

术前口服碳水化合物在糖尿病患者中的应用进展

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收稿日期: 2022年12月19日; 录用日期: 2023年1月11日; 发布日期: 2023年1月28日

摘要

术前过长的禁食禁饮时间会引起不必要的应激反应, 导致患者产生口渴、饥饿、焦虑等不良主观感受。近年来, 基于加速康复外科(enhanced recovery after surgery, ERAS)理念的广泛应用, 术前口服碳水化合物已被证实是安全可行的, 其不仅缓解患者的不良主观感受, 还具有增加术后胰岛素敏感性、减少术后并发症、缩短住院时间等优势。但各类指南、建议等不推荐糖尿病患者实施该策略。文章拟对糖尿病术前口服碳水化合物的临床应用现状进行讨论总结, 并对其安全性与可行性进行分析论述, 为临床工作提供理论支撑。

关键词

禁食, 碳水化合物, 加速康复外科, 糖尿病

Advances in the Application of Preoperative Oral Carbohydrates in Patients with Diabetes Mellitus

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Received: Dec. 19th, 2022; accepted: Jan. 11th, 2023; published: Jan. 28th, 2023

Abstract

Excessive preoperative fasting can cause unnecessary stress responses, which can lead to adverse

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subjective feelings such as thirst, hunger, and anxiety for patients. In recent years, preoperative oral carbohydrate has been proven to be safe and feasible based on the widespread application of the concept of enhanced recovery after surgery (ERAS). This strategy can not only alleviate patients' adverse subjective feelings, but also has the advantages of increasing postoperative insulin sensitivity, reducing postoperative complications, and reducing length of hospital stay. However, most of the guidelines and recommendations do not recommend this strategy for diabetic patients. This review intends to discuss and summarize the clinical application status of preoperative oral carbohydrates in patients with diabetes mellitus. The safety and feasibility of this strategy will be analyzed and discussed to provide theoretical basis for clinical practice.

Keywords

Fasting, Carbohydrate, Enhanced Recovery after Surgery, Diabetes Mellitus

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1. 引言

加速康复外科(enhanced recovery after surgery, ERAS)理念如今已在外科各个领域广泛应用,越来越多的外科患者从中受益。口服碳水化合物作为 ERAS 术前部分不可忽视的措施之一,为接受外科手术的患者提供了更舒适的体验。然而,无论是欧美国家,还是中国,术前禁食指南[1] [2] [3]中针对糖尿病患者大多会采取谨慎的策略,并不建议缩短此类患者禁食时间,这无疑将严重影响糖尿病患者的术后康复。随着社会老龄化的速度不断加快,以及生活方式的改变,糖尿病的患病率仍有增长的趋势。一项关于中国大陆地区糖尿病患病率的横断面研究显示,截止 2017 年,中国大陆 18 岁以上糖尿病患病率高达 11.2% (WHO 标准)或 12.8% (ADA 标准) [4], 并且大约有 50%患者在一生中需要接受外科手术[5], 因此糖尿病患者需要一项更合理、科学的术前禁食策略以提高其术后康复质量。本文就糖尿病患者术前口服碳水化合物的安全性及可行性展开讨论。

2. 术前禁食对机体的影响

尽管美国麻醉医师协会建议成年人术前禁食时间为 6~8 h, 禁饮时间为 2 h [3], 但临床实际情况并非如此, 术前禁食禁饮时间远远超过该指南建议, 甚至禁饮时间长达禁食时间之久, 而且这种情况是普遍存在的[6] [7] [8] [9]。过长的禁食禁饮时间成为了患者手术之前不小的“打击”, 这种情况下, 患者会产生口渴、饥饿、焦虑等不良主观感受, 同时血压不稳定、血糖波动等术中的不良事件的发生率也会增加 [10] [11] [12]。而对于内分泌紊乱的糖尿病患者, 这种状况会表现得更加突出。由于机体长期的高血糖状态导致消化系统神经功能紊乱及自主神经病变等, 长期以来, 糖尿病患者存在胃排空延迟甚至胃轻瘫的可能性[13], 因此, 如果通过延长这类患者术前禁食时间以降低反流误吸发生的概率, 这无疑会导致糖尿病患者术前发生应激反应, 而这种状态的是不利于手术的, 更不利于患者术后的恢复[10]。

3. 术前口服碳水化合物的应用

为了避免患者术前不必要的应激反应, 术前禁食禁饮方案不断被探索和研究, 消化道手术中是术前口服碳水化合物策略应用最广泛的领域之一, 大量数据[14] [15] [16] [17] [18]表明, 接受消化道手术的患

