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· 专题研究 ·

加速康复外科理念在胰十二指肠切除术围手术期的应用

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摘要

目的: 探讨加速康复外科 (ERAS) 理念在胰十二指肠切除术 (PD) 围手术期的临床应用价值。

方法: 回顾性分析郑州大学附属肿瘤医院 2015 年 6 月—2016 年 12 月行根治性 PD 治疗 42 例患者的临床资料, 所有患者围手术期均采用 ERAS 措施, 记录术后并发症、住院时间及再入院情况等。

结果: 术后第 1 天, 所有患者行常规尿管拔除, 2 例因前列腺增生再次留置, 22 例 (52.4%) 患者下床活动, 10 例 (23.8%) 达预定活动标准; 术后第 2 天, 常规拔除胃管, 5 例因发生胃排空延迟重新留置胃管, 30 例 (71.4%) 耐受流质饮食; 术后第 3 天, 35 例 (83.3%) 拔除腹腔引流管; 术后第 4 天, 33 例 (78.6%) 固体饮食。术后胰瘘 3 例, 胆汁漏 1 例, 出血 1 例, 腹腔积液 3 例, 胃排空延迟 4 例, 肺部感染 1 例, 术后总体并发症发生率 31.0%, 均经对症治疗治愈, 无死亡病例。中位住院时间 10 (8~35) d。术后 30 d 再入院 3 例 (7.1%), 其中胃功能不全 1 例, 腹腔积液并感染 1 例, 胆道感染 1 例。

结论: ERAS 理念在 PD 围手术期的应用安全可行, 能缩短住院时间的同时不增加术后并发症发生率和再入院率。

关键词

胰十二指肠切除术; 围手术期医护; 加速康复外科

中图分类号: R657.5

Application of enhanced recovery after surgery program in perioperative management of pancreaticoduodenectomy

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Abstract

Objective: To investigate the clinical value of using enhanced recovery after surgery (ERAS) protocols in perioperative period of pancreaticoduodenectomy (PD).

Methods: The clinical data of 42 patients undergoing radical PD in the Affiliated Tumor Hospital of Zhengzhou University from June 2015 to December 2016 were retrospectively analyzed. All patients received ERAS management during perioperative period. The clinical variables that included postoperative complications, length of hospitalization and readmission were recorded.

Results: On postoperative day (POD) 1, all patients underwent routine removal of urinary catheter, of whom, 2 cases had catheter indwelling due to prostatic hyperplasia, 22 patients (52.4%) successfully ambulated and 10 patients (23.8%) achieved the scheduled activity standard. On POD 2, routine gastric tube removal was

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performed, but the gastric tube was reintroduced in 5 cases for occurrence of delayed gastric emptying and 30 cases (71.4%) tolerated the liquid diet. On POD 3, abdominal drainage tube was removed in 35 cases (83.3%). On POD 4, 33 patients (78.6%) tolerated solid diet intake. The postoperative complications included pancreatic leakage in 3 cases, bile leakage in 1 case, bleeding in 1 case, abdominal fluid collections in 3 cases, delayed gastric emptying in 4 cases, and lung infection in 1 case, with an overall incidence of postoperative complications of 31.0%, which were all resolved after symptomatic treatment. No death occurred. The median length of hospitalization was 10 (8–35) d. Three patients (7.1%) patients required hospital readmission within 30 d of discharge, and of whom, one was for gastric insufficiency, one for abdominal fluid collection with infection and one for biliary tract infection.

Conclusion: Application of ERAS in perioperative period of PD is safe and feasible, which can reduce the length of hospitalization without increase of incidence of postoperative complications and readmission rate.

