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文献综述 REVIEW

腹腔镜手术治疗结直肠癌进展

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Laparoscopic surgery for colorectal cancer

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Abstract
Laparoscopic surgery as an alternative to traditional open surgery, has been accepted by an increasing number of surgeons and patients. In this paper, we review the advances in laparoscopic surgery for colorectal cancer and summarize its pros and cons by comparing with open surgery, including patient inclusion and exclusion, intraoperative outcomes, and short- and long-term outcomes. Furthermore, we provide an initial overview of the Da Vinci robotic system and the single-port laparoscopic surgery.

Key Words: Laparoscopy; Colorectal cancer; Da Vinci robotic system

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摘要
目前, 腹腔镜结直肠癌手术被越来越多的外科医师施行, 也被越来越多的患者所接受, 有替代传统开放结直肠癌手术的趋势. 本文就腹腔镜结直肠癌手术的进展作一概述, 包括患者选择, 术中效益, 术后短期效益和长期效益, 比较其与开放手术的优劣. 并初步介绍了达芬奇机器人系统及单孔法腹腔镜技术.

关键词: 腹腔镜; 结直肠癌; 达芬奇机器人系统

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0 引言
自从1985年Eric Mühe施行了第1例人腹腔镜胆囊切除术[1], 腹腔镜技术已经被广泛用于外科的各个领域, 包括腹腔镜下阑尾切除术、脾切除术、肾切除术等. 1991年, Jacobs等[2]报道了腹腔镜下结肠手术治疗非癌性疾病, 如炎症性疾病、良性肿瘤、憩室等; 1993年, Guillon等[3]报道了59例腹腔镜结直肠癌手术的初步经验并证明了其技术上的可行性. 由于其明显地加快术后恢复及减少术后疼痛[4,5], 腹腔镜结直肠癌手术已被作为传统开放手术的一种可选择的替代术式[6,7]. 然而, 因为许多因素诸如技术复杂性, 成本, 与肿瘤学的安全方面, 腹腔镜结直肠癌手术的发展较其他腹腔镜手术缓慢[8]. 以下对腹腔镜结直肠癌手术的进展作一综述.

1 腹腔镜结直肠癌手术患者的选择
Lim等[9]在手术治疗的临床效果(clinical outcomes of surgical therapy, COST)中显示, 腹腔镜适用于2/3的原发性结直肠癌患者. Janson等[10]通过结肠癌腹腔镜或开放切除术(colon cancer laparoscopic or open resection, COLOR)试验认为, 50%-60%的结肠癌患者可以选择腹腔镜手术. 而Moloo等[11]则认为使用COST或COLOR标准排除的结直肠癌患者除了中转开腹率较高之外, 短期和长期效果与纳入的患者无差异.

2 腹腔镜结直肠癌术中效益
2.1 手术时间与术中出血 Naitoh等[12]在Ⅱ/Ⅲ期结直肠癌手术的研究中, 报道的平均手术时间为184 min, 平均估计失血量为53.5 mL. Gonzalez

■背景资料
1985年Eric Mühe施行了第1例人腹腔镜胆囊切除术, 腹腔镜技术已经被广泛用于外科的各个领域, 包括腹腔镜下阑尾切除术、脾切除术、肾切除术等. 由于其明显地加快术后恢复及减少术后疼痛, 腹腔镜结直肠癌手术已被作为传统开放手术的一种可选择的替代术式. 然而, 因为许多因素诸如技术复杂性, 成本, 与肿瘤学的安全方面, 腹腔镜结直肠癌手术的发展较其他腹腔镜手术缓慢.

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■研发前沿
在严格掌握手术适应证的前提下, 腹腔镜手术可安全地应用于治疗结直肠癌, 其短期和长期治疗效果均能令人满意, 而对腹腔镜手术价值的最终评价有待于大样本、高质量的随机对照试验的长期随访结果.

