

ISSN 1009-3079 (print)
ISSN 2219-2859 (online)

世界华人消化杂志®

WORLD CHINESE JOURNAL OF DIGESTOLOGY

Shijie Huaren Xiaohua Zazhi

2023 年 2 月 8 日 第 31 卷 第 3 期 (Volume 31 Number 3)



3 / 2023

ISSN 1009-3079



9 771009 307056

《世界华人消化杂志》是一本高质量的同行评议、开放获取和在线出版的学术刊物。本刊被国际检索系统《化学文摘(Chemical Abstracts, CA)》、《医学文摘库/医学文摘(EMBASE/Excerpta Medica, EM)》、《文摘杂志(Abstract Journal, AJ)》、Scopus、中国知网《中国期刊全文数据库(CNKI)》、《中文科技期刊数据库(CSTJ)》和《超星期刊域出版平台(Superstar Journals Database)》数据库收录。



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形式规范审核编辑部主任 李香; 最终清样审核总编辑 马连生

世界华人消化杂志

Shijie Huaren Xiaohua Zazhi

吴阶平 题写封面刊名

陈可冀 题写版权刊名

(半月刊)

创 刊 1993-01-15

改 刊 1998-01-25

出 版 2023-02-08

原刊名 新消化病学杂志

期刊名称

世界华人消化杂志

国际标准连续出版物号

ISSN 1009-3079 (print) ISSN 2219-2859 (online)

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Baishideng Publishing Group Inc

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: wcjd@wjgnet.com

<http://www.wjgnet.com>

出版

百世登出版集团有限公司

Baishideng Publishing Group Inc

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: bpgoffice@wjgnet.com

<https://www.wjgnet.com>

制作

北京百世登生物医学科技有限公司
100025, 北京市朝阳区东四环中路
62号, 远洋国际中心D座903室
电话: +86-10-85381901

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《世界华人消化杂志》正式开通了在线办公系统(<https://www.baishideng.com>), 所有办公流程一律可以在线进行, 包括投稿、审稿、编辑、审读, 以及作者、读者和编者之间的信息反馈交流.

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定价

每期136.00元 全年24期3264.00元

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World Chinese Journal of Digestology
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Indexed/Abstracted by

Chemical Abstracts, EMBASE/Excerpta Medica, Abstract Journals, Scopus, CNKI, CSTJ and Superstar Journals Database.

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Shijie Huaren Xiaohua Zazhi

Founded on January 15, 1993

Renamed on January 25, 1998

Publication date February 8, 2023

NAME OF JOURNAL

World Chinese Journal of Digestology

ISSN

ISSN 1009-3079 (print) ISSN 2219-2859 (online)

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World Chinese Journal of Digestology

Baishideng Publishing Group Inc

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: wjcd@wjgnet.com

<https://www.wjgnet.com>

PUBLISHER

Baishideng Publishing Group Inc

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: bpgoffice@wjgnet.com

<https://www.wjgnet.com>

PRODUCTION CENTER

Beijing Baishideng BioMed Scientific Co., Limited Room 903, Building D, Ocean International Center, No. 62 Dongsihuan Zhonglu, Chaoyang District, Beijing 100025, China
Telephone: +86-10-85381901

PRINT SUBSCRIPTION

RMB 136 Yuan for each issue

RMB 3264 Yuan for one year

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INSTRUCTIONS TO AUTHORS

Full instructions are available online at <https://www.wjgnet.com/1009-3079/Nav/36>. If you do not have web access, please contact the editorial office.

影响结肠镜检查中盲肠插管时间的相关因素

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作者贡献分布: 本文由王珂查阅文献及撰写; 许文涛、寇文静校正文章书写格式; 祁兴顺审核.

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收稿日期: 2022-11-24

修回日期: 2023-01-04

接受日期: 2023-01-18

在线出版日期: 2023-02-08

Factors affecting cecal intubation time during colonoscopy

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Received: 2022-11-24

Revised: 2023-01-04

Accepted: 2023-01-18

Published online: 2023-02-08

Abstract

In recent years, the morbidity and mortality of colorectal cancer (CRC) have increased significantly in China, and it has become one of the major malignancies that threaten the health of residents. Colonoscopy is the gold standard for the diagnosis of CRC. High-quality colonoscopy can effectively reduce the mortality of CRC. Cecal intubation time (CIT) is one of the indicators to reflect the quality of colonoscopy. Studies have found that many factors can affect CIT. This paper reviews the literature to identify the factors that affect CIT, such as those related to doctors, patients, assistive technologies, and equipment, in order to improve the quality of colonoscopy performed by endoscopists.

