·临床研究·

针刺联合中枢低频重复经颅磁刺激治疗在老年脾肾阳虚型功能性便秘中的应用价值研究

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【摘 要】 **目的** 研究针刺联合中枢低频重复经颅磁刺激(rTMS)治疗在改善老年脾肾阳虚型功能性便秘(FC)患者临床症状中的应用价值。**方法** 选取2023年1月至2024年1月上海交通大学医学院苏州九龙医院中医科收治的128例老年脾肾阳虚型FC患者为研究对象,采用随机数字表法将患者分为对照组(琥珀酸普芦卡必利片)、针刺组(针刺治疗)、rTMS组(中枢低频rTMS治疗)及联合组(针刺+中枢低频rTMS治疗),每组患者各32例。收集患者治疗前、治疗后4周各项临床指标,包括便秘症状自评量表(PAC-SYM)评分、平均每周自发完全排便次数(SCBM)、血清肠神经递质水平[一氧化氮(NO)、血管活性肠肽(VIP)、5-羟色氨酸(5-HT)、P物质(SP)]、焦虑自评量表(SAS)评分、抑郁自评量表(SDS)评分,并对经治疗后SCBM≥3次的患者进行3个月随访,观察FC复发情况。采用SPSS 27.0软件进行数据分析。根据数据类型,组间比较分别采用单因素方差分析χ^2检验或秩和检验,治疗前后比较采用配对样本t检验。**结果** 治疗后四组患者PAC-SYM量表总评分、血清NO、VIP水平、SAS、SDS量表评分均较同组治疗前下降,且针刺组及rTMS组治疗后上述指标均低于对照组,联合组上述指标均低于针刺组及rTMS组(均$P<0.05$);SCBM、血清5-HT及SP水平均较同组治疗前上升,且针刺组及rTMS组治疗后上述指标均高于对照组,联合组上述指标均高于针刺组及rTMS组(均$P<0.05$)。SCBM≥3次者占比均较同组治疗前上升,且联合组治疗后SCBM≥3次者占比高于其余三组($P<0.05$)。四组患者疗效比较差异有统计学意义($P<0.05$)。停止治疗3个月内随访结果显示,对照组、针刺组及rTMS组便秘复发率比较,差异无统计学意义($P>0.05$),联合组便秘复发率低于对照组,差异有统计学意义($P<0.05$)。**结论** 针刺联合中枢低频rTMS治疗能显著提高老年脾肾阳虚型FC患者的治疗效果,有效降低便秘复发率,可能与针刺联合中枢低频rTMS治疗能改善患者焦虑、抑郁情绪,调节血清肠神经递质水平有关。

【关键词】 老年人;功能性便秘;脾肾阳虚型;针刺;重复经颅磁刺激;肠道神经递质;负面情绪;脑-肠轴
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Application value of acupuncture combined with central low-frequency repetitive transcranial magnetic stimulation in the elderly with functional constipation of spleen-kidney yang deficiency type

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【**Abstract**】 **Objective** To investigate the application value of acupuncture combined with central low-frequency repetitive transcranial magnetic stimulation (rTMS) in improving the clinical symptoms in elderly patients with functional constipation (FC) of spleen-kidney yang deficiency type. **Methods** From January 2023 to January 2024, 128 elderly patients with FC of spleen-kidney yang deficiency type admitted to the Department of Traditional Chinese Medicine of Suzhou Kowloon Hospital, Shanghai Jiaotong University School of Medicine were selected as study subjects. The patients were divided into a control group (prucalopride succinate tablets), an acupuncture group (acupuncture), a rTMS group (central low-frequency rTMS) and a combination group (acupuncture plus central low-frequency rTMS) using random number table method, with 32 patients in each group. Various clinical indicators were collected before treatment and at 4 weeks after treatment, including the patient assessment of constipation symptom (PAC-SYM) score, average weekly spontaneous complete bowel movements (SCBMs), serum intestinal neurotransmitters [nitric oxide (NO), vasoactive intestinal peptide (VIP), 5-hydroxytryptophan (5-HT), substance P (SP)], self-rating anxiety scale (SAS) score, and self-rating depression scale (SDS) score. The patients with SCBMs ≥ 3 times after treatment were followed up for 3 months to observe FC recurrence. Data analysis was performed using SPSS 27.0. Depending on the data type, comparisons between groups were conducted by one-way analysis of variance,