Key words

Pancreaticoduodenectomy; Perioperative Care; Enhanced Recovery After Surgery

CLC number: R657.5

胰十二指肠切除术 (pancreaticoduodenectomy, PD) 经近百年的发展和改进, 其围手术期病死率已显著下降, 术后住院时间长、并发症发生率高仍困扰临床一线外科医生^[1-3]。加速康复外科 (enhanced recovery after surgery, ERAS) 理念在多种外科领域的临床应用结果显示, ERAS能降低术后并发症发病率, 缩短住院时间^[4-8]。临床研究^[9-11]表明, ERAS应用于PD安全可行, 能减少住院时间。本组已成功将ERAS理念应用于PD围手术期, 其临床效果报告如下。

1 资料与方法

1.1 一般资料

回顾性分析2015年6月—2016年12月郑州大学附属肿瘤医院42例行根治性PD术患者的临床资料, 其中男19例, 女23例; 平均年龄 (53 ± 11) 岁; BMI ≥ 28 2例; 糖尿病2例, 高血压3例; 所有患者术前增强CT或MRI检查提示胰头占位, 肿瘤可根治性切除, 术后病理结果确诊为胰头癌; 所有患者实施ERAS围手术期管理理念, 合并糖尿病与高血压患者, 术前血糖与血压控制在正常或正常高值水平, 记录患者ERAS具体措施依从情况、术后出血、胆汁漏、胰瘘、感染等并发症、住院时间及再入院情况等。

1.2 ERAS 主要措施

(1) 术前: ERAS宣教、术前减黄、非机械性肠道准备、留置胃管、预防性使用抗生素; (2) 术中: 全程保温、目标导向性输液、精准切除、常

规放置引流管; (3) 术后: 多模式镇痛、预防恶心呕吐、早期拔除胃管与尿管、早期进食、早期下床活动、及早拔除腹腔引流管 (表1)。

1.3 手术方法

所有患者取仰卧位, 静脉+吸入全身麻醉, 腹部正中切口, 以减轻对腹部肌肉的切割损伤, 行不保留幽门的Whipple术, 常规切除胆囊并彻底清扫淋巴结, 13组及16a2、16b1组淋巴结常规清扫, Child+Braun吻合方式重建消化道。胰肠吻合采用3-0 Prolene线双层连续缝合, 游离左侧胰腺残端约2 cm, 找出主胰管并置入引流管, 3-0 Prolene线缝合胰管周围组织固定引流管, 距胰腺断端1.0 cm处连续缝合胰腺后壁与空肠近系膜浆肌层, 后壁吻合后收紧缝线不打结; 切开空肠, 3-0 Prolene线连续缝合胰腺残端后壁与空肠全层, 后壁缝合完成后收线不打结; 将胰管引流管置入空肠, 内侧缝线继续缝合胰腺残端前壁和空肠全层, 完成内层吻合; 外层缝线连续缝合胰腺前壁与空肠浆肌层, 完成第二层胰肠吻合, 缝合完毕后收线打结。胆肠吻合应用可吸收缝线, 后壁连续、前壁间断缝合, 术后常规放置2根引流管, 分别位于胆肠吻合口与胰肠吻合口下方。

1.4 术后并发症

参照ISGPF及ISGPS界定标准^[12-13]。(1) 胰瘘: PD术后超过3 d, 腹腔引流液淀粉酶含量超过正常血清值3倍 (术后第1、3、5天留取引流液送检); 将胰瘘分为A、B、C 3级, A级仅有腹腔引流液淀粉酶升高, 无特殊症状且无需临床干预; B级腹腔引流液淀粉酶升高, 伴有临床症状并出现

