

椎旁平面阻滞在乳腺癌手术中的应用进展

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摘要

超声引导下的神经阻滞技术在乳腺癌围术期镇痛中承担着重要角色, 在众多的阻滞技术中胸椎旁阻滞技术因镇痛效果确切, 常作为金标准被各指南推荐。为降低胸椎旁阻滞的风险以及操作难度, 竖脊肌平面阻滞、肋横突阻滞、横突-胸膜中点阻滞、椎板阻滞等椎旁平面阻滞技术被陆续开发并应用于临床, 文章介绍了上述椎旁平面阻滞技术及其在乳腺手术当中的应用情况, 这些阻滞技术操作相对简单, 但镇痛效果、药物扩散途径及相关风险目前存在争议, 需要进一步研究。

关键词

椎旁间隙阻滞, 胸椎旁阻滞, 乳腺, 区域阻滞, 镇痛

Application Progress of Paravertebral Plane Block in Breast Cancer Surgery

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Abstract

Ultrasound-guided nerve block plays an important role in the perioperative analgesia of breast cancer. Among many block techniques, thoracic paravertebral block is often recommended as the gold standard by various guidelines because of its exact analgesic effect. In order to reduce the risk of thoracic paravertebral block and the difficulty of operation, paravertebral block techniques such as erector spinae plane block, costotransverse process block, transverse process-pleural point block,

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and laminar block have been developed and applied in clinical practice. This article introduces the above paravertebral plane block techniques and their application in breast surgery. But the analgesia effect, way of drug diffusion and related risk is controversial, needs further research.

Keywords

Paravertebral Space Block, Thoracic Paravertebral Block, The Mammary Gland, Regional Block, Analgesia

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1. 引言

乳腺癌是女性最常见的恶性肿瘤，其发病率和死亡数预计在 2030 年前仍将保持上升趋势[1]。乳腺癌改良根治术是目前国内最常采用手术方式[2]，该术式所涉及的范围较大，损伤区域较多，术后常出现术区疼痛影响患者康复[3]。随着加速康复外科理念的推广，术后镇痛的管理被越发重视，在众多的术后疼痛管理方法中，胸椎旁神经阻滞(thoracic paravertebral nerve block, TPVB)被指南推荐作为乳腺手术术后镇痛的首选方法[4]，能有效缓解患者疼痛，加速患者康复，但该技术操作方法多样[5]、技术掌握相对要求较高，有脊神经损伤、发生气胸、硬膜外血肿、穿刺失败、全脊髓麻醉[6]等风险。随着超声技术的普及以及解剖研究的深入，在胸椎旁阻滞技术基础上椎板阻滞、横突-胸膜中点阻滞、竖脊肌平面阻滞、肋横突阻滞等众多锥旁平面阻滞技术得以开发应用，期待获得类似于胸椎旁阻滞效果的同时，降低相关麻醉风险，现就相关椎旁平面阻滞技术及其在乳腺手术当中的应用进行综述。

2. 椎旁平面阻滞

2.1. 椎板阻滞(Retrolaminar Block, RLB)

椎板阻滞于 2006 年被首次报道[7]，寄希望作为 TPVB 的替代选择，此后 Zeballos 等[8]报道了超声引导下 RLB 技术，把药物注入椎板后表面和覆盖在椎板的脊横肌群(回旋肌、多裂肌、半棘肌)之间，通过药物扩散至邻近若干椎旁间隙、椎间孔、肋间隙，甚至对侧椎板浅层，从而阻滞相邻若干节段脊神经的前支、后支和交感支的一种神经阻滞技术。