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Chi-square test, or rank-sum test, and pre- and post-treatment comparisons were performed using the paired-samples *t*-test. **Results** After treatment, the total PAC-SYM score, serum NO and VIP levels, and SAS and SDS scores in the four groups decreased compared with those before treatment, and the above indicators in the acupuncture group and the rTMS group after treatment were lower than those in the control group, and the above indicators in the combination group were lower than those in the acupuncture group and the rTMS group (all $P<0.05$). SCBM and levels of serum 5-HT and SP were elevated compared to before treatment, and the above indicators after treatment were higher in acupuncture group and rTMS group than those in control group, and were higher in combined group than those in acupuncture group and rTMS group (all $P<0.05$). The proportion of patients with SCBM ≥ 3 times increased compared with that of the same group before treatment, and the proportion of patients with SCBM ≥ 3 times in the combination group was higher than that in the other three groups after treatment ($P<0.05$). A statistical difference was observed in the therapeutic efficacy among the four groups of patients ($P<0.05$). The follow-up results within 3 months after discontinuation of treatment showed no statistical difference in the recurrence rate of constipation among the control group, acupuncture group, and rTMS group ($P>0.05$), and the recurrence rate of constipation in the combination group was lower than that in the control group ($P<0.05$). **Conclusion** Acupuncture combined with central low-frequency rTMS treatment can significantly enhance the therapeutic effect in elderly patients with FC of spleen-kidney yang deficiency type and effectively reduce the recurrence rate of constipation, which may be related to its ability to effectively improve anxiety and depression and to regulate serum intestinal neurotransmitters levels.

【Key words】 aged; functional constipation; spleen-kidney yang deficiency type; acupuncture; repetitive transcranial magnetic stimulation; intestinal neurotransmitters; negative emotions; brain-gut axis

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功能性便秘(functional constipation, FC)的发病率随年龄增长而呈现上升趋势,我国老年人群的FC发病率约为15%~20%,目前FC已成为影响老年人日常生活的常见消化系统疾病[1,2]。FC患者多倾向于选择药物保守治疗,但老年患者普遍存在治疗反应性及耐受力下降的问题,且长期用药易产生依赖性,进而诱发肠道稳态失衡等不良结局[3]。因此,探索安全有效的FC干预方案已成为当前老年性FC研究领域的热点问题。针刺作为传统中医干预手段,可有效改善FC患者临床症状,但其取穴方案目前尚未形成统一标准[4]。重复经颅磁刺激(repetitive transcranial magnetic stimulate, rTMS)是一种可调节大脑神经元活动的无创物理疗法,基于脑-肠轴学说,rTMS在各类功能性胃肠病的治疗中展现出一定的潜能,但现有研究中关于rTMS治疗FC的相关研究报道仍较为有限[5]。上述两种治疗方法均具有较高的安全性及可重复性,探究针刺联合rTMS治疗老年性FC中的临床疗效,可为老年性FC的治疗方案提供新的思路与参考。

1 对象与方法

1.1 研究对象

选取2023年1月至2024年1月上海交通大学医学院苏州九龙医院中医科收治的128例老年脾肾阳虚型FC患者为研究对象,采用随机数字表法将患者分为对照组、针刺组、rTMS组及联合组,每组患者各32例。本研究经上海交通大学医学院苏州九龙医院伦理委员会批准(批准文号:202301-JZ-K703)。所有参与者均签署书面知情同意书。研究符合《赫尔辛基宣言》。