器官损伤征象; C级出现严重败血症和器官功能障碍, 危及患者生命; B或C级常需临床干预。(2) 死亡: 围手术期或出院30 d内因手术或术后并发症导

致的死亡。(3) 胃排空延迟: 术后超过3 d仍携带胃管或因恶心呕吐重新留置胃管。

表1 PD围手术期主要ERAS措施

Table 1 Main ERAS protocols used in perioperative management of PD

具体措施	标准
术前宣教	了解ERAS概念、优化措施、治疗程序、术后每日康复目标等
肠道准备	不机械性灌肠, 术前2 h禁饮, 6 h禁食固体食物
术前减黄	血清总胆红素水平 ≥ 15 mg/dL
预防性抗生素	术前30 min应用头孢西丁, 手术时间超过4 h追加
限制性输液	量入为出, 避免过多补液
全程保温	温水冲洗腹腔, 输液适当加温, 调控室温
术后镇痛	多模式镇痛, PCI+ 静脉镇痛+ 口服NSAIDs (尽早)
拔除腹腔引流管	术后第3天或第5天, 引流液胰淀粉酶含量 $<5\ 000$ U/L, 引流液量 <200 mL/d
术后当天	术后6 h少量饮水, 床上坐起或半卧位
术后第1天	自控饮水(耐受量), 输液量20 mL/kg, 根据情况每天减少5 mL/kg; 拔除尿管; 床旁活动不少于30 min
术后第2天	拔除胃管(胃液 <500 mL); 流质饮食; 床旁活动不少于2 h
术后第3天	半流质饮食; 床旁活动不少于4 h; 适时拔除腹腔引流管
术后第4天	固体饮食; 根据情况停止输液

1.5 出院标准

(1) 口服镇痛药疼痛控制效果佳; (2) 体温 <37.5 °C; (3) 饮食逐渐恢复, 无需输液补给; (4) 实验室检查指标基本正常(白细胞或胆红素水平逐渐下降); (5) 生活自理, 能自主活动。

2 结果

2.1 术后一般情况

术后第1天常规拔除尿管, 2例老年男性因前列腺增生再次留置导尿, 22例(52.4%)患者下床活动, 10例(23.8%)达预定活动标准; 术后第2天常规拔除胃管, 5例发生胃排空延迟, 重新留置胃管, 30例(71.4%)能耐受流质饮食; 术后第3天35例(83.3%)拔除腹腔引流管; 33例(78.6%)术后第4天固体饮食。

2.2 术后并发症、住院时间及再入院情况

术后出现胰瘘3例(其中A级2例, B级1例), 胆汁漏1例, 出血1例, 腹腔积液3例, 胃排空延迟4例, 肺部感染1例, 无死亡病例, 出血患者行二次手术, 1例腹腔积液给予B超引导下穿刺引流, 术后总体并发症发生率31.0%, 出现并发症患者均经对症治疗后顺利出院。术后30 d再入院3例(7.1%), 其中胃功能不全1例, 腹腔积液并感染1例, 胆道感染1例, 均经对症治疗后好转, 中位住院时间10(8~35) d。

3 讨论

ERAS以维护恢复患者的生理功能, 减少痛苦, 减少并发症, 加速患者体质康复为宗旨, 基于多学科协作, 采用一系列具有循证医学基础的优化措施给与患者围手术期干预, 以减少手术创伤应激, 最终达到快速康复目的。ERAS在胃肠外科、泌尿外科及骨科等领域中的应用结果显示, ERAS能缩短住院时间、减少并发症、降低再入院率、加快术后康复进程。

胰十二指肠切除术是治疗壶腹部肿瘤的经典术式, 其涉及腹腔脏器多、手术难度大、历时长, 是外科最为复杂的手术之一。随着医疗技术的提高, PD术后并发症发生率及病死率较前降低, 术后病死率不足5%, 但并发症发生率仍高达50%, 术后住院时间长达2周^[14-15]。

ERAS理念逐渐应用于PD中, 大量临床研究^[16-19]表明, ERAS在缩短住院时间的同时不增加PD术后并发症发生率及再入院率。笔者将ERAS理念成功应用于42例PD患者, 初步探讨ERAS在我科PD中的临床应用价值。

本组患者术前均接受健康宣教, 详细告知患者ERAS理念、优化措施、治疗程序、术后每日康复目标等, 以减轻患者焦虑和恐惧, 缓解其精神压力, 减少机体应激。术前机械性肠道准备与消化道手术术后吻合口瘘或感染无明显相关性, 消

化道手术术前一晚禁食不能降低术后并发症发生率,反而易引起胰岛素抵抗^[20-21],所有患者术前均不常规机械性肠道准备,要求术前2 h禁水、6 h禁食固体食物。术前30 min常规应用头孢西丁预防感染,术后24 h内停用,以预防和降低术后感染的发生^[22]。