从其解剖学角度可知，该阻滞方式在乳腺手术围术期镇痛的靶神经为脊神经，但目前实际应用的镇痛效果仍然存在争议，Takeshi Murouchi 等[9]人比较了 RLB 或 TPVB 置管在乳腺癌改良根治术的患者当中的应用，对比观察两者的镇痛效果，并监测左旋布比卡因的血药浓度，发现术后第 1 天 RLB 的镇痛效果可能弱于 TPVB，之后的第 2、3 天持续 RLB 的镇痛效果不劣于 TPVB。较低的动脉左旋布比卡因峰值浓度表明连续 RLB 是安全的。Hiroshi Aoki 等人[10]为 2 例行保留乳头乳晕的乳房切除联合背阔肌瓣重建的患者进行多点 RLB，结果该阻滞方式能够为患者提供满意的术后镇痛，并认为在选择合适的局部麻醉药剂量的情况下，RLB 多点注射可以广泛应用。然而 Boo-Young Hwang 等人[11]进行的一项研究显示，超声引导下单次注射 RLB 导致术后即刻疼痛评分降低，但其并不能减少术后吗啡用量，降低患者术后镇痛药物的需求。该研究认为 RLB 的镇痛作用有限，考虑与局麻药在椎旁间隙中的扩散不充分、局麻药的给药方式(单次注射)以及乳腺神经支配的复杂性有关。Eiko Onishi 等人[12]开展了一项对全身麻醉下行乳腺癌腋窝淋巴结清扫术患者术后进行 RLB 镇痛的随机对照实验，RLB 组(术后在 T2 和 T4 椎板各注射

0.5%罗哌卡因 15 ml)和对照组(相同层面注射等量的生理盐水), 评估多点 RLB 用于术后镇痛的效果; 结果提示: 椎板阻滞组患者术后即刻疼痛评分明显降低, 可以推迟首次给予镇痛药物的时间, 但该技术并不能降低患者术后 12 小时内的镇痛药物需求。

椎板阻滞操作相对简单, 安全性高, 作为 TPBV 的替代方案, 可有效减少穿刺对胸膜、血管、神经的损伤, 药物也确实能够扩散至硬膜外和椎旁间隙[13], 但其药物的扩散途径以及具体机制目前不明, 镇痛效果不确切[14], 相关解剖研究表明该阻滞方法的阻滞效果更多依赖于药物容量[15], 镇痛效果可能不如 TPVB。其临床应用有待进一步研究。

2.2. 竖脊肌平面阻滞(Plane Block of Erect Spinal Muscle, ESPB)

该阻滞方法于 2016 年由 Forero 等人[16]提出, 是指将局部麻醉药注射到胸腰筋膜的中层(即竖脊肌深面与横突之间), 局部麻醉药将沿着潜在筋膜间扩散从而阻滞脊神经背侧支、腹侧支、交通支达到局部阻滞效果。

在乳腺手术的应用方面, 有大量随机对照实验证明该阻滞方式的有效性[17]-[20], Guan HY 等人[21]的一项有关评估 ESPB 在乳腺癌手术中术后镇痛的镇痛效果和安全性荟萃分析认为, 与单纯全身麻醉相比, ESPB 联合全身麻醉可有效降低乳腺癌手术后 48 h 内的术后疼痛强度和 24 h 内的阿片类药物消耗, 能减少阿片类药物的副作用, 而且认为该阻滞方式具有较低的并发症发生率。类似有关 ESPB 与椎旁阻滞的对比研究认为, ESPB 的阻滞效果类似于椎旁阻滞, 并认为是乳房手术中椎旁阻滞或其他镇痛技术的潜在替代方案[22] [23]。然而, 相关随机对照实验认为, ESPB 在乳腺手术术后镇痛效果不如 TPVB, 并不支持用 ESPB 作为主要乳腺癌手术的一线区域麻醉, 有经验的操作者可能首选 TPVB 作为围术期镇痛的方式[24]-[26]。

目前为止, 尚不清楚竖脊肌平面阻滞其药物扩散和作用机制, 部分文献中描述的机制相互冲突[27]-[29]。竖脊肌平面阻滞可以导致脊神经背侧支和腹侧支的感觉阻滞, 但是其阻滞的程度、范围持续时间等均存在较大的变异[30], 这可能是临床研究和临床应用存在差异性的原因所在。从解剖结构来看, ESPB 可以看作是对 RLB 的轻微改善, ESPB 的穿刺部位表浅, 在超声的辅助下非常容易掌握, 但相较于椎旁阻滞, 药物在椎旁扩散有限[31], ESPB 兼有 TPBV 和 RLB 的优点, 它的确改善了 RLB 阻塞有限传播范围的缺点, 并在短短几年内取得了突飞猛进的发展, 能否取代 TPVB 具备稳定的镇痛效果, 还需要进一步研究。

