

doi: 10.13241/j.cnki.pmb.2022.10.010

肠内营养不同递增输注速度对重症急性胰腺炎患者喂养耐受性、生存质量和胃肠功能恢复的影响*

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摘要 目的:观察肠内营养不同递增输注速度对重症急性胰腺炎(SAP)患者喂养耐受性、生存质量和胃肠功能恢复的影响。**方法:**选取 2019 年 3 月~2021 年 2 月期间我院收治的 SAP 患者 120 例,按照随机数字表法分为低速组、中速组和高速组,各为 40 例,输注速度递增幅度由低到高给予肠内营养。对比三组患者的腹内压、喂养耐受性、生存质量和胃肠功能恢复情况。**结果:**干预 8 h 后、干预 16 h 后、干预 20 h 后低速组腹内压低于高速组、中速组,而中速组低于高速组($P<0.05$)。低速组排气排便恢复时间、肠鸣音恢复时间、经口进食时间、腹胀缓解时间短于中速组、高速组,中速组则短于高速组($P<0.05$)。低速组干预 7 d 后世界卫生组织生存质量简明量表(WHO-QOL-BREF)各维度评分高于中速组、高速组,中速组则高于高速组($P<0.05$)。低速组喂养不耐受发生率低于中速组、高速组,中速组则低于高速组($P<0.05$)。**结论:**肠内营养低速递增输注有利于防止腹内压升高,提高 SAP 患者喂养耐受性,促进胃肠功能恢复,从而提高患者生存质量。

关键词:肠内营养;输注速度;重症急性胰腺炎;喂养耐受性;生存质量;胃肠功能

中图分类号:R459.3;R576 **文献标识码:**A **文章编号:**1673-6273(2022)10-1846-05

Effects of Different Incremental Infusion Speed of Enteral Nutrition on Feeding Tolerance, Quality of Life and Gastrointestinal Function Recovery in Patients with Severe Acute Pancreatitis*

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ABSTRACT Objective: To observe the effects of different incremental infusion speed of enteral nutrition on feeding tolerance, quality of life and gastrointestinal function recovery in patients with severe acute pancreatitis (SAP). **Methods:** 120 patients with SAP who were treated in our hospital from March 2019 to February 2021 were selected, and they were randomly divided into low-speed group, medium-speed group and high-speed group, with 40 cases in each group, the increasing range of infusion rate was from low to high, and enteral nutrition was given. The intra-abdominal pressure, feeding tolerance, quality of life and gastrointestinal function recovery of the three groups were compared. **Results:** 8 h after intervention, 16 h after intervention and 20 h after intervention, the intra-abdominal pressure in low-speed group was lower than that in high-speed group and medium-speed group, while that in medium-speed group was lower than that in high-speed group ($P<0.05$). The exhaust and defecation recovery time, bowel sound recovery time, oral feeding time and abdominal distension relief time in low-speed group were shorter than those in medium-speed group and high-speed group, while those in medium-speed group were shorter than those in high-speed group ($P<0.05$). 7 d after intervention, the scores of all dimensions of the world health organization the quality of life-BREF (WHO-QOL-BREF) in the low-speed group were higher than those in the medium-speed group and the high-speed group, while those in the medium-speed group were higher than those in the high-speed group ($P<0.05$). The incidence of feeding intolerance in low-speed group was lower than that in medium-speed group and high-speed group, and that in medium-speed group was lower than that in high-speed group ($P<0.05$). **Conclusion:** The low-speed incremental infusion of enteral nutrition is helpful to prevent the increase of intra-abdominal pressure, improve the feeding tolerance of patients with SAP, promote the gastrointestinal function recovery, and then improve the quality of life of patients.

Key words: Enteral nutrition; Infusion speed; Severe acute pancreatitis; Feeding tolerance; Quality of life; Gastrointestinal function

Chinese Library Classification(CLC): R459.3; R576 **Document code:** A

Article ID: 1673-6273(2022)10-1846-05

* 基金项目:北京市医院管理局"青苗"计划项目(QML20180206)

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(收稿日期:2021-11-08 接受日期:2021-11-30)