1.1.1 诊断标准 西医诊断参照慢性功能性便秘罗马Ⅲ标准[6]。中医诊断标准参照《便秘中医诊疗专家共识意见(2017)》[7]中脾肾阳虚型辨证标准。主证有:大便干或不干、排出困难、排便频率降低、排便时间延长。次证有:腹中冷痛,得热则减;腰酸易疲;小便清、不畅。舌脉:脉沉迟,舌淡苔白或薄黄。符合所有主证及任意1~2项次证,结合舌脉即可确定证型。

1.1.2 纳入标准 年龄≥60岁;同时符合上述中、西医诊断标准;经肠镜及肛诊等排除器质性病变;FC病程≥6个月。

1.1.3 排除标准 参与研究前1个月内服用促动力药物、抗胆碱能药物或多巴胺能药物;腹部手术史;合并糖尿病、甲状腺疾病等代谢性疾病;重要器官功能严重不全;肠易激综合征及其他病因确定的继发性便秘;合并精神病。

1.1.4 样本量计算 采用多组均数比较所需的样本量计算公式:$n=\varphi^2\left[\sum_{i-1}^{\kappa}\delta^2{}_i/\kappa\right]/\left[\sum_{i-1}^{\kappa}(\mu_i-\mu)^2/(\kappa-1)\right]$,其中$n$为各组样本量,$\delta$为总样本标准差,$\mu$为总体均数,$\kappa$为组数,$\varphi$由$\alpha$、$\beta$、$\nu_i$查表得出。取$\alpha=0.05$,$\beta=0.1$,$\kappa=4$,$\varphi=2.52$,以患者治疗后每周自发完全排便次数(spontaneous complete bowel movement, SCBM)为主要观察指标,根据预实验结果$\delta=0.45$,$\mu=3.16$,将上述参数带入样本量计算公式可计算得出$n=28$,考虑到10%脱落,则每组样本量为32,最终共纳入患者128例。

1.2 方法

1.2.1 治疗方法 (1)对照组。对照组患者给予琥

珀酸普芦卡必利片(石家庄四药有限公司,国药准字 H20203310),2 mg/次,1 次/d,连续治疗 4 周。(2)针刺组。针刺组仅进行针刺治疗,采用“补脾益肾,温阳通便”的针刺疗法。补脾益肾取穴:足三里、腰阳关、肾俞、关元;温阳通便取穴:天枢、上巨虚、下巨虚、气海。穴位定位参照《经穴名称与定位》(GB/T12346-2021)[8]。针刺使用华佗牌不锈钢毫针,毫针规格 0.3 mm×(25~40)mm。患者取侧卧位,面或背朝医者均可,腹部取穴天枢、气海、关元,腰部取穴肾俞、腰阳关。下方腿自然伸直,膝下垫软枕,上方腿自然屈膝,双腿膝间垫软枕,使得两腿之间、下方腿与治疗床之间均有空间且使双侧小腿肌肉放松。双下肢取穴:足三里、上巨虚、下巨虚。使用医用酒精进行局部消毒,取穴位置直刺 0.5~1 寸(约 1.67~3.33cm),针刺足三里、腰阳关、肾俞、关元穴位采用捻转补法,针刺天枢、上巨虚、下巨虚、气海采用提插捻转法,得气后留针,30 min 后起针。每周治疗 4 次,连续治疗 4 周。(3)rTMS 组。rTMS 组患者进行中枢低频 rTMS 治疗,治疗仪器为脉冲磁场刺激仪(深圳英智科技有限公司,粤械注准 20222090204)。保障治疗环境安静,患者平卧于治疗床上,躯体放松,头部固定不动,调整线圈位置,选择右侧额叶背外侧区作为刺激部位,测定静息态运动阈值(rest motor threshold, RMT),给予 1 Hz、强度为 80% RMT,串刺激时间 2s ,串间歇时间 5 s[9,10],120 个刺激总数为一次治疗,每天治疗 1 次,每周治疗5 d,连续治疗 4 周。(4)联合组。联合组患者同时接受针刺与中枢低频 rTMS 治疗,治疗方式及频率同上。