2.3. 横突 - 胸膜中点阻滞(Mid-Point Transverse Process to Pleura Block, MTPB)

该阻滞方式由 Costache 等人最早提出用于胸科手术镇痛[32]。该方法将局麻药物注射在横突和胸膜之间的中点, 通过药物渗透到椎旁间隙从而产生镇痛效果。虽然其药物扩散机制不明, 但相关解剖学研究证实该点注射的药物能通过椎旁潜在的解剖腔隙扩散至脊神经根、交感神经、肋间神经甚至竖脊肌肉等处, 达到 TPVB 类似的效果[33]。

在乳腺手术应用方面, Agâh Abdullah Kahramanlar 等[34]人比较了 MTPB 和 TPVB 用于乳腺手术患者术后镇痛效果, 该项随机对照实验表明超声引导的 TPVB 和 MTPB 阻滞在接受乳房手术的患者中具有相似的术后镇痛效果。对于并发症风险较低的乳房手术, MTPB 阻滞可能是 TPVB 的替代方法。Costache 等人[35]对一名患有阻塞性睡眠呼吸暂停等基础疾病的肥胖患者, 使用该阻滞方法, 在非全麻下完成单纯乳腺肿块切除术, 认为该阻滞方式镇痛效果确切, 单点注射能够满足相应手术区域镇痛需求, 对于一些肥胖患者在难以明确注射至椎盘间隙时, 为避免相关椎旁阻滞风险, 可以使用该方式, 这是对 MTPB 阻滞用于手术麻醉的首次描述。

MTPB 可视为远离椎体的 TPVB, 穿刺深度明显变浅, 其阻滞位置周围无重要结构, 对应的穿刺相关并发症大大降低, 操作相对简单、安全, 对于初学者 MTPB 更易掌握, 但目前样本量小, 还需相关基础研究去阐明其作用机制, 临床应用效果还需大样本、多中心研究进一步验证。

2.4. 肋横突孔阻滞(Costotransverse Foramen Block, CFB)

Nielsen 等人[36]在尸体研究中首次报道了该阻滞方法, 肋横突孔阻滞部位为肋骨颈部和肋横上韧带之间的肋横突孔, 椎盘间隙并不是一个完全封闭的间隙, 药物注射至肋横突孔后可以通过潜在的腔隙进行扩散从而产生作用[37]。在这项研究中作者比较了 10 具尸体的竖脊肌平面阻滞、多点注射肋横突阻滞和胸椎旁阻滞药物扩散进入椎旁间隙的情况, 证实它可以阻滞腹侧支, 交通支, 胸交感干而无硬膜外扩散, 但只有多点注射肋横突阻滞才能达到胸椎旁阻滞相似的效果。

在乳腺手术应用方面, Hakan 等人[38]首次报告了将 CFB 用于女性保乳手术和前哨淋巴结活检的患者, 该阻滞方式有效减轻了乳腺癌术后患者的疼痛。之后也有将该技术用于乳腺手术的个案报道[39], 但目前该阻滞方式比较新颖, 临床高质量的研究非常少, 需要进一步研究。

总之, 随着超声在区域麻醉中的应用, 许多区域麻醉技术被引入, 在解剖机制未明确之前, 很多新型阻滞的命名比较混乱, 很难理解每一种技术的全部细微差别, 要明确该阻滞解剖学和技术差异还有很长的路要走[40]。

3. 总结

椎板阻滞(RLB)、竖脊肌平面阻滞(ESPB)、横突-胸膜中点阻滞(MTPB)、肋横突阻滞(CFB)等阻滞技术都是在 TPVB 的基础上发展而来的新型躯干神经阻滞技术, 通过不同方式把药物注射在椎旁不同部位, 通过潜在的组织腔隙进行扩散, 从而达到阻滞脊神经的一类阻滞技术。这些阻滞方式都是在传统的椎旁间隙外注射来阻滞脊神经而不实际刺破上肋横韧带, 期待追求与 TPVB 相当的镇痛效果的同时降低操作风险, 部分新型阻滞技术的药物扩散途径以及机制仍然存在争议, 就理论而言, 这些方式的安全性高于 TPVB, 尚缺乏大量临床研究证实, 从安全性及阻滞效能等考虑能否取代 TPVB 有待进一步探讨。

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