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胃癌化疗期营养管理的临床研究进展

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摘要 胃癌是我国发病率与病死率均居前列的消化系统恶性肿瘤。化疗在中晚期胃癌综合治疗中发挥着关键作用,但其毒副反应常导致食欲减退、体质量下降和营养不良,从而影响患者的治疗耐受性和生存预后。近年来,多项研究表明,系统化营养管理可显著改善体质量、白蛋白(Alb)、前白蛋白(PAB)等营养指标,减少严重不良反应并提高化疗完成率。炎症-营养复合指标如预后营养指数(PNI)、系统免疫炎症指数(SII)及C反应蛋白/白蛋白比值(CAR)等,已被证实与化疗反应及预后密切相关。本文基于近年国内外相关研究,综述了胃癌化疗期营养风险现状、干预模式及炎症-营养指标在化疗依从性和预后评估中的作用,为临床实施精准化营养管理提供依据。

关键词 胃癌;化疗;营养管理;炎症-营养指标;依从性;预后

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Clinical research progress on nutritional management during chemotherapy for gastric cancer

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Abstract

Gastric cancer remains one of the most prevalent and lethal malignancies in China. Chemotherapy plays a pivotal role in the comprehensive management of advanced or recurrent gastric cancer; however, its toxic side effects frequently lead to anorexia, weight loss, and malnutrition, thereby compromising treatment tolerance and survival outcomes. In recent years, mounting evidence has demonstrated that standardized nutritional management can effectively improve key nutritional indicators, such as body weight, albumin (Alb), and prealbumin (PAB), reduce the incidence of severe adverse reactions, and enhance chemotherapy completion rates. Moreover, composite inflammation-nutrition indices, including the prognostic nutritional index (PNI), systemic immune-inflammation index (SII), and C-reactive protein/albumin ratio (CAR), have emerged as reliable

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predictors of chemotherapy response and prognosis. This review summarizes recent advances in nutritional risk assessment, intervention strategies, and inflammation-nutrition biomarkers during chemotherapy for gastric cancer, offering valuable insights into precision nutritional management in clinical oncology.

Key Words Gastric Cancer; Chemotherapy; Nutritional Management; Inflammation-Nutrition Indices; Adherence; Prognosis

胃癌是全球常见的消化系统恶性肿瘤,在亚洲尤其是中国呈现显著的疾病负担^[1]。化疗是中晚期或术后复发胃癌的重要治疗手段,可有效延长生存期并改善生活质量。然而,化疗引起的胃肠道反应和代谢应激可导致能量摄入不足,进而诱发营养不良甚至恶病质倾向^[2-3]。FUKAHORI等^[3]在日本的研究显示胃癌化疗患者12周内体质量下降 $\geq 5\%$ 的比例为53.4%,48周累积下降率达87.7%,且早期体质量下降与总体生存期呈负相关($HR=1.39$, 95%CI:0.95~2.05)。在非西方地区,癌症患者的营养不良率同样高达58.2%^[4]。营养不良可降低患者对化疗的耐受性,增加毒副反应发生风险,从而影响治疗的连续性与依从性。多癌种研究同样证实,营养不良与化疗依从性及生存结局密切相关^[2,5]。营养不良在胃癌患者中很常见,会对预后和生活质量产生负面影响^[6-7]。因此,在胃癌化疗过程中实施规范化的营养管理,对于维持治疗强度和改善患者预后具有重要意义。

1 胃癌化疗期营养问题及影响

1.1 化疗相关营养风险现状 在国内研究中常采用营养风险筛查(nutritional risk screening, NRS) 2002筛查,评分 ≥ 3 通常被视为存在营养风险。胃癌化疗患者普遍属于高营养风险人群,需在早期开展营养干预^[8]。在胃癌术后或化疗期间,患者往往在治疗早期出现白蛋白(albumin, Alb)与前白蛋白(prealbumin, PAB)下降趋势,而系统化营养干预可显著减缓该变化并促进恢复^[9-10]。化疗诱导的炎症反应和代谢异常是营养不良的主要机制。肿瘤相关炎症因子(如IL-6、TNF- α)可干扰碳水化合物、脂肪和蛋白质代谢,导致肌肉消耗与营养恶化^[11]。同时,较高系统免疫炎症指数(systemic immune-inflammation index, SII)值常与疗效差及炎症活化相关^[12]。除炎症反应外,化疗引起的贫血、恶心、呕吐及口腔黏膜炎也显著减少了能量摄入。亚洲及发展中国家患者普遍存在营养储备不足,使化疗期营养风险更加突出^[1,4]。