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Key Words: Cecal intubation time; Colonoscopy; Review

Citation: Wang K, Xu WT, Kou WJ, Qi XS. Factors affecting cecal intubation time during colonoscopy. *Shijie Huaren Xiaohua Zazhi* 2023; 31(3): 105-112

URL: <https://www.wjgnet.com/1009-3079/full/v31/i3/105.htm>

DOI: <https://dx.doi.org/10.11569/wcjd.v31.i3.105>

摘要

近年来,我国结直肠癌(colorectal cancer, CRC)发病率和死亡率明显上升,已成为威胁居民健康的主要癌症之一.结肠镜作为诊断CRC的金标准,高质量的结肠镜检查可以有效降低结直肠癌的死亡率.盲肠插管时间(cecal intubation time, CIT)是反映结肠镜检查质量的指标之一,研究已发现多种因素均可影响CIT.本文通过回顾文献介绍了医生、患者、辅助技术、设备等方面可能影响CIT的相关因素,以期提高内镜医师完成结肠镜检查的质量.

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关键词: 盲肠插管时间; 结肠镜检查; 综述

核心提要: 盲肠插管时间(cecal intubation time, CIT)是反映结肠镜检查质量的指标之一, 较短的CIT往往意味着高质量的结肠镜检查。本文从医生、患者、辅助技术、设备和其他因素五个方面对可能影响CIT的因素作一综述。

文献来源: 王珂, 许文涛, 寇文静, 祁兴顺. 影响结肠镜检查中盲肠插管时间的相关因素. 世界华人消化杂志 2023; 31(3): 105-112

URL: <https://www.wjgnet.com/1009-3079/full/v31/i3/105.htm>

DOI: <https://dx.doi.org/10.11569/wjcd.v31.i3.105>

0 引言

结直肠癌(colorectal cancer, CRC)是我国最常见的恶性肿瘤之一, 近年来发病率和死亡率均呈上升趋势。盲肠插管时间(cecal intubation time, CIT)被定义为从结肠镜尖端插入肛门边缘到盲肠底部或盲肠末端的时间^[1]。CIT是反映结肠镜检查困难程度的指标之一^[2]。延长的CIT意味着困难的结肠镜检查^[3], 往往会导致检查质量下降^[4,5], 不利于CRC的早诊。本文从医生因素、患者因素、辅助技术、设备因素和其他因素五个方面论述了影响结肠镜检查中CIT的因素, 旨在加强内镜医师对CIT的了解, 并在检查中有意识地采取措施来缩短CIT。

1 医生因素

1.1 内镜医师的经验 内镜医师的经验(包括检查例数、工作年限等)是影响结肠镜检查CIT的重要因素, 目前大多数研究证实经验越丰富的医师行结肠镜检查时CIT越短。Bernstein等^[6]前瞻性分析了七名内镜医师结肠镜检查的CIT数据, 随着医师检查例数的增加, CIT相应缩短($P=0.042$, $\beta=-0.0002$)。Kawasato等^[7]分析了由18名内镜医师进行结肠镜检查的CIT数据, 其中5名为内镜专家(具有至少9年的内镜检查经验, $n=251$)、13名为普通内镜医师(内镜检查经验不足9年, $n=562$), 结果显示内镜专家检查时的CIT明显短于普通内镜医师($792\text{ s}\pm 568.3\text{ s}$ vs $1264\text{ s}\pm 695.8\text{ s}$, $P<0.0001$)。此外, Zuber-Jerger等^[8]指出, 初级内镜医师(检查次数 <500 次)和高级内镜医师(检查次数 >1000 次)相比CIT有着显著差异($11.8\text{ min}\pm 10.8\text{ min}$ vs $7.2\text{ min}\pm 14.1\text{ min}$, $P<0.001$)。随着检查例数和工作年限的增长, 内镜医师对结肠镜的操作也愈加熟练, 可以更加容易地通过结肠屈曲, 进而顺利插镜至盲肠。同时有着丰富经验的医师在遇到困难的检查病例时更能保持冷静, 良好的心态也有利于顺利检查, 从而缩短

