

血液循环驱动泵联合治疗对脊柱结核术后患者深静脉血栓的预防效果及预后影响

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【摘要】目的:探讨血液循环驱动泵联合治疗对脊柱结核术后患者深静脉血栓的预防效果及预后的影响。**方法:**90例脊柱结核患者作为研究对象,以简单随机数字表法分两组,各45例。所有患者均由同一术者行脊柱结核术治疗,对照组给予利伐沙班抗凝治疗,观察组在对照组治疗基础上联合血液循环驱动泵治疗。比较两组肺栓塞、深静脉血栓发生率,记录治疗前后血液流变学指标[血浆黏度、全血高切、低切黏度及纤维蛋白原(FIB)]及凝血酶原时间(PT)和D-二聚体水平变化,统计两组不良反应发生情况。**结果:**观察组肺栓塞、深静脉血栓发生率分别为2.22%、4.44%,均低于对照组($P<0.05$);治疗后,两组患者血浆黏度、全血高切、低切黏度及FIB均较治疗前降低,且观察组低于对照组($P<0.05$);治疗后,两组患者D-二聚体水平均降低,且观察组低于对照组($P<0.05$);观察组不良反应发生率低于对照组(6.67% vs 24.44%, $P<0.05$)。**结论:**血液循环驱动泵联合治疗脊柱结核术患者可有效改善患者的凝血功能,降低血液黏稠度,降低术后肺栓塞、深静脉血栓及不良反应发生。

【关键词】脊柱结核;血液循环驱动泵;利伐沙班;深静脉血栓;凝血功能;血液黏稠度;不良反应

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Effect of rivaroxaban combined with blood circulation driven pump on prevention and prognosis of deep vein thrombosis after surgery for spinal tuberculosis

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Abstract: Objective To investigate the effect of the combined treatment of rivaroxaban and blood circulation driven pump on prevention and prognosis of deep vein thrombosis after surgery in patients with spinal tuberculosis. **Methods** Ninety cases of spinal tuberculosis were enrolled and randomly divided into 2 groups, with 45 cases in each group. All patients received surgery by the same surgeon. Rivaroxaban was used in control group for anticoagulant therapy, while rivaroxaban combined with blood circulation driven pump was adopted in observation group. The incidence of pulmonary embolism and deep vein thrombosis were compared between 2 groups; and the changes of hemorheological indexes [plasma viscosity, low-shear and high-shear blood viscosities, and fibrinogen], prothrombin time and D-dimer level before and after treatment, and adverse reactions were recorded. **Results** The incidences of pulmonary embolism and deep vein thrombosis in observation group were 2.22% and 4.44%, lower than those in control group ($P<0.05$). After treatment, the plasma viscosity, low-shear and high-shear blood viscosities, fibrinogen and D-dimer level in both groups decreased, and the indexes were lower in observation group than control group ($P<0.05$). The incidence of adverse reactions in observation group was lower than that in control group (6.67% vs 24.44%, $P<0.05$). **Conclusion** The combined treatment of rivaroxaban and blood circulation driven pump in patients with spinal tuberculosis can effectively improve the blood coagulation function, reduce blood viscosity, and prevent postoperative pulmonary embolism, deep venous thrombosis and adverse reactions.

Keywords: spinal tuberculosis; blood circulation driven pump; rivaroxaban; deep vein thrombosis; coagulation function; blood viscosity; adverse reaction

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前言

脊柱结核因全身关节结核病变所致,具有较高的发病率,在临床较为常见,因其病程迁延漫长,多合并骨质疏松,会导致脊柱椎体破坏程度加重,给患者的生活、工作均造成严重影响^[1]。手术是治疗脊柱结核的常用术式,能够有效清除病灶组织,帮助受压的神经获得解救,重新构建脊柱的稳定性,但手术治疗为有创操作,会导致患者的活动受限,下肢活动显著减少,患者需要卧床休息,在多种因素共同作用下导致深静脉血栓的发生^[2]。深静脉血栓的形成会导致静脉回流受阻而诱导患者出现病理性改变,影响患者的局部血液供应,对患者的生命安全构成威胁^[3]。利伐沙班属于一种新型的口服抗凝剂,能够选择性地与Xa因子活性相结合,有效抗凝且对血小板聚集无影响^[4]。血液循环驱动泵属于物理预防措施,能够促进肢体血液回流减慢,通过改善血流动力学发挥预防深静脉血栓形成的作用^[5]。本研究旨在分析血液循环驱动泵联合治疗对脊柱结核患者术后深静脉血栓的预防效果及预后的影响。