者术前口服碳水化合物具有增强胰岛素的敏感性、降低术后胰岛素抵抗、缩短术后住院时间、提高患者术后恢复质量及满意度等优势。另外, 接受妇科腹腔镜手术、骨科手术、剖宫产术及儿科手术等更多手术类型的患者同样可以在术前口服碳水化合物策略中受益, 且不增加反流误吸的风险[19] [20] [21] [22] [23]。基于以上优点, 中国加速康复外科临床实践指南(2021 版)将其作为术前部分措施之一, 推荐除合并胃排空延迟、胃肠蠕动异常、糖尿病、急诊手术等病人外的患者术前 2 小时口服含碳水化合物的饮品[1]。当这种打破传统观念的术前禁食策略为手术患者带来诸多益处时, 麻醉医生便开始探索其更广泛的适用领域, 因此, 在更多如糖尿病等特殊患者身上, 越来越多的证据表明这种策略似乎同样具有其可行性。

4. 糖尿病与胃排空

一项 2 型糖尿病与健康者对比研究[24]发现, 机体的血糖与胃排空呈现复杂的双向关系, 并不是血糖的数值单纯地影响胃排空时间。在流质食物的胃排空时间随着年龄增长而延长的总体趋势下, 对于病程较短以及没有并发症的 2 型糖尿病患者, 无论血糖控制如何, 其胃排空速度较对照组的健康者增快。Linda E. Watson [25]的研究也得出了相似的结论, 胃排空在控制良好的 2 型糖尿病患者中相对较快。一项前瞻性队列研究指出, 通过内窥镜及超声技术观察发现糖尿病病程和病情都不会影响胃容量[26]。不过, 也存在相反的研究结果, Li Zhou [27]等纳入 52 例 2 型糖尿病与 50 例非糖尿病患者对比发现, 糖尿病胃排空时间相对较长。令人感到遗憾的是, 糖尿病胃排空似乎没有特征性的症状, 或者说其症状与血糖数值没有明确的线性关系, 我们尚无法从糖尿病患者的病程长短和严重程度来预测术前胃容量[26]。

以胃排空延迟为临床特征的胃轻瘫, 它被定义为在没有机械性梗阻的情况下表现出的胃排空延迟综合征[28], 作为糖尿病并发症之一, 发生机制目前尚不明确, 可能与支配胃黏膜神经减少、Cajal 间质细胞异常及炎症因子的表达等有关[29] [30] [31], 甚至某些非编码 RNA 同样发挥潜在的作用[32] [33]。另外, 其患病率等尚无可靠、准确的全国甚至世界范围的统计数据。有调查研究显示[34], 1 型糖尿病和 2 型糖尿病的胃轻瘫 10 年累计发生率分别为 5.2%, 1.0%。最近的一项时间跨度为 15 年, 多达 4000 万份病例回顾性调查分析中, 结果也是类似的, 1 型糖尿病和 2 型糖尿病患者中并发胃轻瘫的人数分别为 4.59%, 1.31% [35]。就目前有限的统计资料分析, 胃轻瘫并不是糖尿病常见的并发症之一, 因此, 有关糖尿病患者术前禁食禁饮的观念, 现在看来似乎显得有些保守。对于这类患者, 术前口服碳水化合物的策略从理论上或许值得进一步探究。

5. 术前口服碳水化合物对糖尿病机体的影响

5.1. 反流误吸

术前口服碳水化合物在非胃排空延迟、胃肠蠕动异常、糖尿病、急诊手术等患者中, 多项研究已证实是安全的, 这些研究涉及骨科、剖宫产、妇科恶性肿瘤、胃肠肿瘤及日间手术等, 麻醉类型包括全身麻醉和椎管内麻醉, 受试者为 18 岁以上的各个年龄阶段, 术前 2~4 h 口服 200~400 mL 不等的碳水化合物饮品均不影响患者术前胃容量, 不增加反流误吸的风险[20] [22] [36] [37], 即使在胃肠道肿瘤及妇科恶性肿瘤患者中, 通过胃窦部超声发现术前 2 h 碳水化合物负荷会增加术前胃容量, 但这种增加并不意味着反流误吸的风险增加[18] [38]。I.-K. Song [23]等人发现, 甚至在 18 岁以下的小儿患者中, 术前碳水化合物负荷同样是安全的, 不增加术前胃容量。

正如上文所提到的, 除并发胃轻瘫的糖尿病患者外, 大部分糖尿病胃排空速度通常是加快的, 那么是否可以认为这类患者在碳水化合物负荷下同样是安全的呢? Breuer [39]等人评估了接受心脏手术的 2 型糖尿病患者发现, 于术前 2 h 口服 400 mL 碳水化合物饮品后不增加胃液体积。不过正如 Breuer [39]等人分析指出, 该研究通过胃管的胃液反流而估算胃液体积, 这种方法可能与真实的胃容量存在误差。另

一项将对乙酰氨基酚在消化道的吸收率作为胃排空指标的研究中发现, 2 型糖尿病患者口服 400 mL 碳水化合物饮品, 3 h 后完全排出, 且排空速度较健康受试者快[40]。近几年, 通过胃窦超声技术测算胃容量的报道称, 术前 2 h 给予 2 型糖尿病患者 200~300 mL 碳水化合物饮品不会增加反流误吸的风险[41] [42]。