1.2.2 观察指标 (1)主要疗效指标。①便秘症状自评量表(patient assessment of constipation symptom, PAC-SYM)[11]评分;②平均每周自发完全排便次数(spontaneous complete bowel movement, SCBM),SCBM≥3 次可视为排便正常;③临床疗效[12],包括临床痊愈、显效、有效、无效。(2)次要疗效指标。①血清肠神经递质水平:分别于治疗前及治疗后,采集患者外周静脉血 5 ml,采用酶联免疫吸附法检测一氧化氮(nitric oxide, NO)、血管活性肠肽(vasoactive intestinal peptide, VIP)、5-羟色氨酸(5 hydroxytryptamine, 5-HT)、P 物质(substance P, SP)水平;②负面情绪:分别于治疗前及治疗后,采用焦虑自评量表(self-rating anxiety scale, SAS)及抑郁自评量表(self-rating depression scale, SDS)[13]评估患者焦虑、抑郁情绪;③便秘复发情况:对经治疗后 SCBM≥3 次的患者进行 3 个月的随访,观察 FC 复发情况。

1.3 统计学处理

采用 SPSS 27.0 统计软件进行数据分析。计量资料用均值±标准差($\bar{x}\pm s$)表示,四组间比较采用单因素方差分析,检验总体有差异时,采用 *SNK q* 检验进行两两比较,治疗前后比较采用配对样本 *t* 检验;计数资料用例数(百分率)表示,四组间比较采用 χ^2 检验,检验总体有差异时,组间两两比较采用 Bonferroni 法对检验水准进行校正,等级资料采用秩和检验。$P<0.05$ 为差异有统计学意义。

2 结 果

2.1 四组患者基线资料

四组患者基线资料比较,差异均无统计学意义(均 $P>0.05$;表 1),均衡可比,所有患者均完成相关治疗,无中途脱落或失访病例。

2.2 四组患者 PAC-SYM 量表评分及 SCBM

治疗前,四组患者 PAC-SYM 量表评分及 SCBM 平均次数差异均无统计学意义(均 $P>0.05$),SCBM≥3 次者占比均为 0。治疗后,四组患者 PAC-SYM 量表总评分均较同组治疗前下降,SCBM 平均次数及 SCBM≥3 次者占比均比同组治疗前上升;针刺组、rTMS 组及联合组患者 PAC-SYM 量表总评分均低于对照组,SCBM 平均次数均高于对照组;且联合组患者 PAC-SYM 量表总评分均低于针刺组及 rTMS 组,SCBM 平均次数均高于针刺组及 rTMS 组,SCBM≥3 次者占比均高于对照组,差异均有统计学意义(均 $P<0.05$;表 2)。

表 1 四组患者基线资料比较

Table 1 Comparison ofbaseline data among four groups ($n=32$)

Group	Age(years, $\bar{x}\pm s$)	Gender[n(%)]		BMI	Disease course	Area[n(%)]	
		Male	Female	(kg/m^2, $\bar{x}\pm s$)	(years, $\bar{x}\pm s$)	Rural	Urban
Control	66.48±4.15	10(31.25)	22(68.75)	22.69±2.15	5.79±1.58	12(37.50)	20(62.50)
Acupuncture	66.23±3.96	13(40.62)	19(59.38)	23.41±2.43	5.81±1.64	14(43.75)	18(56.25)
rTMS	67.19±4.27	11(34.38)	21(65.62)	22.94±1.98	6.01±1.73	11(34.38)	21(65.62)
Combined	65.87±4.03	9(28.12)	23(71.88)	23.07±2.25	5.82±1.57	13(40.63)	19(59.37)
F/χ^2	0.591	1.226		0.590	0.126	0.656	
P value	0.622	0.747		0.623	0.944	0.883	

BMI: body mass index; rTMS: repetitive transcranial magnetic stimulate.

