

成人腹部手术后镇痛的最新进展

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摘要

腹部手术是外科领域中常见的手术类型。由于其较大的创伤、炎症反应、粘膜缺血缺氧以及内脏和腹膜的牵拉等因素, 术后不可避免地会产生切口痛、内脏痛和创伤应激反应。这些剧烈的疼痛会影响患者的术后翻身、深呼吸、咳痰等动作, 从而增加术后肺不张、肺部感染等并发症的风险。此外, 急性疼痛还容易引发患者的焦虑、紧张等负面情绪, 导致免疫紊乱和应激状态, 甚至可能影响手术切口的愈合。研究指出, 术后剧烈的急性疼痛是术后慢性疼痛的高风险因素, 因此术后镇痛显得尤为重要。加速康复外科理念强调多模式镇痛的重要性, 本文将就成人腹部手术术后镇痛的最新进展进行综述。

关键词

腹部手术, 术后镇痛, 超声引导下神经阻滞

Recent Advances in Analgesia after Abdominal Surgery in Adults

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Abstract

Abdominal surgery is a common surgical operation in clinical practice. Due to factors such as greater trauma, inflammation, mucosal ischemia and hypoxia, as well as visceral and peritoneal pull, abdominal surgery will inevitably produce incision pain, visceral pain and traumatic stress reaction after surgery. Severe pain will affect patients' postoperative movements such as turning over, deep breathing and expectoration. It increases the risk of postoperative complications such as atelectasis and pulmonary infection. In addition, acute pain can easily lead to patients' anxiety, tension and other negative emotions, resulting in immunosuppression and stress, and even affecting the healing

of surgical incisions. Studies have shown that acute postoperative pain is a high risk factor for chronic postoperative pain, so postoperative analgesia is particularly important. The concept of accelerated rehabilitation surgery also suggests that multi-modal analgesia is an important link. This article reviews the progress of postoperative analgesia in adult abdominal surgery.

Keywords

Abdominal Operation, Postoperative Analgesia, Ultrasound-Guided Nerve Block

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1. 腹部手术常见的术后镇痛方式

1.1. 全身途径

1.1.1. 静脉镇痛泵

静脉镇痛泵是一种医疗装置，它通过静脉输注的方式向患者体内输送镇静剂和镇痛药物，以缓解疼痛。这种装置通常使用阿片类药物、非甾体抗炎药以及镇静剂的组合，其效果显著。利用静脉镇痛泵，可以有效地将患者的中重度疼痛减轻至轻度，从而促进患者术后更快地康复。然而，需要注意的是，阿片类药物的过量使用可能会导致呼吸抑制的风险，并可能对肠道蠕动产生影响，引起诸如便秘、腹胀和饱腹感等不适症状。

1.1.2. 口服/肌注镇痛药物

口服镇痛药物主要包括麻醉性镇痛剂、非甾体抗炎药和糖皮质激素类，它们具有一定的镇痛效果，然而其起效速度不及静脉注射，对于急性疼痛的缓解通常较为有限。

1.2. 局部途径

1.2.1. 局部切口浸润

局部浸润的术后镇痛方法因其简单性、安全性、有效性、快速性以及便于术后管理而受到外科医生和麻醉医生的青睐。它有助于促进术后恢复，并降低患者术后并发症的发生率[1]。Samina Ismail 等人开展的随机对照实验表明，局麻浸润在术后即刻提供疼痛缓解方面具有显著效果，对妇科大手术患者术后的即刻镇痛效果可与腹横肌阻滞相媲美[2]。Na Yang 及其同事发现，在经济单孔腹腔镜胆囊切除术患者中，常规局麻药浸润与超声引导下腹直肌鞘阻滞在缓解术后疼痛和促进恢复方面效果相当。使用局部麻醉药进行切口浸润可以显著减少患者对患者控制的镇痛药(PCA)的需求频率，起到辅助镇痛的作用[3]。Francesco Mongelli 等人比较了接受减重手术的患者中，接受腹横肌阻滞或局麻浸润的患者术后情况，两组在术后疼痛、恶心、住院时间和满意度方面具有相似的结果。然而，由于局麻浸润技术的简便性和高可重复性，它可能成为减重手术术后多模式镇痛的首选方法[4]。

1.2.2. 硬膜外镇痛

硬膜外镇痛(EA)是一种侵入性、成本高昂且劳动密集型的镇痛方法，长期以来被视为传统腹部手术镇痛的“金标准”。一项随机对照研究显示，在腹部手术中，竖脊肌平面阻滞与骶管 EA 均是安全且有效的镇痛手段[5]。骶管 EA 能提供更持久的镇痛效果和更优质的镇痛体验。在 EA 不适用或难以实施的情