5.2. 血糖

外科患者由于术前禁食禁饮通常会导致血糖紊乱, 其次手术的创伤对血糖的影响更是值得重点关注的, 这种情况在糖尿病患者中表现得尤为突出, 术中血糖增高、降低, 甚至剧烈波动时有发生, 而在不同类型的手术中, 血糖的变化也各不相同[43] [44]。有统计数据显示, 普通手术当天至术后第二天时间内, 29.1% 的患者出现高血糖[45], 在心脏大手术中这一比例则更高[46], 而围术期高血糖的发生与术后的并发症及不良事件存在关联[47] [48]。针对之一问题, 一项关于接受膝关节镜手术的随机对照试验指出, 术前碳水化合物负荷可以有效降低术后血糖的波动[49], Luca Gianotti [50] 团队通过多中心的随机对照研究发现, 接受腹部手术的患者通过术前口服碳水化合物饮品后可避免高血糖的发生。Stephanie D. Talutis [51] 研究结果显示, 术前碳水化合物负荷虽然会导致糖尿病患者血糖短暂升高, 但并不会增加术后胰岛素的使用量及并发症。由于围术期血糖的变化受多方面复杂因素影响, 因此术前碳水化合物负荷对血糖的影响不能要而论之。有完全不同的研究结果指出, 术前口服碳水化合物会增加糖尿病患者的血糖变异性[52]。

5.3. 胰岛素抵抗

近年来, 减轻术后胰岛素抵抗作为术前口服碳水化合物明显的优势已成为研究的热点之一。现已证实, 由于术前禁食及手术应激等导致的胰岛素抵抗是影响术后康复的重要因素, 它与术后并发症和住院时间等存在密切的关系[16] [53] [54], 其发生机制极其复杂, 涉及机体营养代谢、信号传递、基因突变等学说[55]。在 ERAS 理念应用广泛的消化道手术中, 术前碳水化合物负荷减轻术后胰岛素抵抗的效果是显著的[14] [15] [16] [56], 在心血管大手术中具有类似的效果, 并且能够防止心肌细胞的损伤[57] [58]。然而, 以上大多基于非糖尿病普通患者的临床研究数据, 关于糖尿病患者这方面的研究是相当有限的, 陆丽华[59]等通过胰岛素抵抗指数评估发现, 肝癌合并糖尿病患者术前口服碳水化合物可改善术后胰岛素抵抗, 这与 T. Jodlowski [60]等关于在接受结直肠手术的 2 型糖尿病患者中的研究结论是一致的。Breuer [39]等通过对接受心脏手术的 2 型糖尿病患者评估指出, 并未发现碳水化合物组和对照组的胰岛素抵抗有明显的差异。而在一项关于接受膝关节或髋关节置换术的 2 型糖尿病患者的随机对照试验中, 其研究结果与之前大相径庭, 术前口服碳水化合物方案会增加糖尿病患者的胰岛素抵抗[52]。

5.4. 一般情况

术前口服碳水化合物具有改善患者主观体验的优势, Breuer [39]等指出, 糖尿病患者在接受心脏手术之前口服碳水化合物可减轻口渴感, 这与陆丽华[59]等在肝癌合并糖尿病患者相关试验中的结果是一致的。另外, Jiu-hui Yang [61]还在接受肝叶切除术的 2 型糖尿病患者中观察到, 碳水化合物组术后血浆 IL-6 和 TNF- α 浓度显著低于空腹饮水组。不过, Seokyoung Shin [62]等在一项接受全膝关节置换术的 2 型糖尿病患者的随机对照试验中发现, 术前口服碳水化合物并未降低患者术后恶心呕吐的发生率。

6. 总结

糖尿病患者由于受病程、控制程度、治疗等诸多因素的影响可能引起各类并发症, 所以术前口服碳水化合物在不同的糖尿病患者中表现出不同的效果。在安全性方面, 除合并自主神经病变而胃肠动力受损的, 即胃轻瘫的糖尿病患者外, 大部分胃排空时间是加快的, 这表明, 从理论上大部分糖尿病患者术前口服碳水化合物的安全性是明确的。但在临床中却很难推广, 由于快速、准确地筛查胃排空延迟的糖

尿病患者并非易事, 因此为了确保少数者的安全性而未能使多数者受益。虽然胃窦部超声可以辅助评估患者麻醉反流误吸的风险, 但作为胃排空延迟或术前口服碳水化合物策略的筛选手段并不合适。因而麻醉医生需要一种高效的评估方法对合并胃轻瘫的糖尿病患者或胃排空延迟的患者精准筛查, 使更多的糖尿病患者从中受益。在主观舒适度、术后并发症及住院时间等方面, 糖尿病患者是否受益目前数据有限, 争议较多, 这可能不仅仅与糖尿病本身相关, 手术时间、手术类型、麻醉方式等都会影响效果, 所以仍然需要更多、更高质量的临床试验提供更有力的证据。

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