表2 四组患者PAC-SYM量表评分及SCBM比较

Table 2 Comparison of PAC-SYM scores and SCBM among four groups ($n=32$)

Group	Before treatment			After treatment		
	PAC-SYM total score(points, $\bar{x}\pm s$)	Average time of SCBM(points, $\bar{x}\pm s$)	SCBM≥3 times [n(%)]	PAC-SYM total score(points, $\bar{x}\pm s$)	Average time of SCBM(points, $\bar{x}\pm s$)	SCBM≥3 times [n(%)]
Control	32.64±4.15	1.68±0.38	0(0.00)	18.69±3.37*	2.84±0.49*	15(46.88)*
Acupuncture	33.08±4.53	1.71±0.29	0(0.00)	14.01±2.63*#	3.24±0.61*#	21(65.63)*
rTMS	32.97±4.29	1.69±0.33	0(0.00)	13.94±2.57*#	3.35±0.84*#	21(65.63)*
Combined	33.30±4.25	1.63±0.32	0(0.00)	10.31±2.26*#△▲	3.97±0.87*#△▲	30(93.75)*#△▲
F/χ^2	0.130	0.337	-	50.356	13.503	16.471
P value	0.942	0.799	-	<0.001	<0.001	<0.001

PAC-SYM: patient assessment of constipation symptom; SCBM: spontaneous complete bowel movement; rTMS: repetitive transcranial magnetic stimulate. -: no datum. Compared with the same group before treatment, *$P<0.05$; compared with control group after treatment, #$P<0.05$; compared with acupuncture group after treatment, △$P<0.05$; compared with rTMS group after treatment, ▲$P<0.05$.

2.3 四组患者血清肠神经递质水平

治疗前,四组患者NO、VIP、5-HT及SP差异均无统计学意义(均$P>0.05$)。治疗后,四组患者NO及VIP水平均较同组治疗前下降,5-HT及SP水平均较同组治疗前上升;针刺组、rTMS组及联合组NO及VIP水平均低于对照组,5-HT及SP水平均高于对照组;联合组NO及VIP水平均低于针刺组及rTMS组,5-HT及SP水平均高于针刺组及rTMS组,差异均有统计学意义(均$P<0.05$;表3)。

2.4 四组患者负面情绪

治疗前,四组患者SAS及SDS量表评分差异均无统计学意义(均$P>0.05$)。治疗后,四组患者SAS及SDS量表评分均较同组治疗前下降;针刺组、rTMS组及联合组SAS及SDS量表评分均低于对照组,联合组SAS及SDS量表评分均低于针刺组及rTMS组,差异均有统计学意义(均$P<0.05$;表4)。

2.5 四组患者治疗疗效

四组患者临床疗效比较,差异有统计学意义($P<0.05$;表5)。

表3 四组患者血清肠神经递质水平比较

Table 3 Comparison of serum intestinal neurotransmitters levels among four groups ($n=32$, $\bar{x}\pm s$)

Group	Before treatment				After treatment			
	NO(μmol/L)	VIP(μmol/L)	5-HT(ng/L)	SP(ng/L)	NO(μmol/L)	VIP(μmol/L)	5-HT(ng/L)	SP(ng/L)
Control	89.46±20.48	42.17±7.95	80.15±16.84	20.15±4.15	82.48±21.16*	36.45±6.63*	91.15±19.58*	36.98±6.49*
Acupuncture	90.23±22.47	42.67±8.07	80.49±17.33	19.84±4.23	73.15±19.87*#	32.15±7.52*#	112.15±22.34*#	45.39±7.63*#
rTMS	90.35±22.35	43.09±7.83	81.07±19.15	20.24±3.85	72.83±20.36*#	33.05±5.49*#	114.46±23.63*#	46.59±5.91*#
Combined	90.16±20.79	43.02±8.83	79.84±18.45	19.97±3.35	60.05±21.39*#△▲	26.74±4.42*#△▲	126.39±22.67*#△▲	57.45±12.36*#△▲
F	0.011	0.085	0.028	0.067	6.335	13.795	14.060	31.364
P value	0.998	0.968	0.994	0.977	<0.001	<0.001	<0.001	<0.001

NO: nitric oxide; VIP: vasoactive intestinal peptide; 5-HT: 5 hydroxytryptamine; SP: substance P; rTMS: repetitive transcranial magnetic stimulate. Compared with the same group before treatment, *$P<0.05$; compared with control group after treatment, #$P<0.05$; compared with acupuncture group after treatment, △$P<0.05$; compared with rTMS group after treatment, ▲$P<0.05$.