况下, 竖脊肌平面阻滞可作为一种替代方案[5]。Y. Liu 等人对比了腹横筋膜阻滞与胸段 EA 对腹腔镜手术患者术后用药需求、疼痛程度及恢复情况的影响, 研究结果表明: EA 在各方面均优于腹横筋膜阻滞, 尤其是胸段 EA 对早期免疫功能的影响较小, 显示出其在术后镇痛和促进恢复方面的安全性和有效性, 因此在腹腔镜术后镇痛的应用价值高于腹横筋膜阻滞[6]。Hsin-I Tsai 等人回顾性分析了静脉阿片类药物镇痛结合腹壁神经阻滞、EA 以及单纯使用静脉阿片类药物镇痛三种镇痛策略在开腹肝脏手术中的效果, 发现静脉阿片类药物镇痛结合腹壁神经阻滞与 EA 效果相当。然而, EA 可能会导致肝切除术后患者肠功能和膀胱功能恢复缓慢, 或增加住院时间[7]。在急性胰腺炎患者中, 实施充分的血流动力学监测并采用 EA 也是一个可行的选择[8][9]。但需要注意的是, EA 有可能引起术后股四头肌肌力减弱, 这可能会对患者的早期活动造成影响, 并可能增加护理成本。

1.2.3. 经皮穴位电刺激/针灸

随着穴位刺激技术的进步和应用, 它已经成为围手术期患者采用多模式镇痛方案、促进术后康复的有效治疗方式。Murali Chakravarthy 的研究表明, 经络刺激能够显著缓解剖宫产术后的疼痛, 并且未发现严重的不良反应, 他们对产妇的耳廓施加神经刺激, 发现其减轻了 48 小时内的疼痛评分[10]。针灸治疗同样能够减轻术后恶心和呕吐的症状, 改善镇痛效果, 并有助于减少阿片类药物的使用量[11]。

1.2.4. 超声引导下神经阻滞

1) 腹横肌阻滞

腹横肌平面阻滞(TAPB)是一种专门用于缓解腹部疼痛的筋膜间平面阻滞技术。相较于硬膜外镇痛, 超声引导下的 TAPB 操作简便, 且创伤较小[12]。

TAPB 技术已在多种腹腔镜手术中应用, 以减轻术后疼痛。多项研究证实, 超声引导下的 TAP 阻滞在降低腹腔镜腹壁疝修补术[13]、剖宫产[14]、结直肠手术[15]、胆囊切除术[16]等手术后的疼痛方面具有显著效果。超声引导下的 TAPB 不仅在术后即刻在 PACU (术后恢复室)中显示出其优势, 而且根据我们的经验, 它导致了 PACU 中阿片类药物使用率和患者停留时间的显著减少, 同时实现了低疼痛评分, 并降低了术后恶心呕吐的发生率[17]。在腹腔镜结肠癌手术后, TAP 阻滞与硬膜外麻醉(EA)在镇痛效果上可能相当, 在尿潴留方面甚至可能更优[18]。然而, 2024 年发生了一例由于腹横肌平面阻滞引起的巨大腹壁血肿, 这提醒我们, 尽管 TAP 阻滞通常被认为是安全有效的, 并且并发症极为罕见, 但必须严格遵守适应症和规范操作[19]。

2) 腹直肌鞘阻滞

腹直肌鞘阻滞(RSB)涉及将长效局部麻醉药物注射到腹直肌与腹直肌鞘之间, 通过阻断中腹壁肌肉和皮肤的神经传导来发挥作用。其疗效已在临床实践中得到广泛认可。

在超声引导下进行的 RSB, 已被证明在缓解腹腔镜手术后的急性疼痛方面效果显著。与传统的局部浸润麻醉相比, 双侧超声引导下的 RSB 为接受急诊开腹手术的患者提供了更持久的术后镇痛效果, 尤其是在静息和咳嗽时, 首次补救镇痛的时间显著延长[20]。此外, 将腹直肌鞘阻滞与腹横肌平面阻滞结合, 通过单次穿刺用于腹腔镜上腹部手术的术后镇痛, 这一技术不仅为上腹部手术提供了有效的术后镇痛, 还降低了麻醉恢复室期间苏醒时躁动的发生率, 有助于患者早期康复[21]。

3) 椎旁阻滞

此外, 将腹直肌鞘阻滞与腹横肌平面阻滞结合, 通过单次穿刺用于腹腔镜上腹部手术的术后镇痛, 这一技术不仅为上腹部手术提供了有效的术后镇痛, 还降低了麻醉恢复室期间苏醒时躁动的发生率, 有助于患者早期康复[22]、肝肿瘤微波消融术[23]、胆囊切除术[24]、开腹肝切除术[25]以及肥胖患者进行的腹腔镜袖状胃切除术[26]等, 取得了令人满意的术后恢复质量和镇痛效果。Guojiang Yin 及其同事将 PVB