1 材料与方法

1.1 一般资料

选择2020年3月~2022年3月间上海市肺科医院收治的脊柱结核患者90例作为研究对象,以简单随机数字表法分两组,各45例。纳入标准:①经MRI检查证实,均接受脊柱结核术治疗;②患者积极配合研究;③患者知情并签署知情同意书。排除标准:①对本次研究药物过敏者;②合并其他严重疾病或肝肾功能障碍者;③保守治疗或存在手术禁忌证;④有严重失语或认知功能障碍者;⑤合并颅外伤或脊髓损伤患者;⑥合并恶性肿瘤或急慢性感染者。观察组男24例,女21例,年龄(49.78±4.29)岁,体质指数(22.98±3.09) kg/m²;对照组男27例,女18例,年龄(48.62±4.37)岁,体质指数(22.57±2.87) kg/m²。两组患者资料比较无统计学差异($P>0.05$),具有可比性。本次研究得到医院伦理委员会批准同意。

1.2 方法

对照组给予利伐沙班(生产厂家:德国Bayer Schering;规格:10 mg;国药准字:H20110912)治疗,口服,10 mg/次,治疗1周。

观察组在对照组治疗基础上联合血液循环驱动泵(生产厂家:韩国大兴公司;型号:Lympha-tron-2500型)治疗:①示意患者躺平,双下肢用套筒绑缚,用拉链将双下肢固定;②将3根充气管与对应颜色管套进气口连接,再与循环泵出气口紧密连接,接通电

源,缓慢充气,初始位置为踝部,然后依次至小腿、大腿,并对下肢的压力进行调节,逐个设置为45、35、30 mmHg;③根据患者深静脉充盈的程度,对充气的时间进行调节,加压时间由低到高缓慢上升,30 min/次,2次/d,治疗1周。

1.3 观察指标

(1)比较两组肺栓塞、深静脉血栓发病率。深静脉血栓判断标准:患肢肿胀分布广泛,浅静脉怒张,皮肤暗红,温度升高,Homans征(+),且经造影检查证实。

(2)血液流变学指标。治疗前后采集空腹静脉血4 mL,离心并分离血清后以全自动血液流变学检测患者的血浆黏度、全血高切、低切黏度及纤维蛋白原(FIB),仪器由北京宏达科技公司提供,型号为EB-5000,检测步骤按仪器说明书。

(3)凝血功能。以胶体金法检测血清D-二聚体水平,以全自动凝血分析仪器检测凝血酶原时间(PT)水平,试剂盒由瑞士罗氏公司生产,步骤按仪器说明书进行。

(4)统计两组不良反应发生情况。

1.4 统计学分析

采用SPSS20.0软件分析数据,计量资料以均数±标准差表示,行 t 检验,计数资料用率表示,行 χ^2 检验。 $P<0.05$ 表示差异有统计学意义。

2 结果

2.1 两组肺栓塞、深静脉血栓发生率比较

观察组肺栓塞、深静脉血栓发生率分别为2.22%(1/45)、4.44%(2/45),均低于对照组的15.56%(7/45)、20.00%(9/45)($P=0.026, 0.024$)。

2.2 两组血液流变学指标比较

与治疗前比较,两组患者血浆黏度、全血高切、低切黏度及FIB均降低,且观察组低于对照组($P<0.05$),见表1。

2.3 两组治疗前后PT和D-二聚体水平比较

治疗前,两组患者PT、D-二聚体水平无差异($P>0.05$);治疗后,两组患者D-二聚体水平均降低,且观察组低于对照组($P<0.05$)。见表2。

2.4 两组不良反应比较

观察组牙龈出血、粪便隐血、肝功能受损各1例,对照组发生不良反应11例,观察组不良反应发生率低于对照组(6.67% vs 24.44%, $P<0.05$)。

3 讨论

脊柱结核属于一种继发病,因循环障碍、结核病菌感染所致。随着我国老龄化进程的加快,患病

表1 两组患者血液流变学指标比较($\bar{x} \pm s$)

Table 1 Comparison of hemorheological indexes between two groups (Mean±SD)

组别	n	血浆黏度/mPa·s		全血高切黏度/mPa·s		全血低切黏度/mPa·s		FIB/g·L ⁻¹	
		治疗前	治疗后	治疗前	治疗后	治疗前	治疗后	治疗前	治疗后
观察组	45	1.79±0.51	1.09±0.37*	5.79±1.07	2.91±0.45*	12.48±3.92	8.18±2.09*	3.89±0.72	1.78±0.35*
对照组	45	1.83±0.48	1.67±0.47*	5.78±1.21	3.98±0.52*	12.52±3.88	10.92±2.67*	3.81±0.83	2.29±0.37*
t值		0.383	6.505	0.042	10.438	0.048	5.421	0.488	6.715
P值		0.703	0.000	0.967	0.000	0.961	0.000	0.627	0.000