表4 四组患者负面情绪比较

Table 4 Comparison of negative emotions among four groups (points, $n=32$, $\bar{x}\pm s$)

Group	Before treatment		After treatment	
	SAS	SDS	SAS	SDS
Control	56.48±6.48	59.33±7.85	53.15±5.97*	55.67±8.03*
Acupuncture	57.05±6.63	60.16±8.46	50.15±5.54*#	0.27±7.71*#
rTMS	57.26±6.27	60.23±8.18	49.59±5.74*#	51.11±7.24*#
Combined	57.02±6.21	60.05±8.75	47.17±5.28*#△▲	47.47±6.44*#△▲
F	0.086	0.080	6.080	6.806
P value	0.967	0.971	0.001	<0.001

SAS: self-rating anxiety scale; SDS: self-rating depression scale; rTMS: repetitive transcranial magnetic stimulate. Compared with the same group before treatment, *$P<0.05$; compared with control group after treatment, #$P<0.05$; compared with acupuncture group after treatment, △$P<0.05$; compared with rTMS group after treatment, ▲$P<0.05$.

表 5 四组患者治疗疗效比较

Table 5 Comparison of treatment efficacy among the four groups

[n=32, n(%)]

Group	Clinically cured	Markedly effective	Effective	Ineffective
Control	1(3.12)	9(28.13)	16(50.00)	6(18.75)
Acupuncture	6(18.75)	16(50.00)	6(18.75)	4(12.50)
rTMS	7(21.88)	15(46.88)	7(21.87)	3(9.37)
Combined	10(31.25)	18(56.25)	2(6.25)	2(6.25)
Z	21.380			
P value	<0.001			

rTMS: repetitive transcranial magnetic stimulate.

2.6 四组患者便秘复发情况

随访 3 个月,四组患者便秘复发率比较,差异有统计学意义(P=0.002),其中联合组便秘复发率(2/30,6.67%)显著低于对照组,差异有统计学意义(P<0.05),其余对照组(9/15,60.00%)、针刺组(7/21,33.33%)及 rTMS 组(6/23,26.09%)便秘复发率比较,差异无统计学意义(均 P>0.05)。所有患者均配合完成相关治疗,治疗过程中均未出现不良反应。

3 讨 论

本研究的对照组老年性 FC 患者的干预措施为服用琥珀酸普芦卡必利片,结果显示患者治疗后 PAC-SYM 量表评分较治疗前显著降低,SCBM 次数较治疗前增加,但随访发现停药后患者 FC 复发率高达 60.00%,提示常规药物治疗老年性 FC 的临床疗效存在局限。

针刺用于 FC 的治疗已被证实具有一定临床疗效,但其取穴方案目前尚未形成统一标准。张景岳在《景岳全书·秘结》中首次明确将便秘划分为“阳结”和“阴结”两类,阳结者,邪有余,宜攻宜泻,下焦阳虚则阳气不行,阳气不行则不能传送,而阴凝于下,此阳虚而阴结也。因此,脾肾阳虚型便秘的治疗当以补脾益肾,温阳通便为主[14]。基于上述中医理论,本研究选取足三里、腰阳关、肾俞、关元以补脾益肾,取天枢、上巨虚、下巨虚、气海以温阳通便。《针灸甲乙经·卷之九》中有载,腹中不便,取三里,盛则泻之,虚则补之。腰阳关为督脉上的重要腧穴,能温肾壮阳,改善肾虚乏力,促进局部血气循环,临床常与肾俞合用,以温阳驱寒,调节肾脏功能;关元穴居于两肾之间,是全身脏腑经络之根本,刺激关元穴能温中散寒,提高胃肠动力;上巨虚与下巨虚均属足阳明胃经,同为下合穴,刺激二穴位能调节肠胃功能,改善气血不足,缓解便秘症状;中天枢为大肠募穴,刺激该穴位能调理气血、疏通经络,促进肠道蠕动;气海为人体元气汇聚之处,刺激该穴位能调理下焦[15]。诸穴合用,可益脾补肾、温阳通便,改善患者便秘症状。