CIT。此外, 经验丰富的内镜医师在操作时患者会感受到更轻微的不适和疼痛, 这有助于减轻患者的紧张情绪、增加患者配合的意愿, 从而有助于缩短CIT。

1.2 内镜医生接受的培训 在临床实践中, 对内镜医师进行适当的培训被普遍认为是提高结肠镜检查质量、缩短CIT的一种有效方法。目前临床上常用的培训方法有上级医师指导、观看教学视频和参加讲座等。Patwardhan等^[9]在一项回顾性研究中分析了接受1年、2年和3年职业培训教育的眼镜医师结肠镜检查的数据, 随着内镜医师接受培训的时间的延长, 检查时的CIT显著缩短(13.29 min vs 8.79 min vs 5.14 min , $P<0.001$)。然而, Spier等^[10]指出, 与接受了2年职业教育的内镜医师相比, 接受了3年职业教育的内镜医师的CIT反而延长(10 min vs 11 min , $P<0.001$)。职业教育的时间过长可能会导致内镜医师投入到临床工作的注意力减少, 而且更有可能引起内镜医师的疲惫, 从而对内镜医师的技术进步产生不利影响。综上, 有必要对内镜医师进行适当的培训, 但不应过度, 以利于缩短CIT。

2 患者因素

2.1 BMI 体重指数(body mass index, BMI) 是国际上诊断超重和肥胖使用最广泛的指标^[11]。BMI和CIT之间存在着密切的关系。既往多数研究认为BMI较高的患者在结肠镜检查中有着较短的CIT^[12-14]。这可能是因为BMI较高的患者可能含有更多的腹部脂肪和内脏脂肪, 这为结肠在腹腔内的稳定性提供支撑, 使得结肠镜能够顺利通过^[2]。Krishnan等^[15]纳入了1430例接受结肠镜检查的患者, 评估了BMI与CIT之间的关系, 根据BMI数值将患者分为低体重组($n=40$)、正常体重组($n=121$)、超重组($n=624$)、肥胖组($n=522$)和严重肥胖组($n=123$), 并分别记录CIT, 结果显示随着BMI的增加, 平均CIT呈线性下降。最近Jaruvongvanich等^[16]的荟萃分析也表明BMI与CIT呈负相关。然而, 也有其他研究提出了不同的观点。Kim等^[1]对韩国1229例接受结肠镜检查的患者分析, 发现BMI与CIT无显著相关($P=0.95$)。Jain等^[17]对926例门诊行结肠镜检查者进行回顾性分析, 发现男性受试者的BMI和CIT呈正相关。这些争议可能与BMI高低的界定标准有差异以及受试者的性别比例不同有关。目前认为过高或过低的BMI均会延长CIT^[18]。未来仍需更多高质量的研究来深入分析BMI和CIT之间的关系。

2.2 性别 目前多数研究支持女性在结肠镜检查时有着较长的CIT。Hwang等^[19]的回顾性研究纳入了12561例接受结肠镜检查的患者, 根据性别分为两组(男性6148例、女性6413例), 分析两组的CIT数据结果显示, 女性患者的CIT明显长于男性患者($8.3\text{ min}\pm 6.2\text{ min}$ vs $6.2\text{ min}\pm 6.1$

min, $P < 0.001$). 这可能与以下因素有关: (1)女性的内脏脂肪较少, 对腹腔内结肠稳定性的支撑作用较差; (2)女性骨盆较男性更深、更宽, 导致结肠镜更难通过乙状结肠; (3)女性的结肠较男性长; (4)女性较男性可能接受了更多的腹腔镜手术^[20].

2.3 肠道准备 肠道准备质量和CIT密切相关, 较高的肠道准备质量往往可以加快内镜医师的插镜, 从而缩短到达盲肠的时间. 尽管不同研究对CIT延长界值的定义存在差异, 但是目前大部分研究都证实了肠道准备不良会导致CIT延长. Kim等^[21]在一项前瞻性研究中纳入了由同一位内镜医师操作的909例行结肠镜检查的患者, 根据肠道准备质量分为良好组($n = 166$)、一般组($n = 565$)和较差组($n = 121$). 通过比较三组的CIT, 发现肠道准备不良(包括一般和较差)是导致CIT延长(≥ 10 min)的重要因素($OR = 2.80$, $95\%CI = 1.41-5.56$, $P = 0.003$). Bernstein等^[6]在一项纳入了693例接受门诊结肠镜检查的患者的前瞻性研究中发现, 肠道准备不良患者的CIT显著延长(≥ 20 min)($P = 0.0077$). 肠道准备质量越高意味着结肠内残余的大便和黏液越少, 视野更加开阔, 内镜医师更易寻找到进镜方向, 有利于结肠镜顺利通过, 从而缩短到达盲肠所需的时间. 总之, 患者行结肠镜检查前应达到最佳的肠道准备质量, 这有利于缩短CIT、减轻患者痛苦和提高结肠镜检查质量.