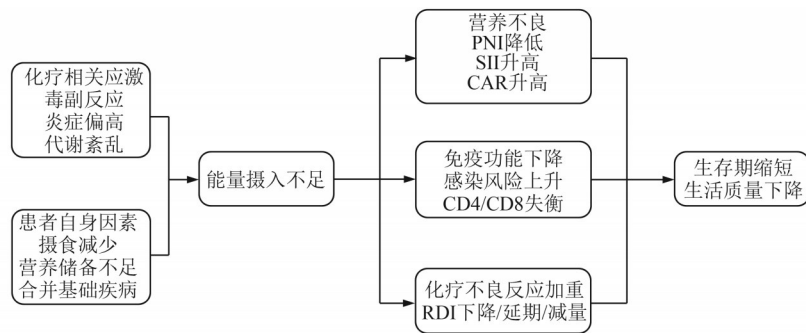
1.2 营养不良的临床后果及潜在可逆性 营养不良会削弱免疫功能并降低化疗耐受性。BOZZETTI^[2]指出,营养不良患者更易发生严重(Ⅲ~Ⅳ级)化疗不良反应。预后营养指数(prognostic nutritional index, PNI)能较好反映机体的营养及免疫水平。XIAO等^[13]报道,低PNI组患者的化疗依从性及生存结局均明显低于高PNI组。

炎症-营养相关指标能预测预后的差异。C反应蛋白/白蛋白比值(C-reactive protein/albumin ratio, CAR)、中性粒细胞计数/淋巴细胞计数比值(neutrophil/lymphocyte ratio, NLR)和血小板计数/淋巴细胞计数比值(platelet/lymphocyte ratio, PLR)均被证实具有预测价值。研究^[5,14]表明,营养干预有助于改善患者的疲劳、恶心及社会功能等生活质量维度,提示部分营养不良效应可逆。此外,SII升高提示系统炎症活跃并与免疫功能下降相关^[12,15]。由此可见,营养状态不仅影响机体免疫功能和代谢稳态,也直接关系到化疗的可耐受性和疗效,见图1。

2 营养管理的临床意义与模式

2.1 营养干预的效果 系统营养管理可显著改善患者营养状态与免疫功能。MENG等^[9]报道,接受口服营养补充剂(oral nutritional supplements, ONS)联合饮食指导的患者,3个月后体质量下降更少、体质量指数(body mass index, BMI)更高,化疗调整率降低($P<0.05$);同样,一项胃癌患者胃切除术后Meta分析^[16]发现,与标准饮食相比,ONS与胃癌患者胃切除术后体质量减轻的降低显著相关。MIYAZAKI等^[10]的多中心随机研究中发现,术后3个月ONS组体质量下降,少于对照组[(7.1 $\pm$ 5.6)% vs (8.5 $\pm$ 5.8)%, $P=0.0011$];每日摄入 >200 kcal(1 kcal=4.184 kJ)的患者优势可持续至1年($P=0.02$)。

在国内,黄凌莉等^[17]在多学科团队(multi-disciplinary team, MDT)指导下实施全程营养管理,两周期后干预组Alb上升5.10 g·L⁻¹,对照



PNI. 预后营养指数; SII. 系统免疫炎症指数; CAR. C反应蛋白/白蛋白比值; RDI. 相对剂量强度。

图1 胃癌化疗期营养风险形成的多因素机制示意

组下降 $1.75 \text{ g} \cdot \text{L}^{-1} (P < 0.05)$ 。朱琪伟等^[18]在腹部肿瘤放化疗患者中亦观察到干预组 CD4/CD8 比值与血红蛋白水平均高于对照组 ($P < 0.05$)。国外系统综述^[19-20]显示,营养干预可降低癌症严重(Ⅲ~Ⅳ级)不良反应的发生率。