本组患者术中全程保温,采用加温补液、温水冲洗腹腔、调控室温等保温措施,以预防手术患者发生低体温而影响其凝血功能,减少术中出血量,从而降低手术并发症发生率,促进患者术后早期康复。术中限制性补液,根据患者心率、血压、尿量、出血量及中心静脉压综合评估制定输液计划,以减少组织细胞及细胞间质钠水储留,预防肠水肿和肠麻痹,降低吻合口瘘发生率,减轻心脏负荷,减少术后并发症^[23-24]。腹腔引流管对胰腺手术术后并发症发生率及病死率虽无影响,但胰瘘是PD术后最严重的并发症,也是PD术后病死最主要原因,PD术后胰瘘发生率高达15%,术中常规放置腹腔引流管,以便术后检测引流液中胰淀粉酶含量,对胰瘘发生风险进行评估。

术后充分镇痛可减轻患者不适,减少疼痛引起的机体应激,利于患者早期下床活动;本组患者术后采用PCI联合静脉输液镇痛,对于可进食患者及早口服NSAIDs镇痛,术后疼痛控制佳。胃管不能防止吻合口瘘,反而引起咽部不适甚至呕吐、误吸,增加肺部感染机会,不利患者早期进食,术后早期拔除胃管,能够减少肺炎、肺不张等并发症的发生^[25]。术后早期进流食有利于肠黏膜屏障功能恢复,减少细菌移位,避免内源性感染,有利于机体维持水、电解质和酸碱平衡,缓解术后恶心、呕吐及肠麻痹,PD术后早期进食安全可行,不增加术后胃排空延迟和吻合口瘘发生率^[26-27]。本组所有患者术后第1天即开始饮水,术后第2天拔除胃管,对于可耐受患者第2天开始流质饮食。早期拔除尿管,以减少尿道刺激,降低尿路感染发生风险,增加患者舒适性,利于术后早期锻炼与恢复。腹腔引流管的长期留置可引起腹腔逆行感染,增加术后肠粘连等并发症的风险,使患者活动受限,延迟进食时间,腹腔引流管还会使体内蛋白质随腹腔渗液及腹水的流出大量丧失,导致低蛋白血症,指南亦指出,PD术后3 d,引流液中胰淀粉酶含量 $<5\ 000\ \text{U/L}$ 拔除腹腔引流管安全可取^[28-29];本组患者术后第3、5天查引流液淀粉酶含量,引流液淀粉酶含量达拔管要求时当日拔除引流管。本组患者术后第1天即开始

下床活动,有效防止下肢深静脉血栓形成,避免肠粘连,增加肌肉强度及组织氧供,促进胃肠功能恢复,增强机体抵抗力,改善全身血循环,促进切口愈合^[18,30]。

结果显示,术后13例患者出现并发症,出血患者行二次手术康复出院,1例腹腔积液给予B超引导下穿刺引流,无死亡病例,总体并发症发生率31.0%,与大多临床报道相近,术后中位住院时间10 d,较传统住院时间明显缩短^[9, 21, 31]。ERAS理念应用于胰十二指肠切除术安全可行,缩短住院时间的同时不增加PD术后总体并发症发生率。