前言

重症急性胰腺炎(SAP)是临床常见的危急重症,具有发病急骤、病情复杂、进展迅速、预后差的特点,相关数据显示该病的死亡率高达 10%~30%^[1]。以往的研究证实^[2],导致 SAP 患者死亡的最主要原因为多器官功能衰竭、全身炎症反应综合征等。而在这些病理变化过程中,肠屏障功能的损害是重要环节之一^[3]。肠内营养可有效维持肠黏膜的功能和结构,减少炎症介质和有毒物质的产生,对于改善 SAP 患者预后至关重要,可有效降低 SAP 患者的病死率^[4]。但 SAP 患者在肠内营养期间也易出现腹内压升高情况^[5],肠内营养的递增输注速度可在一定程度上调节腹内压。故本研究通过探讨肠内营养不同递增输注速度对 SAP 患者的影响,以期为此类患者肠内营养增输注速度的选择提供参考依据。

1 资料与方法

1.1 基本资料

选取 2019 年 3 月~2021 年 2 月期间我院收治的 SAP 患者 120 例,此次研究方案已通过我院伦理学委员会批准。纳入标准:(1)参考《急性胰腺炎诊治指南(2014 版)》^[6],患者符合 SAP 诊断标准;(2)发病至入院时间<24 h;(3)需给予肠内营养干预患者;(4)腹内压<12 mmHg;(5)家属均知情同意本研究。排除标准:(1)合并糖尿病、高血压者;(2)无法测量腹内压者;(3)有精神疾病患者;(4)伴有严重免疫系统疾病者;(5)对本次研究营养液过敏者;(6)合并严重肝肾功能障碍者;(7)预计住院时间≤7 d。按照随机数字表法将 120 例 SAP 患者分为低速组、中速组和高速组,各为 40 例,三组一般资料对比无差异($P>0.05$)。见表 1。

表 1 三组患者一般资料对比

Table 1 Comparison of general data of three groups of patients

Groups	Low-speed group(n=40)	Medium-speed group(n=40)	High-speed group(n=40)	χ^2/F	P
Male/female(n)	26/14	24/16	25/15	0.213	0.898
Age(years)	49.68±4.37	49.23±5.46	49.81±4.92	0.152	0.859
Pathogeny(n)					
Biliary origin	18	22	19	1.132	0.980
Alcoholic	10	9	11		
Eat and drink too much	8	6	7		
Other	4	3	3		
Acute physiology and chronic health scoring system II (APACHE II) score(scores)					
	11.38±1.27	11.56±1.06	11.42±1.15	0.264	0.768
Serum amylase(U/L)	837.46±52.91	836.41±49.83	838.57±53.64	0.017	0.983

1.2 方法

SAP 患者入院后均接受维持水电解质及酸碱平衡、氧疗、禁食、胃肠减压等常规治疗。待患者生命体征平稳时,实施早期肠内营养支持。其中肠内营养液使用肠内营养混悬液(SP)。采用鼻空肠法,温度设定为 37~38℃,常规每日 115 kJ/kg 热量,0.20~0.35 g/kg 氮,每日总量 500~1500 mL。初始输注速度三组均为 30 mL/h,其中低速组每 4 h 增加 10 mL,24 h 后增加至最高速度 90 mL/h 保持持续输注。中速组每 4 h 增加 15 mL,16 h 后增加至最高速度 90 mL/h 保持持续输注。高速组每 4 h 增加 20 mL,12 h 后增加至最高速度 90 mL/h 保持持续输注。干预过程中,若出现重度腹胀或腹内压>25 mmHg,立即停止输注并进行腹部检查。若出现中度腹胀或腹内压 16~25 mmHg,降低输注速度并给予药物干预。若出现腹泻,重度可酌情给予药物干预,轻中度保持原输注速度并密切观察。若出现轻度腹胀或腹内压 12~15 mmHg,保持原输注速度。若出现胃潴留量超过 1000 mL/12 h,先给予腹部 X 线检查,鼻胃管未移位检查鼻肠管回抽内容物中葡萄糖含量,根据症状给予胃动力药物,鼻肠管位置移位进行重新插管。

1.3 观察指标

(1)测量三组干预前、干预 8 h 后/16 h 后/20 h 后的腹内压。膀胱排空,取平卧位,将 25 mL 无菌生理盐水注入尿管内,30~60 s 后,测压管与尿管之间水平相同,当患者处于呼气末时记录读数。(2)干预前、干预 7d 后采用世界卫生组织生存质量简量表(WHO-QOL-BREF)^[7]评价三组患者的生存质量。其中 WHO-QOL-BREF 包括环境影响、生理因素、心理因素和社会关系 4 个领域,每个领域各为 100 分,分数越高生存质量越好。(3)对比三组患者胃肠功能恢复情况,包括排气排便恢复时间、肠鸣音恢复时间、经口进食时间、腹胀缓解时间。(4)观察三组患者喂养不耐受情况。