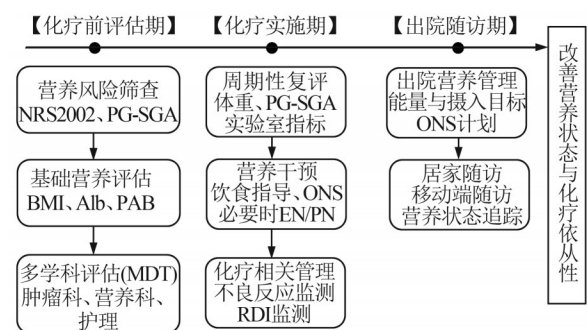
此外,乳腺癌^[21]、结直肠癌^[22]等多癌种研究也证实营养干预能改善患者不良反应发生率并提升治疗耐受性,提示其具有跨癌种普适性。

2.2 管理模式与执行路径 营养管理的有效实施依赖团队协作和制度化流程。MDT 模式将营养师、肿瘤科医师和护理团队纳入统一管理体系,实现治疗-营养一体化^[17]。

朱晓丹等^[23]在结肠癌患者中应用病人参与式管理模式,患者主观整体评估(patient-generated subjective global assessment, PG-SGA)评分下降,依从性提高。类似地,放化疗后肿瘤患者^[24]及胆道恶性肿瘤^[25]的研究显示,院内-居家连续管理模式能持续改善 Alb 与 PG-SGA,并降低再入院率。

欧洲临床营养与代谢协会(European Society for Clinical Nutrition and Metabolism, ESPEN)指南及我国 2023 年的专家共识均提出,化疗患者应在治疗前进行营养风险筛查,并在每个化疗周期内定期复评^[11,19,26]。系统营养管理除改善营养状况外,还能缩短住院时间、降低医疗费用^[20]。

此外,健康教育与个体化营养指导对提升患者自我管理意识与能量摄入也具有积极意义。刘素凤^[27]报道,干预组患者能量摄入较对照组显著增加 ($P < 0.05$),与杨园园等^[28]提出的“营养认知与自我管理提升有助于改善营养状况”的结论一致。通过规范化评估、干预与随访,可将营养管理贯穿化疗全过程,从而改善营养状态与治疗依从性,见图 2。



NRS2002. 营养风险筛查 2002; PG-SGA. 患者主观整体评估; BMI. 体质指数; Alb. 白蛋白; PAB. 前白蛋白; ONS. 口服营养补充剂; EN. 肠内营养; PN. 肠外营养; RDI. 相对剂量强度。

图2 胃癌化疗期全程营养管理路径图

3 营养管理对化疗依从性与预后的促进作用

3.1 对化疗依从性与生活质量的影响 相对剂量强度(relative dose intensity, RDI)是反映化疗依从性的重要指标。一项针对晚期实体瘤的 Meta 分析^[29]显示,晚期实体瘤患者中, $\text{RDI} < 80\%$ 者的死亡风险较 $\geq 80\%$ 者增加 17% ($\text{HR} \approx 1.17$), $\text{RDI} < 85\%$ 者的死亡风险较 $\geq 85\%$ 者增加 39% ($\text{HR} \approx 1.39$),这提示维持较高的 RDI 对改善生存至关重要。黄凌莉等^[17]报道,多学科协作的全程营养管理能提高化疗完成率。刘素凤^[27]研究表明,个体化营养干预联合健康教育后,观察组的 Alb 为 $(37.68 \pm 4.95) \text{ g} \cdot \text{L}^{-1}$ 、PAB 为 $(294.37 \pm 32.45) \text{ mg} \cdot \text{L}^{-1}$ 、Hb 为 $(124.37 \pm 12.35) \text{ g} \cdot \text{L}^{-1}$,以上指标均显著高于对照组 ($P < 0.05$),化疗相关不良反应发生率显著降低 ($8.10\% \text{ vs } 27.03\%, P < 0.05$)。SUGIYAMA 等^[30]进一步指出,营养支持可延长治疗失败时间 ($\text{HR} = 0.53, P = 0.01$)。