参考文献

- [1] Lee DY, Schwartz JA, Wexelman B, et al. Outcomes of pancreaticoduodenectomy for pancreatic malignancy in octogenarians: an American College of Surgeons National Surgical Quality Improvement Program analysis[J]. *Am J Surg*, 2014, 207(4):540-548. doi: 10.1016/j.amjsurg.2013.07.042.
- [2] Griffin JF, Poruk KE, Wolfgang CL. Pancreatic cancer surgery: Past, present, and future[J]. *Chin J Cancer Res*, 2015, 27(4):332-348. doi: 10.3978/j.issn.1000-9604.2015.06.07.
- [3] de Wilde RF, Besselink MG, van der Tweel I, et al. Impact of nationwide centralization of pancreaticoduodenectomy on hospital mortality[J]. *Br J Surg*, 2012, 99(3):404-410. doi: 10.1002/bjs.8664.
- [4] Jones EL, Wainwright TW, Foster JD, et al. A systematic review of patient reported outcomes and patient experience in enhanced recovery after orthopaedic surgery[J]. *Ann R Coll Surg Engl*, 2014, 96(2):89-94. doi: 10.1308/003588414X13824511649571.
- [5] Findlay JM, Gillies RS, Millo J, et al. Enhanced recovery for esophagectomy: a systematic review and evidence-based guidelines[J]. *Ann Surg*, 2014, 259(3):413-431. doi: 10.1097/SLA.0000000000000349.
- [6] Hughes MJ, McNally S, Wigmore SJ. Enhanced recovery following liver surgery: a systematic review and meta-analysis[J]. *HPB (Oxford)*, 2014, 16(8):699-706. doi: 10.1111/hpb.12245.
- [7] 彭浪, 王恺, 樊友文, 等. 加速康复外科理念在原发性肝癌肝切除术围手术期管理的应用价值[J]. *中国普通外科杂志*, 2017, 26(2):218-222. doi:10.3978/j.issn.1005-6947.2017.02.014.
Peng L, Wang K, Fan YW, et al. Application value of enhanced recovery concept in perioperative management of hepatectomy for primary liver cancer[J]. *Chinese Journal of General Surgery*, 2017, 26(2):218-222. doi:10.3978/j.issn.1005-6947.2017.02.014.
- [8] 宋伟, 邹书兵. 加速康复外科在肝脏手术围手术期应用的Meta分析[J]. *中国普通外科杂志*, 2016, 25(1):115-125. doi:10.3978/j.issn.1005-6947.2016.01.018.
Song W, Zou SB. Application of enhanced recovery after surgery in setting of liver surgery: a Meta-analysis[J]. *Chinese*

