经兴奋和丘脑下部垂体前叶-肾上腺皮质分泌增多为主的一系列神经内分泌活动<sup>[24,25]</sup>。手术和麻醉均会引起机体不同程度的应激反应,肾上腺素、血糖、去甲肾上腺素及多巴胺均是临床常见的应激反应指标,其水平升高可导致肾脏、心脏等重要脏器的血管强烈收缩,影响机体正常供血,血流动力学紊乱,同时上述指标水平紊乱也是影响患者术后恢复的因素之一<sup>[26]</sup>。本研究中 B 组术后 1 d 肾上腺素、血糖、去甲肾上腺素及多巴胺水平均低于 A 组,说明 TPVB 联合全身麻醉对交感神经抑制作用较强,能够减弱应激反应。既往研究证实<sup>[27]</sup>,应用 TPVB 的患者去甲肾上腺素、肾上腺素及多巴胺等应激反应指标较单纯全麻患者明显降低,且血流波动相对更小。与本次研究结果基本一致。这可能与胸椎旁神经的解剖结构特点有关,胸椎旁神经位于椎间孔的脊神经,对此部位施行

局麻后,可影响邻近部位数个感觉、运动与交感神经纤维,并对其产生阻滞效应,有效减轻围术期的各种刺激<sup>[28]</sup>。同时比较患者围术期安全性,结果显示 TPVB 联合全身麻醉未增加不良反应发生率,安全可靠,易于使患者耐受。另通过随访发现,两组术后 6 个月生存质量得到显著改善,但组间对比未见显著性差异。可见 TPVB 联合全身麻醉有利于患者术后恢复,不会对患者预后产生影响。

综上所述,TPVB 联合全身麻醉应用于乳腺癌根治手术患者,可减轻机体应激反应,维持血流动力学平稳,减轻术后疼痛,且不增加不良反应发生率,对生存质量无显著影响。

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