营养改善除增强治疗依从性外,还能缓解毒副反应并提升心理状态。薛志芳等^[31]在老年食管癌患者中证实,精细化营养管理能改善免疫功能与生

活质量。MULAZZANI 等^[32]一项关于癌症患者的研究指出,抑郁与食欲下降及营养恶化密切相关,及时干预有助防止营养状况进一步下降;杨园园等^[28]指出,良好的营养状态可通过提升生活质量间接增强依从性。

3.2 炎症-营养指标与预后的预测意义 炎症-营养指标是评估化疗耐受性和预后的重要工具。DING 等^[15]指出,SII 联合 PNI 可有效预测新辅助化疗疗效($AUC \approx 0.8$)。吴鹏飞等^[12]报道,SII 和控制营养状况评分(controlling nutritional status score, CONUT)均与免疫联合化疗疗效相关,低值组患者有效率高于高值组($P < 0.05$)。武志恒等^[33]综述认为,高 PNI 与低 SII 患者预后较佳,可作为营养-炎症状态的独立指标。SUN 等^[34]报道,CAR 升高患者的总体生存风险增加($HR = 1.846, 95\% CI: 1.388 \sim 2.245, P = 0.67$),但差异未达统计学意义。与此同时,PNI 与 Alb 升高常提示更佳预后^[13,35]。

国外研究还探索了基于人工智能的动态模型,可整合炎症与营养相关指标(如 SII、CAR、PNI)进行个体化风险评估^[36]。目前国内尚缺乏统一阈值和标准化监测体系,需要多中心研究进一步验证。

4 讨论

近年来,临床对胃癌化疗患者的营养管理关注度逐渐提高。大量研究^[37-38]表明,营养不良不仅是化疗相关毒副反应的典型表现,同样也是导致患者治疗中断和化疗疗效下降的重要原因。随着多学科管理理念的推广,营养支持的作用已从单纯的辅助提升为化疗过程中的重要组成部分。实践表明,早期识别营养风险并实施个体化干预,有助于改善患者的免疫功能^[39]、耐受性和生活质量^[40]。

从研究方向来看,营养干预正逐步走向精准化与动态化。传统的热量与蛋白补充已难以满足临床需求,新的管理模式更强调炎症调控、肠道屏障维护及免疫营养支持。数字化技术的应用,也使营养管理的连续性显著增强。移动端随访、智能化膳食评估与远程干预,使患者在化疗间歇及出院后的营养状态能够持续监测和调整,这对提升长期疗效具有现实意义^[41]。

尽管进展明显,但仍存在若干问题需要解决。目前,不同研究在营养干预的时机、方案强度和持续时间方面缺乏一致标准,筛查工具的灵敏度和特异度亦有待验证。此外,营养支持与免疫治疗、靶向治疗之间的相互作用尚缺乏系统研究。由于化

疗方案和个体差异较大,未来的研究应采用多中心、前瞻性设计,综合评价营养管理对化疗强度、免疫恢复及生存结局的长期影响。

总体来看,科学的营养管理是提升胃癌化疗效果的重要保障。医务人员通过规范评估、动态跟踪和多学科配合,可以让营养干预贯穿整个治疗过程,使目标从单纯纠正营养不良转向帮助患者更好地应对化疗。这一转变标志着营养管理已成为化疗全过程管理中不可或缺的临床环节,未来结合多中心临床验证与营养信息化平台建设,有望推动我国胃癌化疗期营养管理的标准化与精细化进程。

5 小结

胃癌化疗患者普遍面临不同程度的营养风险,合理的营养干预对维持治疗强度、减轻毒副反应及改善生存结局具有重要价值。现有研究证据表明,应在化疗各阶段实施连续、系统、个体化的营养管理。今后应完善营养风险评估工具,建设信息化监测体系,并强化医师、护士与营养师的协作,以实现精准、长期的营养支持目标,从而进一步提升患者的整体获益。



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