2.4 手术史 结肠镜检查患者的手术史, 尤其是腹部和盆腔的手术史, 普遍被认为和CIT延长有关. 在一项回顾性研究中, Kim等^[22]比较了482例有胃切除术史的患者和2892例无胃切除术史的患者结肠镜检查数据, 结果显示有胃切除术史患者的CIT明显延长($9.7 \text{ min} \pm 6.5 \text{ min}$ vs $8.7 \text{ min} \pm 6.4 \text{ min}$, $P = 0.002$). Hsu等^[23]在最近的一项前瞻性研究中指出, 脐疝手术史是CIT延长的重要因素($OR = 3.614$, $95\%CI = 1.623-8.049$, $P = 0.002$). 近来一项纳入了835例女性受试者的横断面研究发现, 既往的妇科手术史(如子宫切除术)也与CIT延长有关($P = 0.001$)^[24]. 上腹部手术可能导致结肠粘连、肠腔狭窄和结肠弯曲程度增大, 使得结肠镜通过横结肠和肝曲更加困难. 此外, 妇科手术可能会增加盆腔的自由空间, 导致肠管在盆腔的活动度增大, 结肠镜更难通过乙状结肠, 继而延长CIT. 对于存在腹腔镜手术史的患者, 在结肠镜检查中及时变换体位和准确的腹部压迫是缩短CIT和减轻患者痛苦的有效方法.

3 辅助技术

3.1 患者体位 左侧水平卧位是患者在接受结肠镜检查时的传统体位, 但是近年来有研究提出采取其他体位有着更短的CIT及更高的结肠镜检查质量. Zhao等^[25]分

析了175例采取仰卧位和172例采取左侧水平卧位患者的结肠镜检查数据, 结果显示仰卧位组的CIT明显短于左侧水平卧位组(275.0 s vs 316.0 s , $P < 0.001$). Uddin等^[26]在一项纳入了50例男性肥胖患者的研究中发现, 结肠镜检查采取俯卧位时CIT短于左侧水平卧位(424 s vs 550 s , $P = 0.03$), 他们推测肥胖者采取俯卧位会导致腹压重新分布, 从而防止结肠镜成襻. Vergis等^[27]发现结肠镜检查时患者采取右侧卧位的CIT要明显短于左侧卧位($P = 0.0078$). 患者取右侧卧位时乙状结肠随之拉伸, 结肠镜可能更易通过继而缩短了CIT. 然而, 最近Watanabe等^[28]的一项荟萃分析表明, 右侧卧位和左侧卧位在缩短CIT方面并没有明显差异. 临床实践中, 不同BMI的患者常在结肠镜检查中采取的体位亦不相同, 体位变换的次数也存在差异, 这可能是导致目前研究存在分歧的原因. 因此, 未来仍需通过排除BMI因素的干扰, 进一步探讨患者体位和CIT之间的关系.

3.2 镇静 结肠镜检查中应用镇静剂可以提高患者的耐受性、减轻患者的恐惧感, 而且还能增加患者复查的依从性. 与非镇静患者相比, 镇静患者更有可能顺利插管至盲肠或回肠末端^[23]. 目前大多数研究均证实镇静患者比非镇静患者有较高的盲肠插管率, 但有关镇静和CIT之间关系的研究较少. Radaelli等^[29]在一项回顾性研究中发现, 无论采用何种药物进行镇静(苯二氮卓或异丙酚), 镇静患者的盲肠插管率和CIT均显著短于非镇静患者($P < 0.05$). Zuber-Jerger等^[8]指出, 不管是深度镇静还是轻度镇静, 镇静患者的CIT均较非镇静患者缩短($P = 0.049$). 由于镇静患者的耐受性高, 且无心理紧张状态, 患者肠管常处于放松状态, 结肠镜更易通过结肠的屈曲部并减少成襻, 进而缩短CIT. 虽然镇静有助于缩短CIT, 但是镇静后需要密切关注患者存在镇静剂不耐受以及不良反应的发生情况^[30]. 综上, 根据患者身体情况合理应用镇静剂可有效缩短CIT, 提高结肠镜检查质量.