等[13]报道的腹腔镜下复杂结直肠癌姑息性手术的平均手术时间为181 min±22 min, 平均估计失血量为283 mL±48 mL. Liang等[14]报道腹腔镜内侧到外侧入路右半结肠根治性切除术的手术时间为192.6 min±32.8 min, 同时报道了乙状结肠癌伴淋巴结转移的D3期清扫的手术时间为303.4 min±35.2 min, 术中失血量为344.8 mL±50.6 mL. Sotomayor等[15]的研究显示手辅助腹腔镜结肠癌手术的平均手术时间为195 min. Vorob'ev等[16]的研究中, 手辅助腹腔镜左半结肠切除的平均手术时间为181 min±53 min, 术中出血92 mL±65 mL. Mehta等[17]的研究显示腹腔镜辅助结肠切除平均手术时间128.16 min. Miyajima[18]报道腹腔镜直肠癌手术时间为237.0 min±71.6 min, 平均失血量为165.0 mL±163.8 mL. 在Mukai等[19]的研究中, 对腹腔镜结肠癌与直肠癌的手术时间进行了比较, 腹腔镜结肠癌的平均手术时间为146 min, 平均失血量166.3 mL, 而腹腔镜直肠癌的平均手术时间为218 min, 平均失血量238.8 mL. 在结直肠癌伴转移病灶切除的研究中, Kim等[20]报道结直肠癌伴肝转移的平均手术时间439 min, 估计总失血量为350 mL. Akiyoshi等报道结直肠癌伴肝转移的平均手术时间为446 min[21], 估计总失血量为175 mL, 直肠癌伴肝转移的平均手术时间为517 min[22], 估计总失血量为398 mL. Hewett等[23]认为腹腔镜结肠癌的手术时间较开放手术要长, 而González等[24]的研究表明腹腔镜全直肠系膜切除要比开放全直肠系膜切除的平均手术时间短(186.7 min与204.4 min, $P<0.007$). 因此, 腹腔镜结肠癌的手术时间要比腹腔镜直肠癌手术时间短, 失血量要少, 而在伴有转移灶同步切除的手术中, 手术时间与术中失血量均有所增加.

2.2 淋巴结清扫与切缘 Jayne等在传统与腹腔镜辅助结直肠癌手术(conventional versus laparoscopic assisted surgery in colorectal cancer, CLASICC)试验小组的研究中发现腹腔镜的肿瘤切缘阳性率更高, 但复发率并不比开放手术高[25]. Fiscon等[26]研究的腹腔镜结肠癌手术的淋巴结检出数达到16个. Jacob等[27]的腹腔镜结肠癌研究中, 平均淋巴结检出数为10.1个±6个. Staudacher等[28]在腹腔镜全直肠系膜切除术的研究中发现, 平均肿瘤和切缘距离为2.7 cm±2 cm, 平均淋巴结检出数为14.4个±4.6个, 是安全可行的. 而在Ströhlein等[29]对腹腔镜与开放直肠癌手术的研究中, 淋巴结检出数有统计学差异(13.5 *vs* 16.9; $P = 0.001$), 但复发率亦没有明显差异. Buunen等[30]的1 076例随机临床试验显示腹腔镜与开放结肠癌手术的肿瘤切缘及淋巴结检出数相似, 同时Mirza等[31]在233例非转移性结直肠癌手术的研究中也认为, 腹腔镜与开放手术的肿瘤切缘及淋巴结检出数相似. 可见, 腹腔镜结直肠癌手术的淋巴结清扫与肿瘤切缘距离是足够的, 可以安全执行[25].

2.3 中转开腹与手术死亡率 Rotholtz等[32]在对腹腔镜结直肠癌手术的中转因素的研究中发现, 400例接受腹腔镜手术的患者中有51例最终转开放手术, 其中年龄>65岁(*OR* = 2.3; 95%CI: 1.25-4.46), 执行低位前切除(*OR* = 3.9; 95%CI: 1.64-9.18), 有复杂的憩室炎(*OR* = 3.9; 95%CI: 1.64-9.18)均是中转的因素. Thorpe等[33]的CLASICC试验研究发现, 488例腹腔镜手术, 143例(29.3%)转换为开放手术, 其中, 体质量较重的, 男性患者, 直肠癌患者, ASA(美国麻醉医师协会)III期或更大的肿瘤的扩散(包括浸润程度与远处转移)等均是独立的中转因素. Abraham等[34]对单一外科医生的进行的365例择期结直肠癌切除术(219例结肠癌, 146例直肠癌)的分析中发现, 中转的独立因素是直肠癌手术(*OR* = 3.12)和BMI≥28(*OR* = 3.87). 而在严格选择患者后, Ng等[35]对腹腔镜直肠癌手术的回顾性分析中, 579例手术的中转率为5.4%. 因此, 选择合适的患者, 通过有经验的团队[36]执行腹腔镜手术是有必要的. Mirza等[31]在比较腹腔镜与开放结直肠癌手术的研究中, 围手术期的死亡率两者没有差异($P = 0.644$). Abraham等[34]对腹腔镜结直肠癌手术的短期效益的Meta分析中, 腹腔镜与开放手术的死亡率也没有显著性的差异(1.2% *vs* 1.1%, $P = 0.787$). Hewett等的ALCCaS(Australasian Laparoscopic Colon Cancer Study)前瞻性随机临床试验发现, 腹腔镜结直肠癌手术死亡率与开放相比无统计学差异[23], 腹腔镜手术是可行的, 安全的, 手术死亡率可与开放手术相比[37].