1.4 统计学方法

采用 SPSS25.0 分析数据。计量资料以($\bar{x}\pm s$)表示,组内比较采用配对 t 检验,组间比较采用单因素方差分析及 LSD-t 检验。以%表示计数资料,采用 χ^2 检验。 $\alpha=0.05$ 为检验水准(双侧检验)。

2 结果

2.1 腹内压对比

三组干预前腹内压对比无统计学差异($P>0.05$)。三组干预

8 h 后、干预 16 h 后、干预 20 h 后腹内压均有升高现象($P<0.05$)。且干预 8 h 后、干预 16 h 后、干预 20 h 后低速组腹内压低

表 2 腹内压对比($\bar{x}\pm s$, mmHg)
Table 2 Comparison of intra-abdominal pressure($\bar{x}\pm s$, mmHg)

Groups	Before intervention	8 h after intervention	16 h after intervention	20 h after intervention
Low-speed group(n=40)	8.69±0.97	9.06±0.58 ^a	9.48±0.47 ^{ab}	10.14±0.73 ^{abc}
Medium-speed group(n=40)	8.71±0.72	9.73±0.54 ^{ad}	10.36±0.75 ^{abd}	11.21±0.78 ^{abcd}
High-speed group(n=40)	8.63±0.83	10.31±0.66 ^{abc}	11.92±0.63 ^{abc}	13.23±0.69 ^{abcde}
F	0.097	44.148	155.242	182.681
P	0.908	0.000	0.000	0.000

Note: a, b, c, d, e were compared with those before intervention, 8h after intervention, 16h after intervention, low-speed group and medium-speed group, respectively, and the differences were statistically significant.

2.2 对比生存质量

三组干预前环境影响、生理因素、心理因素、社会关系评分均升高($P<0.05$)。且低速组干预 7 d 后生存质量各维度评分高于中速组、高速组,中速组则高于高速组($P<0.05$)。见表 3。对比无统计学差异($P>0.05$)。三组干预 7 d 后生存质量各维度

表 3 生存质量对比($\bar{x}\pm s$, 分)
Table 3 Comparison of quality of life($\bar{x}\pm s$, scores)

Groups	Environmental effect		Physiological factors		Psychological factor		Social relations	
	Before intervention	7 d after intervention	Before intervention	7 d after intervention	Before intervention	7 d after intervention	Before intervention	7 d after intervention
Low-speed group(n=40)	66.27±6.52	87.49±7.62 ^a	65.76±8.23	89.53±6.17 ^a	67.62±5.46	88.57±7.64 ^a	62.68±6.67	87.63±5.49 ^a
Medium-speed group(n=40)	65.43±7.16	81.87±8.03 ^{ab}	65.82±7.35	84.34±6.11 ^{ab}	68.13±6.74	82.12±6.17 ^{ab}	62.26±6.73	78.38±6.27 ^{ab}
High-speed group(n=40)	67.86±6.93	74.29±6.26 ^{abc}	66.68±6.73	76.18±7.12 ^{abc}	67.73±6.18	75.06±7.04 ^{abc}	62.37±7.25	73.65±5.28 ^{abc}
F	1.289	32.557	0.193	43.101	0.102	37.539	0.048	62.339
P	0.279	0.000	0.827	0.000	0.903	0.000	0.961	0.000

Note: a, b, c were compared with those before intervention, low-speed group and medium-speed group, respectively, and the differences were statistically significant.

2.3 胃肠功能恢复情况

低速组经口进食时间、肠鸣音恢复时间、排气排便恢复时间、腹胀缓解时间短于中速组、高速组,中速组则短于高速组($P<0.05$)。见表 4。

表 4 胃肠功能恢复情况($\bar{x}\pm s$, d)
Table 4 Recovery of gastrointestinal function($\bar{x}\pm s$, d)

Groups	Exhaust and defecation recovery time	Bowel sound recovery time	Oral feeding time	Abdominal distension relief time
Low-speed group(n=40)	3.28±0.41	2.27±0.26	15.24±2.69	4.18±0.36
Medium-speed group(n=40)	3.96±0.43 ^a	2.98±0.31 ^a	18.52±3.11 ^a	4.83±0.41 ^a
High-speed group(n=40)	4.67±0.47 ^{ab}	3.62±0.32 ^{ab}	23.47±3.09 ^{ab}	5.69±0.46 ^{ab}
F	101.014	205.652	77.862	135.174
P	0.000	0.000	0.000	0.000

Note: a, b were compared with low-speed group and medium-speed group respectively, and the differences were statistically significant.