TMS 是一种非侵入性的脑刺激技术,可在大脑组织内诱导产生电流,调节大脑神经活动,其作用效果具有持续性。但是目前 rTMS 在 FC 中的相关研究报道仍较为有限。既往研究指出脑-肠轴之间的神经连接可实现胃肠道不同部位与大脑情感、认知中心之间的信息传递,并与肌肠丛直接连接,向胃肠道效应靶器官传递信号。上述神经通路可通过神经递质调控肠道生理功能,并对个体心理状态产生影响[16]。FC 是一种公认的身心性疾病,患者焦虑、抑郁的发生风险显著高于健康人群,因此改善 FC 患者的精神心理状态,对改善 FC 临床症状中具有一定的潜在价值。右侧额叶背外侧区参与负面情绪的产生与调节过程,是临床指南推荐的 rTMS 治疗抑郁症的作用部位,因此本研究选取 rTMS 刺激右侧额叶背外侧区。本次研究结果显示,经 rTMS 干预治疗后,老年 FC 患者 SAS、SDS 量表评分显著降低,而血清 5-HT 及 SP 水平显著升高,提示经颅 rTMS 刺激右侧额叶背外侧区可有效改善患者负面情绪,其作用机制可能为激活对应功能脑区,提高神经兴奋性,进而通过迷走神经或神经内分泌通路来调控 5-HT 及 SP 水平,增加肠道蠕动活动性[17]。

本研究结果显示,单独应用针刺或中枢低频 rTMS 对于改善老年 FC 患者便秘症状、提高 SCBM 次数中的效果均优于对照组,且二者在调节患者血清肠神经递质水平,改善患者焦虑、抑郁情绪等方面同样具有显著优势,说明单独应用针刺或中枢低频 rTMS 治疗老年 FC 的临床价值优于常规西医药物治疗。此外,接受针刺联合 rTMS 治疗的联合组患者,经治疗干预后上述各观测指标水平均优于其余三组,且联合组患者疗效最优,治疗后 FC 复发率最低,提示针刺联合中枢低频 rTMS 治疗老年性 FC 中的应用价值最高,该效应可能与联合治疗可进一步巩固加强治疗效果,提高治疗有效率相关。

综上,针刺与中枢低频 rTMS 单独应用对改善老年性 FC 患者便秘症状、提升临床治疗疗效的效果相近,且二者均优于单纯西药治疗;而针刺联合中枢低频 rTMS 可进一步提高老年性 FC 治疗效果,降低便秘复发风险。但本研究受研究条件限制,存在一定局限性:研究所纳入的总样本量较小,在多组比较时统计效能可能不足;此外,本次研究所有病例均来自于同一所医院,样本代表性有限,所得结论可能存在一定的偏倚。

【参考文献】

[1] Wegh CAM, Baaleman DF, Tabbers MM, *et al*. Nonpharmacologic treatment for children with functional constipation: a systematic review and meta-analysis[J]. J Pediatr, 2022, 240: 136-149. DOI: 10.1016/j.jpeds.2021.09.010.

[2] 梁禄灵, 陈宏慈. 中医辨证治疗老年慢性功能性便秘30例[J]. 中华老年多器官疾病杂志, 2019, 18(10): 778-779. DOI: 10.11915/j.issn.1671-5403.2019.10.168.