3 腹腔镜结直肠癌术后短期效益

3.1 术后并发症 近年, 多项研究显示腹腔镜手术与开放手术的术后并发症无统计学差异[23,38-43]. 但同时, Allardyce等[44]研究发现, 年龄大于70岁的患者行腹腔镜结直肠癌手术的术后并发症发病率要比开放手术低($P = 0.002$). Kennedy等[45]的国家手术质量改进计划统计结果显示, 腹腔镜手术明显减少结肠切除术后并发症, 并有统

计学意义. Poon等[46]对腹腔镜结直肠癌手术部位感染的研究中指出, 开放和腹腔镜结直肠癌切除术手术部位感染率分别为5.7%和2.7%. 腹腔镜手术具有减少术后肠粘连的潜在优势[47], 还有较低的术后并发症发病率, 特别是感染性并发症[48]. 在Mukai等[19]对58例腹腔镜结肠癌手术与50例直肠癌手术的比较中, 前者的术后并发症为5例伤口感染(8.6%), 3例术后梗阻(5.2%), 和1例(1.7%)吻合口狭窄; 后者的术后并发症为6例伤口感染(12.0%), 3例术后梗阻(6.0%), 3例吻合口狭窄(6.4%), 3例吻合口瘘(8.6%), 相对地, 腹腔镜结肠癌较直肠癌术后并发症要少. 特别地, Sereno Trabaldo等[49]报道了腹腔镜手术后发生腹内疝这种罕见而危险的并发症, 是由于小肠通过术中造成的肠系膜缺损形成的. 在他的研究中, 436例行腹腔镜左侧结直肠癌切除术的患者有五名男性患者出现腹内疝并需要再次手术. 因此, 在高龄人群及某些术后并发症中, 腹腔镜手术要优于开放手术, 而在总术后并发症方面, 腹腔镜手术至少不逊色于开放手术.

3.2 术后恢复与住院天数 大量临床试验已经证实, 腹腔镜手术明显减少住院时间及加快术后恢复[23,50,51]. Carli等[52]的研究显示行腹腔镜结直肠癌手术的患者平均住院时间为3 d, 肠道功能恢复及饮食恢复都在术后36 h内. Lin等[53]在对开放与腹腔镜手术的前瞻性研究中发现, 开放结肠切除术70例, 腹腔镜辅助结肠切除术99例, 开放组平均住院天数为9.3 d, 腹腔镜组为5.9 d(P<0.001). Selvindos等[54]的腹腔镜超低位前切除及结肠J-袋肛管吻合术研究显示, 术后平均住院7 d, 恢复流质饮食时间平均为2 d. 值得一提的是, 腹腔镜中转开腹与住院天数密切相关, 在Offodile等[55]的研究中, 中转开腹的平均住院天数为8.8 d, 相对未中转的6.3 d(P<0.0001). 另外, 行腹腔镜手术的患者术后疼痛及镇痛需求也比行开放的要低[56].

4 腹腔镜结直肠癌术后远期效益

4.1 生存率与复发率 目前多项对腹腔镜手术的长期生存率的研究认为腹腔镜手术与开放手术无差异[31,37,57]. Naitoh等[12]对121例Ⅱ/Ⅲ期结直肠癌手术远期效益的研究显示, 总体5年生存率Ⅱ期为95.7%, ⅢA/B为84.1%, ⅢC为70.0%. 同时5年无病生存率分别为75.6%, 80.1%和66.8%, 共18例复发(14.9%). Jayne等[25]对794例(526例腹腔镜和268例开放)结直肠癌手术的CLASICC试验中的3年随访结果显示, 与开放手术相比, 腹腔镜手术的3年总生存率有1.8%差异(95%CI: -5.2%-8.8%, P = 0.55), 无病生存率差异-1.4%(95%CI: -9.5%-6.7%, P = 0.70), 局部复发的差异-0.8%(95%CI: -5.7%-4.2%, P = 0.76), 总体来说无统计学差异. 在Fleshman等[58]的COST前瞻性随机对照试验中, 872例结肠癌患者随机分为接受腹腔镜辅助或开放结肠切除手术并进行中位数为7年的随访(5-10年), 5年无病生存率(开放68.4%, 腹腔镜69.2%, P = 0.94), 总5年生存率(开放74.6%, 腹腔镜76.4%, P = 0.93)2组相似. 总体复发率分别为(开放21.8%, 腹腔镜19.4%, P = 0.25)2组亦无差异. Lacy等[59]的回归分析表明, 腹腔镜辅助结肠手术可以降低肿瘤复发(HR = 0.47, 95%CI: 0.23-0.94), 与癌症有关的死亡原因(HR = 0.44, 95%CI: 0.21-0.92)和任何死亡原因(HR = 0.59, 95%CI: 0.35-0.98). Baća等[60]在腹腔镜辅助右半结肠切除术的生存率的研究中建议将其作为首选方法. Ng等[35]的579例腹腔镜直肠癌切除研究中, 根治性切除后7.4%的患者发生局部复发. 总的5年和10年生存率分别为70%和45.5%. 癌症相关的5和10年生存率为76%和56%. 也有研究表明腹腔镜直肠癌手术的长期生存率较开放的令人满意, 但无统计学意义[29]. 总的来说, 腹腔镜结直肠癌手术的长期生存率是可以与开放手术相比较的, 并是一种安全, 有效的替代传统的手术治疗结直肠癌的方法[31].