*表示与同组治疗前比较,P<0.05

表2 两组患者治疗前后PT和D-二聚体水平比较($\bar{x} \pm s$)

Table 2 Comparison of PT and D-dimer level between two groups before and after treatment (Mean±SD)

组别	n	PT/s		D-二聚体/μg·L ⁻¹	
		治疗前	治疗后	治疗前	治疗后
观察组	45	12.49±2.45	11.89±3.28	5.98±1.02	1.28±0.31*
对照组	45	12.51±3.18	12.71±3.19	6.01±1.28	2.71±0.59*
t值		0.033	1.202	0.123	14.393
P值		0.973	0.233	0.902	0.000

*表示与同组治疗前比较,P<0.05

率呈现出递增趋势,患者主要表现为脊柱活动障碍、疼痛、畸形,伴随病情不断进展可导致截瘫,给患者的工作、生活均造成不良影响^[6-7]。有资料表明脊柱结核的主要传播方式为飞沫,早期症状不明显,随着病情进展,可出现食欲减退、全身不适、乏力、贫血等全身中毒症状^[8-9]。

手术是治疗此病的有效方式,可有效清除病灶组织,解救受压迫的神经,重新构建脊柱。脊柱结核手术时间较长,且术后需要患者长时间卧床休息,不利于血液循环,常诱导静脉血液流速减缓、静脉壁损伤,进而诱导患者术后出现深静脉血栓,对患者的预后造成不良影响^[10-13]。Tang等^[14]研究指出深静脉血栓的防治主要在于快速促进静脉灌注恢复,避免血栓形成和扩散。利伐沙班是临床常用的抗凝药物,对凝血因子Xa抑制剂具有较高的选择性,其抗凝作用的发挥主要是降低凝血因子Xa活性,进而发挥干扰血栓形成的作用。血液循环驱动泵已在国外被常用于骨科术后,可通过压力护套及泵作用于肢体,促进静脉血液循环加速运行,能够有效改善血液流速,同时利用气压泵可以降低血液淤积所带来的负面影响^[15-16]。陈伟等^[11]研究指出脊柱结核术后患者静脉血栓发生率为3.98%,而肺栓塞的发生率为3.12%。本次研究对在我院行脊柱结核术治疗的45例患者给

予血液循环驱动泵联合利伐沙班治疗,并与单纯利伐沙班治疗患者进行对比,结果显示观察组患者肺栓塞和深静脉血栓发生率分别为2.22%、4.44%,均低于对照组的15.56%、20.00%,说明联合治疗能够有效降低脊柱结核术后患者肺栓塞、深静脉血栓发生率,与上述报道基本相符。

有资料表明下肢深静脉血栓的理想治疗目标主要在于快速恢复患者的静脉血流,避免患者因为血栓扩散危及患者的生命安全^[17-18]。PT和D-二聚体是反映患者凝血功能状况的常用指标,其水平表达有助于准确判断患者的凝血功能状况^[19]。血液循环驱动泵能够通过气压泵间歇作用,有效促使内皮细胞发挥相关功能,促使内皮细胞释放纤溶系统的主要成分,进入血液后会随之改善患者的血液高凝状态^[20-21]。本研究结果显示治疗前后两组患者的PT无显著差异,而D-二聚体水平显著降低,且观察组低于对照组,说明联合治疗可有效改善患者的凝血功能。分析原因为:血液循环驱动泵能够促使血管内皮释放诸多有利因子,进而促进凝血功能状态改善。血液流变学异常与深静脉血栓的形成有密切关联。血液循环驱动泵属于主观运动,能够随时进行,依次从下肢末端至近心端顺序逐渐压迫肌肉组织并进行按摩,能够促进下肢静脉回流,其主要是通过改善血流动力学、凝血机制进而发挥抗深静脉血栓形成的作用^[22-24]。本研究结果显示观察组患者的血液流变学指标均得到有效改善,效果优于对照组,说明联合治疗具有协同增效标本兼顾的作用,对其调节血液循环起着重要作用。观察组不良反应发生率低于对照组,说明联合治疗不会增加不良反应,安全性值得信赖。

综上所述,血液循环驱动泵联合治疗脊柱结核术患者可有效改善患者的凝血功能,降低血液黏稠度,降低术后肺栓塞、深静脉血栓及不良反应发生,值得在临床推广运用。

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