2.4 喂养不耐受情况

低速组喂养不耐受发生率低于中速组、高速组,中速组则低于高速组($P<0.05$)。见表 5。

3 讨论

SAP 病情凶险,常发于中老年群体,其发病机制与患者暴

表 5 喂养不耐受情况[例(%)]
Table 5 Feeding intolerance[n(%)]

Groups	Abdominal distention	Vomit	Gastric retention	Gastrointestinal bleeding	Diarrhea	Total incidence rate
Low-speed group (n=40)	1(2.50)	1(2.50)	1(2.50)	0(0.00)	1(2.50)	4(10.00)
Medium-speed group(n=40)	3(7.50)	2(5.00)	2(5.00)	2(5.00)	3(7.50)	12(30.00) ^a
High-speed group (n=40)	4(10.00)	4(10.00)	3(7.50)	3(7.50)	7(17.50)	21(52.50) ^{ab}
χ^2						16.963
P						0.002

Note: a, b were compared with low-speed group and medium-speed group respectively, and the differences were statistically significant.

饮暴食、过度饮酒、既往有胆囊、胆道病史等原因密切相关^[8]。且SAP患者普遍存在严重代谢障碍性紊乱,易导致负氮平衡^[9]。肠内营养支持具有修复肠道黏膜屏障、滋养肠粘膜、提供营养物质等多种优点,对SAP患者进行肠内营养支持可以为患者后续的干预提供良好的生理基础^[10]。但在临床的干预过程中,仍有一定比例的患者,会发生喂养不耐受的情况^[11]。此外,SAP患者的腹腔压力往往高于正常值,使得肠内营养喂养不耐受的概率增加^[12]。相关研究证实^[13],肠内营养过程中喂养不耐受症状与输注递增速度有所关联。目前临床上的输注递增速度主要包括低速/中速/高速递增输注等3种速度,在实际操作中主要依据医护人员经验,尚无统一的意见。

本次研究从肠内营养后各个时段来看,高速组腹内压>中速组>低速组,提示低速递增输注的肠内营养可有效维持SAP患者腹内压平稳。唐丽萍等人^[14]的研究表明低速递增输注可减轻胃肠道消化带来的张力,腹内压降低,佐证了本次研究结果。主要是因为低速递增输注营养液可减轻对血管和肠道黏膜的冲击,延长输液时间,易于患者适应,腹内压降低^[15-17]。以往的资料显示^[18],SAP患者在实施肠内营养的过程中,约有半数以上的患者可产生喂养不耐受。喂养不耐受是指给予肠内营养过程中发生胃肠不良反应如腹胀、呕吐、胃肠道出血、胃潴留等,导致患者每日的目标能量无法完成,加剧营养不良的发生,不利于患者病情恢复。本次研究中,低速递增输注的患者其喂养不耐受发生率明显低于中速递增输注、高速递增输注患者。笔者认为,低速递增输注对患者胃肠道保护更好,胃肠道负荷减轻,耐受性提高。同时,稳定控制腹内压也利于患者耐受性的提高^[19-21]。

胃肠功能障碍是SAP患者常见并发症之一,也是导致腹腔间隔室综合征多器官功能衰竭的主要原因^[22,23]。有效的肠内营养支持能促进胃肠蠕动,刺激胃肠激素释放,维护肠道正常菌群生长^[24,25]。本次研究中,低速递增输注的患者可缩短胃肠功能恢复时间。可能也与低速递增输注可减少机体胃肠道刺激,逐步帮助机体胃肠道功能恢复,提高肠黏膜细胞维持正常生理功能的营养物质^[26,27]。同时,研究还表明,相对于中速、高速递增输注的患者,低速递增输注的患者其生存质量明显升高。可能是因低速递增输注有助于早期胃肠功能恢复,提高喂养耐受性,帮助患者获得足够的能量补给,有利于早期恢复,继而改善其生存质量^[28-30]。

综上所述,低速递增输注的肠内营养可有效改善SAP患者的喂养耐受性,促进胃肠功能恢复,进而提高患者生存质量,具有较好的临床应用价值。另本研究初始输注速度为30 mL/h,考虑到SAP患者需尽可能的减少外界刺激,未来可进一步对初始输注速度能否降低进行研究。

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