3.3 水交换技术 水交换技术(water exchange, WE)的特点是在插入时注入水以引导肠镜, 同时将注入的水回抽, 这可减少患者的不适并提高检查效率^[31]. 相比于水浸泡(water immersion, WI)或传统的空气注入技术, 采用WE行结肠镜检查有着较长的CIT. Chen等^[32]的一项荟萃分析表明, 与WI相比, WE会延长CIT($MD = 4.58$, $95\%CI = 4.01-5.15$, $P < 0.0001$), 但可提高腺瘤检出率并减轻疼痛. Fuccio等^[33]的一项网状荟萃分析也支持这一观点. Cadoni等^[34]在一项纳入了17项研究的荟萃分析发现, WE比空气注入的传统肠镜CIT更长. WE不仅需要注水冲洗, 而且需要将废水回抽, 这可能是导致CIT延长的原因之一. 此外, 在结肠镜检查中, 注水过程所需的时间要多于充气时间, 这也可能是造成WE时CIT延长的原因. 由于WE

可提高腺瘤检出率, 因此如何在使用WE的同时缩短CIT尤为重要。Wang等^[35]指出, 限于左半结肠的WE比全结肠WE有着更短的CIT。Tseng等^[36]发现, 采用双通道的WE检查比单通道的CIT显著更短($14.0 \text{ min} \pm 4.0 \text{ min}$ vs $17.4 \text{ min} \pm 6.7 \text{ min}$, $P < 0.001$)。综上, WE会延长CIT, 但可提高腺瘤检出率并减轻疼痛。因此, 合理采用WE作为结肠镜检查的辅助技术是十分必要的。

3.4 帽辅助技术 帽辅助(Cap)结肠镜是一种可以提高检查质量的简单实用的技术^[37]。既往研究证实Cap可有效缩短CIT($6.0 \text{ min} \pm 4.0 \text{ min}$ vs $7.2 \text{ min} \pm 4.8 \text{ min}$, $P < 0.001$)^[38]。Floer等^[39]在一项随机对照试验中发现, 与标准结肠镜检查相比, 使用Cap可缩短CIT(6 min vs 7 min , $P = 0.0001$)。Natalapati等^[40]的一项荟萃分析显示, 应用Cap使得平均CIT缩短了 0.88 min ($95\% \text{ CI} = 0.37-1.39$)。Tseng等^[41]还发现, Cap联合WE比单独应用WE能更有效地缩短CIT。结肠镜前端安装一枚透明帽可有效避免镜头和肠壁距离过近, 使得结肠镜检查过程保持视野良好, 有利于进镜, 从而缩短CIT。

透明帽也可在退镜过程中撑开肠管皱襞, 有利于内镜医师观察。Cap不但可以缩短CIT, 还能提高ADR^[42-44], 因此, 在进行结肠镜检查时, 合理使用Cap有利于提高结肠镜检查质量。

3.5 腹部压迫装置 腹部加压缩短CIT是可行的, 通过助手辅助按压来缩短CIT的方法已被普遍用于结肠镜检查中。然而, 传统的人工按压往往不够精确, 且可能造成助手的疲劳, 增加发生背部和上肢肌肉损伤的风险。因此, 越来越多的内镜医师倾向于应用腹部压迫装置来代替人工压迫。Nishizawa等^[45]在一项荟萃分析中证明了环绕式腹部加压装置可有效地缩短CIT($\text{WMD} = -1.31$, $P = 0.02$), 同时还可以降低患者改变体位的频率。Schulman等^[46]展示了一种新型的免于手动的腹部加压装置也可用于缩短CIT($P < 0.007$)。采用腹部压迫装置可以减少结肠的屈曲, 提高结肠在腹腔内的稳定性并有效减少肠镜成襻, 从而达到缩短CIT的作用。综上, 采用腹部压迫装置不但可以缩短CIT, 而且可以减少助手的劳动量, 值得在临床应用。