[3] Kim E, Chang S, Nam J, *et al*. The synergistic effect of herbal medicine and probiotics in pediatric functional constipation: a systematic review and meta-analysis[J]. Medicine (Baltimore). 2024, 103(7): e36899. DOI: 10.1097/MD.0000000000036899.

[4] Song S, Hao W, Fu H. Efficacy of acupuncture for functional constipation in elderly: a systematic review and meta-analysis[J]. Front Med (Lausanne), 2024, 11: 1473847. DOI: 10.3389/fmed.2024.1473847.

[5] Li G, Lv T, Jin B, *et al*. The role of repetitive transcranial magnetic stimulation therapy in functional bowel disease[J]. Front Med (Lausanne), 2023, 10: 1249672. DOI: 10.3389/fmed.2023.1249672.

[6] Drossman DA. Functional gastrointestinal disorders: history, pathophysiology, clinical features and rome IV[J]. Gastroenterology, 2016: S0016-5085(16)00223-7. DOI: 10.1053/j.gastro.2016.02.032.

[7] 中华中医药学会脾胃病分会. 便秘中医诊疗专家共识意见(2017)[J]. 中医杂志, 2017, 58(15): 1345-1350. DOI: 10.13288/j.11-2166/r.2017.15.023.

[8] 国家市场监督管理总局, 国家标准化管理委员会. 中华人民共和国国家标准《经穴名称与定位》(GB/T 12346-2021)[S]. 北京:中国标准出版社,2021.

[9] 谢浩源, 陈军. 外周与中枢重复经颅磁刺激治疗功能性便秘的疗效对比[J]. 中华物理医学与康复杂志, 2025, 47(2): 123-126. DOI: 10.3760/cma.j.cn421666-20240417-00286.

[10] 上海市医学会脑电图与临床神经生理专科分会. 重复经颅磁刺激的临床应用与操作规范上海专家共识[J]. 上海医学, 2022, 45(2): 65-70. DOI: 10.19842/j.cnki.issn.0253-9934.2022.02.001.

[11] Zhang W, Wang H, Yang S, *et al*. Post-marketing safety assessment of constipation drugs: a real-world pharmacovigilance study based on FAERS database[J]. Expert Opin Drug Saf, 2025, 18: 1-12. DOI: 10.1080/14740338.2025.2467829.

[12] Brenner DM, Corsetti M, Drossman D, *et al*. A rome working group gonsensus document[J]. Clin Gastroenterol Hepatol, 2024, 22(2): 397-412. DOI: 10.1016/j.cgh.2023.08.044.

[13] Abd El Azeem AM, Alsharnoubi J, Abd El-Rahman Mohamed M. Laser acupuncture improving functional chronic constipation in children: a randomized controlled trial[J]. Lasers Med Sci, 2023, 38(1): 72. DOI: 10.1007/s10103-023-03727-z.

[14] Li Z, Niu Q, Yang K, *et al*. Acupuncture for constipation in Parkinson's disease: a systematic review and meta-analysis of randomized controlled trials[J]. Medicine (Baltimore). 2024, 103(29): e38937. DOI: 10.1097/MD.0000000000038937.

[15] Ekwudo MN, Gubert C, Hannan AJ. The microbiota-gut-brain axis in huntington's disease: pathogenic mechanisms and therapeutic targets[J]. FEBS J, 2025, 292(6): 1282-1315. DOI: 10.1111/febs.17102.

[16] Karasawa Y, Nozawa K, Nomoto K, *et al*. Constipation among workers with depression/anxiety: a retrospective study using a claims database and survey data in Japan[J]. BMJ Open, 2024, 14(11): e083668. DOI: 10.1136/bmjopen-2023-083668.

[17] Guo P, Zhang XN, Jin XY, *et al*. Clinical efficacy of transcutaneous electrical nerve stimulation (TENS) in pediatric functional constipation: impact on immunological indicators and gut microbiota[J]. J Immunol Res, 2025: 8888730. DOI: 10.1155/jimr/8888730.

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