与全身麻醉结合,应用于机器人辅助的腹腔镜肾切除术中,发现这种组合能够提供更好的术中和术后镇痛效果,减少术中及术后阿片类药物的使用量,降低手术刺激引起的血流动力学变化,减少术后视觉模拟评分(VAS),从而延长初次镇痛需求的时间,并加速患者的术后恢复[27]。

4) 腰方肌阻滞

腰方肌阻滞(QLB)是一种在多种腹部手术中应用的区域镇痛技术。该技术由 Blanco 于 2007 年首次提出,被视为 TAPB 的升级版。QLB 不仅能够提供腹壁镇痛,还能沿着胸腰筋膜向椎旁扩散,实现内脏镇痛。目前,QLB 在妇产科手术、胃肠手术以及老年髋部手术中得到了广泛的应用[28][29]。多项随机对照试验和 meta 分析的结果显示,QLB 的镇痛效果优于 TAPB [30],与 EA 镇痛效果相当[31],但不良反应发生率低于 EA。将 QLB 纳入腹部手术的多模式镇痛方案,对于疼痛管理方案的发展和标准化具有重要的意义。

一份病例报告详细描述了在超声引导下,对一名左心室射血分数(EF 值)仅为 18%的患者成功实施了无全身麻醉的开腹阑尾切除术。手术中使用了 20 毫升的 0.25%左布比卡因作为局部麻醉药液,并辅助使用了 2 毫克的咪达唑仑和 50 ug 的芬太尼[32]。另外,还有一名女性患者,她患有骨质发育不全、严重的脊柱侧后凸畸形以及限制性肺疾病,同时伴有颈脊髓空洞和颅颈交界区狭窄(C2/C3)。即便如此,她也在超声引导下安全地完成了开放性双侧卵巢囊肿剥除术(下腹正中剖腹探查术)[33]。这些具有临床挑战性的案例证明了超声引导下腰方肌阻滞(QLB)作为一种特殊情况下腹部手术的主要多模式麻醉方法(无需全身麻醉和椎管内麻醉)的可行性。

5) 低位前锯肌阻滞

前锯肌平面阻滞(SAPB)是一种外周神经阻滞技术,被广泛认为是安全、高效、操作简便且副作用风险较低的镇痛手段。在胆囊切除术中,Yu Wu 等人通过低位(T8 至 T9)SAPB 为患者提供了术中和术后镇痛[34],Fei Jiang 则利用超声引导下的连续 SAPB (T6 至 T8)来管理肝切除术后患者的疼痛[35],此外,还有研究探讨了低位 SAPB (T8 至 T9)对机器人辅助经剑突下胸腺切除术后患者的镇痛效果及其对恢复质量的影响[36]。这些研究一致认为,超声引导下的低位 SAPB 在上腹部手术患者的术后镇痛方面效果令人满意,并且不良反应较少。

此外,多项研究也证实了多点阻滞相较于单点阻滞具有优势。例如,菱形肌-肋间肌-低位前锯肌(RISS)平面阻滞在腹腔镜肾切除术患者中展现出良好的镇痛效果[37];而低位前锯肌阻滞、肋缘下腹横肌平面阻滞、腹直肌后鞘阻滞这三点阻滞的组合,对于开腹肝胆手术患者,能够提供与单侧椎旁阻滞相当的术中及术后镇痛效果。更为重要的是,这种复合阻滞方式的低血压发生率显著低于椎旁阻滞,因此,它成为了一种可供临床选择的上腹部神经阻滞方法[38]。

6) 竖脊肌阻滞

竖脊肌阻滞(ESPB)最初是为治疗胸段神经病理性疼痛而开发的,如今已广泛应用于开腹手术和腹腔镜手术后的镇痛。Hui Chen 及其同事比较了在腹腔镜胆囊切除术中使用竖脊肌阻滞与腹横肌平面阻滞的患者术后情况,结果表明,这两种方法在手术时间以及术后恶心呕吐等不良事件的发生率上并无显著差异。然而,竖脊肌阻滞在术后短期镇痛效果上优于腹横肌平面阻滞,并且所需的镇痛剂量更低。在剖宫产手术中,其镇痛效果与 QLB 相当[39]。

2. 展望

随着超声可视化技术的应用,超声引导下的神经阻滞因其安全、高效和精准的优势,正逐渐成为术后多模式镇痛的首选方法。不断改进的躯干神经阻滞技术为腹部手术提供了理想的镇痛效果。根据不同的手术范围,选择最合适的单一组织或组合阻滞方案,可以促进患者术后快速康复、降低应激反应。展

望未来, 超声引导下的神经阻滞技术还将继续深入研究和开发。

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