4 设备因素

4.1 结肠镜的工作长度 结肠镜长度也是影响CIT的因素之一。由于患者间的结肠长度存在较大差异, 因此常需要根据患者的情况采用不同长度的结肠镜。目前临床常用的中型结肠镜的工作长度为 133 cm , 长型结肠镜的工作长度为 168 cm ^[47]。多数研究认为使用中型结肠镜的CIT要短于长型结肠镜。Lee等^[48]指出中型结肠镜比长型结肠镜在缩短CIT方面更具有优势($4.14 \text{ min} \pm 0.13 \text{ min}$ vs 5.16

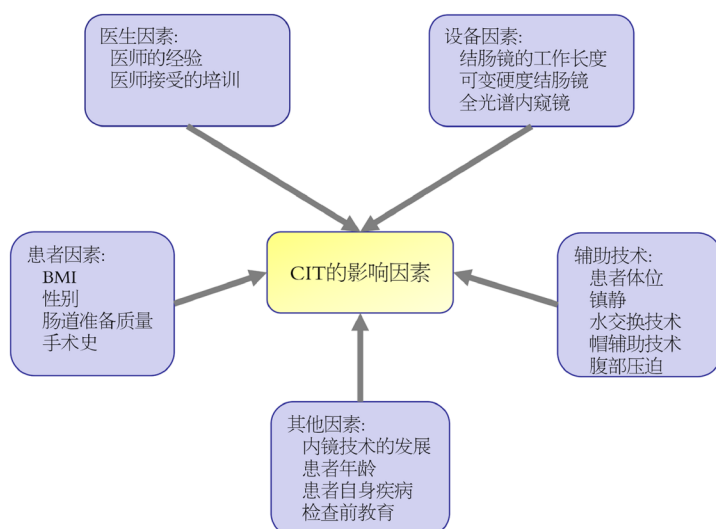
$\text{min} \pm 0.13 \text{ min}$, $P < 0.001$)。在一项随机、对照试验中, Kim等^[49]发现, 使用中型结肠镜检查的患者比使用长型结肠镜检查的患者有着更短的CIT($234.2 \text{ s} \pm 115.0 \text{ s}$ vs $280.7 \text{ s} \pm 135.0 \text{ s}$, $P < 0.001$)。中型结肠镜的工作长度相对较短, 应用比较灵活且更易操作, 因此内镜医师使用中型结肠镜时可减少肠镜成襻, 进而缩短CIT。然而, 中型结肠镜比长型结肠镜需要更多的训练时间^[50]。因此, 临床实践中应该综合考虑结肠镜长度和CIT的关系, 以便更好地做出选择。

4.2 可变硬度结肠镜 可变硬度结肠镜(variable stiffness colonoscope, VSC)具有一个硬度控制环, 内镜医师可以调整结肠镜插入时的相对硬度^[51]。除极少数研究外^[52,53], 目前大多数都认为使用VSC可以有效缩短结肠镜检查的CIT。Kaffes等^[54]前瞻性分析了接受标准结肠镜($n = 384$)和VSC($n = 413$)患者的CIT, 结果显示VSC组的CIT显著短于标准结肠镜组($\text{OR} = 5.0$, $95\% \text{ CI} = 4.7-5.3$, $P = 0.01$)。Sola-Vera等^[55]发现, 应用VSC不但可以缩短CIT($P = 0.035$), 而且还可以减少病人体位的改变($P = 0.01$)。使用VSC缩短CIT可能与以下原因有关: (1)VSC硬度可变, 故较普通结肠镜更易通过乙状结肠; (2)VSC可以通过增加自身硬度来减少在结肠镜检查时成襻的风险; (3)应用VSC调节结肠镜的相对硬度时, 结肠镜远端的硬度增加, 但近端硬度几乎不变, 因此有利于内镜医师操作。综上, VSC比传统结肠镜有更多的优点, 合理应用VSC可缩短CIT, 有利于实现高质量的结肠镜检查。

4.3 全光谱内窥镜 全光谱内窥镜(full spectrum endoscopy, FUSE)是一种在内镜尖端两侧均安装有电荷耦合透镜的新一代内窥镜系统, 可使内镜医师的观察视角扩大到 330° , 有利于发现更微小的病变^[56]。作为一种新兴技术, FUSE对CIT的影响仍存争议。Núñez-Rodríguez等^[57]分析了接受标准结肠镜和FUSE检查的患者数据, 结果显示应用FUSE可增加ADR, 但会延长CIT(6.2 min vs 4.2 min , $P < 0.001$)。Roepstorff等^[58]也发现, 与标准结肠镜相比, 使用FUSE会延长CIT($P = 0.040$)。然而, Facciorusso等^[59]在一项荟萃分析中发现使用FUSE和标准结肠镜的CIT无显著差异($\text{SMD}: 0.22 \text{ min}$, $95\% \text{ CI} = 1.18-1.62$, $P = 0.76$)。由于应用FUSE时内镜医师的观察角度扩大, 因此可能在进镜时过多地观察肠壁, 这导致了CIT延长。此外, FUSE是一种新型的结肠镜技术, 因此内镜医师的经验也可能会影响CIT。总之, FUSE作为一种近年来广受关注的新型结肠镜, 仍需要更全面的评估其对CIT的影响。