4.2 生活质量 术后性功能障碍是一个直肠癌患者的严重问题, 已有报道在腹腔镜直肠癌手术, 对男性膀胱和性功能造成影响[61], Nitori等[62]对腹腔镜与开腹治疗直肠癌术后男性性功能, 关于性欲, 勃起, 硬度, 射精和满意度进行了比较. LS和OS的各项评分和总评分无显著差异. 单因素分析, 肿瘤位置较低的性功能障碍较显著(P = 0.0111). 因此, 低位肿瘤的位置是唯一影响男性性功能的因素. 腹腔镜术中保留盆腔自主神经[63], 并由经验丰富, 敬业的腹腔镜外科医生进行[61], 可以最大限度地减轻术后性功能障碍.

5 腹腔镜结直肠癌手术新技术

5.1 达芬奇机器人系统 随着标准腹腔镜技术的日臻完善, 多种新技术已在逐渐发展. Choi等[64]描述了达芬奇机器人应用在直肠癌手术的解剖过程和短期结果, 50例手术均成功完成, 无中转开腹, 短期的结果是可以接受的. 达芬奇机器人系统的优势在于克服了常规腹腔镜手术的一些

■相关报道
Choi等描述了达芬奇机器人应用在直肠癌手术的解剖过程和短期结果, 50例手术均成功完成, 无中转开腹, 短期的结果是可以接受的.

■同行评价
本文引用数据详实, 内容较全面, 具有较好的可读性.

限制[65], 是一种安全有效的方法, 与开放和腹腔镜手术的结果存在可比性[66].

5.2 单孔腹腔镜技术 单孔技术由于其术后疼痛更轻, 美容效果更好, 最近发展得很快, 多种器械的发展例如Uni-X^{TM}(Pnavel systems, NJ, USA)和R-PortR(Advanced Surgical Concepts, Wicklow, Ireland)可以让更多的器械经1个孔插入脐, 使得单孔腹腔镜手术变为可行[67]. Remzi等[68]报道了1例单孔腹腔镜乙状结肠癌切除术, 总手术时间198 min. 估计失血量为300 mL. 住院时间为3 d. 患者无术中或术后并发症. 标本的病理检验显示: 肿块大小5.0 cm×2.5 cm×2.5 cm, 足够的手术切缘(10 cm和5.5 cm), 14个区域淋巴结未见转移. 未行手术后辅助化疗. 手术后1年行结肠镜显示无明显肿瘤或息肉. 腹部和盆腔的CT也没有发现任何复发或转移证据. 单孔法腹腔镜手术可以很好地治疗良性病变, 而且对情况较好的结直肠癌患者也同样适用, 可以作为通向经自然腔道内镜手术(natural orifice translumenal endoscopic surgery, NOTES)的桥梁[67].

6 结论

随着腹腔镜手术的发展以及外科医生手术经验的累积, 在严格掌握手术适应证的前提下, 腹腔镜手术可安全地应用于治疗结直肠癌, 其短期和长期治疗效果均能令人满意[69], 而对腹腔镜手术价值的最终评价有待于大样本、高质量的随机对照试验的长期随访结果.

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• 消息 •

《世界华人消化杂志》入选《中国学术期刊评价研究报告 – RCCSE 权威、核心期刊排行榜与指南》

本刊讯 《中国学术期刊评价研究报告-RCCSE权威、核心期刊排行榜与指南》由中国科学评价研究中心、武汉大学图书馆和信息管理学院联合研发, 采用定量评价和定性分析相结合的方法, 对我国万种期刊大致浏览、反复比较和分析研究, 得出了65个学术期刊排行榜, 其中《世界华人消化杂志》位居396种临床医学类期刊第45位. (编辑部主任: 李军亮 2010-01-08)