- Journal of General Surgery, 2016, 25(1):115–125. doi:10.3978/j.issn.1005-6947.2016.01.018.
- [9] Coolsen MM, van Dam RM, van der Wilt AA, et al. Systematic review and meta-analysis of enhanced recovery after pancreatic surgery with particular emphasis on pancreaticoduodenectomies[J]. World J Surg, 2013, 37(8):1909–1918. doi: 10.1007/s00268-013-2044-3.
- [10] Robertson N, Gallacher PJ, Peel N, et al. Implementation of an enhanced recovery programme following pancreaticoduodenectomy[J]. HPB (Oxford), 2012, 14(10):700–708. doi: 10.1111/j.1477-2574.2012.00521.x.
- [11] Nikfarjam M, Weinberg L, Low N, et al. A fast track recovery program significantly reduces hospital length of stay following uncomplicated pancreaticoduodenectomy[J]. JOP, 2013, 14(1):63–70. doi: 10.6092/1590-8577/1223.
- [12] Bassi C, Dervenis C, Butturini G, et al. Postoperative pancreatic fistula: an international study group (ISGPF) definition[J]. Surgery, 2005, 138(1):8–13.
- [13] Wente MN, Veit JA, Bassi C, et al. Postpancreatectomy hemorrhage (PPH): an International Study Group of Pancreatic Surgery (ISGPS) definition[J]. Surgery, 2007, 142(1):20–25.
- [14] Uzunoglu FG, Reeh M, Vettorazzi E, et al. Preoperative Pancreatic Resection (PREPARE) score: a prospective multicenter-based morbidity risk score [J]. Ann Surg, 2014, 260(5):857–863. doi: 10.1097/SLA.0000000000000946.
- [15] Eaton AA, Gonen M, Karanicolas P, et al. Health-related quality of life after pancreatectomy: results from a randomized controlled trial[J]. Ann Surg Oncol, 2016, 23(7):2137–2145. doi: 10.1245/s10434-015-5077-z.
- [16] Kobayashi S, Ooshima R, Koizumi S, et al. Perioperative care with fast-track management in patients undergoing pancreaticoduodenectomy[J]. World J Surg, 2014, 38(9):2430–2437. doi: 10.1007/s00268-014-2548-5.
- [17] Nussbaum DP, Penne K, Stinnett SS, et al. A standardized care plan is associated with shorter hospital length of stay in patients undergoing pancreaticoduodenectomy[J]. J Surg Res, 2015, 193(1):237–245. doi: 10.1016/j.jss.2014.06.036.
- [18] Coolsen MM, van Dam RM, Chigharoe A, et al. Improving outcome after pancreaticoduodenectomy: experiences with implementing an enhanced recovery after surgery (ERAS) program[J]. Dig Surg, 2014, 31(3):177–184. doi: 10.1159/000363583.
- [19] Shao Z, Jin G, Ji W, et al. The role of fast-track surgery in pancreaticoduodenectomy: a retrospective cohort study of 635 consecutive resections[J]. Int J Surg, 2015, 15:129–133. doi: 10.1016/j.ijsu.2015.01.007.
- [20] Ljungqvist O. Insulin resistance and outcomes in surgery[J]. J Clin Endocrinol Metab, 2010, 95(9):4217–4219. doi: 10.1210/jc.2010-1525.
- [21] Smith MD, McCall J, Plank L, et al. Preoperative carbohydrate treatment for enhancing recovery after elective surgery[J]. Cochrane Database Syst Rev, 2014, (8):CD009161. doi: 10.1002/14651858.CD009161.
- [22] Mazaki T, Mado K, Masuda H, et al. A randomized trial of antibiotic prophylaxis for the prevention of surgical site infection after open mesh-plug hernia repair[J]. Am J Surg, 2014, 207(4):476–484. doi: 10.1016/j.amjsurg.2013.01.047.
- [23] Cannesson M, Ramsingh D, Rinehart J, et al. Perioperative goal-directed therapy and postoperative outcomes in patients undergoing high-risk abdominal surgery: A historical-prospective, comparative effectiveness study[J]. Crit Care, 2015, 19:261. doi: 10.1186/s13054-015-0945-2.
- [24] Navarro LH, Bloomstone JA, Auler JO Jr, et al. Perioperative fluid therapy: a statement from the international Fluid Optimization Group[J]. Perioper Med (Lond), 2015, 4:3. doi: 10.1186/s13741-015-0014-z.
- [25] Bauer VP. The Evidence against Prophylactic Nasogastric Intubation and Oral Restriction[J]. Clin Colon Rectal Surg, 2013, 26(3):182–185. doi: 10.1055/s-0033-1351136.
- [26] Gerritsen A, Wennink RA, Besselink MG, et al. Early oral feeding after pancreatoduodenectomy enhances recovery without increasing morbidity[J]. HPB (Oxford), 2014, 16(7):656–664. doi: 10.1111/hpb.12197.
- [27] Braga M, Pecorelli N, Ariotti R, et al. Enhanced recovery after surgery pathway in patients undergoing pancreaticoduodenectomy[J]. World J Surg, 2014, 38(11):2960–2966. doi: 10.1007/s00268-014-2653-5.
- [28] Bassi C, Molinari E, Malleo G, et al. Early versus late drain removal after standard pancreatic resections: Results of a prospective randomized trial[J]. Ann Surg, 2010, 252(2):207–214. doi: 10.1097/SLA.0b013e3181e61e88.
- [29] Lassen K, Coolsen MM, Slim K, et al. Guidelines for perioperative care for pancreaticoduodenectomy: Enhanced Recovery After Surgery (ERAS®) Society recommendations[J]. Clin Nutr, 2012, 31(6):817–830. doi: 10.1016/j.clnu.2012.08.011.
- [30] Pillai SA, Palaniappan R, Pichaimuthu A, et al. Feasibility of implementing fast-track surgery in pancreaticoduodenectomy with pancreaticogastrostomy for reconstruction--a prospective cohort study with historical control[J]. Int J Surg, 2014, 12(9):1005–1009. doi: 10.1016/j.ijsu.2014.07.002.
- [31] Chaudhary A, Barreto SG, Talole SD, et al. Early discharge after pancreatoduodenectomy: what helps and what prevents?[J]. Pancreas, 2015, 44(2):273–278. doi: 10.1097/MPA.000000000000254.

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