5 其他因素

除了上述因素外, 还有许多其他因素也可影响CIT, 如内镜技术的发展、患者年龄、患者自身疾病和检查前患



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图 1 CIT的影响因素. CIT: 盲肠插管时间; BMI: 体重指数.

者教育等. Matyja^[60]等在一项大规模的回顾性研究中把结肠镜划分成了三个不同的时代(光学、电子和现代内窥镜)并分析了接受这三种结肠镜检查患者的数据;结果显示,随着内窥镜技术的不断发展,CIT也随之缩短($250 \text{ s} \pm 92.75 \text{ s}$ vs $224 \text{ s} \pm 103.07 \text{ s}$ vs $209 \text{ s} \pm 93.75 \text{ s}$, $P < 0.05$).

Jaruvongvanich^[16]等的荟萃分析表明,高龄(≥ 65 岁)患者在行结肠镜检查时有着较长的CIT. Akere等^[61]也认为高龄是导致CIT延长的因素. 这一结果可能与老年人检查时结肠镜更易成襻和老年人罹患憩室病的风险更大有关^[62].

Caglar^[63]等分析了59例肢端肥大症患者(其中病情得到控制组30例、未得到控制组29例)和73例非肢端肥大症患者的CIT数据,结果显示,不论肢端肥大症是否得到控制,患者的CIT均显著延长(5.33 min vs 7.00 min vs 3.10 min , $P < 0.001$). 这可能是肢端肥大症有较高的生长激素/胰岛素样生长因子-1水平,这进而减缓了结肠转运^[64],延长CIT.

Chiu等^[65]分析了接受217例接受肠道准备教育和193例未接受教育的患者数据,结果显示接受教育的患者CIT明显缩短($3.68 \text{ min} \pm 2.02 \text{ min}$ vs $4.52 \text{ min} \pm 3.25 \text{ min}$, $P < 0.01$). 接受肠道准备教育的患者往往有着更好的肠道清洁度,这可能是接受教育的患者CIT明显缩短的主要原因. 见图1.

6 总结

内镜医师需要清楚认识影响CIT的因素,尽力缩短CIT,以提高结肠镜检查质量. 从医生角度来说,努力丰富自身经验和接受适当的培训教育是缩短CIT的有效方法;

从患者角度来说,提高肠道准备质量和减重有助于缩短CIT;从辅助技术角度来说,变换体位、应用Cap、合理的镇静和采取腹部压迫技术均有助于缩短CIT;从设备角度来说,应用中等长度的结肠镜和VSC也是缩短CIT的方法之一.

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科学编辑: 张砚梁 制作编辑: 张砚梁



ISSN 1009-3079 (print) ISSN 2219-2859 (online) DOI: 10.11569 © 2023 Baishideng Publishing Group Inc. All rights reserved.

• 消息 •

书 讯



本刊讯 由池肇春教授等主编的《代谢相关脂肪性肝病肝外并发症》已由天津科学技术出版社出版发行。

本书的出版为国内首创, 填补了国内有关这方面的空白, 拓宽了对《代谢相关脂肪性肝病》认识的高度和深度。《代谢相关脂肪性肝病肝外并发症》分总论和各论两部分。1-4章为总论, 分别介绍代谢相关脂肪性肝病肝外并发症研究现状与进展, 包括发病风险、发病机制和治疗近展; 脂肪代谢生物化学和分子生物学; 代谢相关脂肪性肝病肝外并发症免疫学; 肠道微生物生态失衡与代谢相关脂肪性肝病肝外并发症。5-18章为各论, 分别介绍代谢相关脂肪性肝病肝外并发症与机体各系统疾病的相关性。可为消化科、肝病科、内分泌代谢科、普外科、肿瘤科、影像科、其他相关科临床医师和从事MAFLD研究的人员学习和参考。

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