·脑出血临床研究·

基底节区出血血肿穿刺置管引流术后早期康复治疗研究

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【摘要】 **目的** 探讨基底节区出血血肿穿刺置管引流术(简称引流术)后早期康复治疗的有效性和安全性。**方法** 共80例行引流术的基底节区出血患者随机分为两组,每组40例,早期康复组在引流术后2天、对照组在引流术后7天均予为期2周的康复治疗;在康复治疗前、治疗2周和3个月随访时评定患肢Fugl-Meyer运动功能(FMA)、Barthel指数(BI),以及3个月随访时进行改良Rankin量表(mRS)预后评估,同时统计两组患者的肺部感染、下肢静脉血栓和再出血发生率。**结果** 两组患者康复治疗2周和3个月随访时FMA评分($t=-16.288$,$P=0.000$;$t=-45.638$,$P=0.000$)和BI评分($t=-20.188$,$P=0.000$;$t=-48.938$,$P=0.000$)高于治疗前,3个月随访时FMA评分($t=-29.350$,$P=0.000$)和BI评分($t=-28.750$,$P=0.000$)高于治疗2周时;早期康复组各观察时间点FMA评分($F=7.505$,$P=0.008$)和BI评分($F=7.029$,$P=0.010$)均高于对照组。3个月随访时早期康复组患者预后优于对照组($Z=-3.591$,$P=0.000$),肺部感染发生率低于对照组[45%(18/40)对67.50%(27/40);$\chi^2=4.114$,$P=0.043$]。**结论** 基底节区出血引流术后早期进行康复治疗可以有效提高患者运动功能和日常生活活动能力,并降低肺部感染发生率,同时不增加再出血风险。

【关键词】 脑出血; 基底神经节; 引流术; 康复

Effect of early rehabilitation for basal ganglia hemorrhage patients treated with hematoma puncture and catheter drainage

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【Abstract】 **Objective** To observe the efficiency and safety of early rehabilitation for patients with basal ganglia hemorrhage after hematoma puncture and catheter drainage. **Methods** A total of 80 basal ganglia hemorrhage patients treated with hematoma puncture and catheter drainage were randomly divided into 2 groups: control group (N = 40) received a two-week rehabilitation program 7 d after operation and early rehabilitation group (N = 40) received a two-week rehabilitation program 2 d after operation. They were assessed by Fugl-Meyer Assessment Scale (FMA), Barthel Index (BI) before and after 2-week treatment, as well as 3 months after treatment (during the following-up period), and they were also assessed by modified Rankin Scale (mRS) 3 months after 2-week treatment. The incidence of pulmonary infection, lower extremity venous thrombosis and rebleeding in 2 groups were statistically analyzed. **Results** Compared with before treatment, FMA score ($t=-16.288$, $P=0.000$; $t=-45.638$, $P=0.000$) and BI score ($t=-20.188$, $P=0.000$; $t=-48.938$, $P=0.000$) of patients in both groups were all significantly increased after 2-week treatment and 3 months after treatment. Besides, FMA score ($t=-29.350$, $P=0.000$) and BI score ($t=-28.750$, $P=0.000$) of patients in both groups 3 months after treatment were higher than those after 2-week treatment. Compared with control group, FMA score ($F=7.505$, $P=0.008$) and BI score ($F=7.029$, $P=$

doi:10.3969/j.issn.1672-6731.2018.12.007

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0.010) were significantly increased in early rehabilitation group. Compared with control group, the prognosis in early rehabilitation group was better (Z = - 3.591, P = 0.000). The incidence of pulmonary infection in early rehabilitation group were lower than that in control group [45% (18/40) vs. 67.50% (27/40); χ^2 = 4.114, P = 0.043]. **Conclusions** Early rehabilitation contributes to better motor recovery and ability in the activities of daily living for basal ganglia hemorrhage patients treated with hematoma puncture and catheter drainage. Early rehabilitation can reduce the incidence of pulmonary infection without increasing the risk of rebleeding.

【Key words】 Cerebral hemorrhage; Basal ganglia; Drainage; Rehabilitation

脑出血在脑卒中各亚型中发病率仅次于缺血性卒中，占全部脑卒中发病率的18.8%～47.6%[1-3]，大多数患者预后不良[4-5]。对于症状轻微者的治疗一般以药物保守治疗为主，而病情危重或存在血肿周围水肿（PHE）等继发原因且有明确手术适应证的患者，则需根据出血部位、出血量、血压及全身情况分别选择开颅血肿清除术、去骨瓣减压术联合血肿清除术、血肿穿刺置管引流术（以下简称引流术）或脑室引流术等[1]。然而，无论哪一种手术方法，术后仍有部分患者遗留不同程度的神经功能障碍。大量临床研究业已证实，脑出血患者在术后早期即进行康复治疗可有效缩短住院时间、提高生存率、改善日常生活活动能力（ADL）和心理状态[6-7]。在本研究中，我们拟对基底节区出血患者引流术后早期接受康复治疗的有效性和安全性进行探讨，以为临床改善其预后提供借鉴。

资料与方法

一、临床资料

1. 纳入标准 （1）高血压脑出血诊断的符合1995年全国第4次脑血管病学术会议制定的标准，并经头部CT检查证实。（2）出血部位位于基底节区，血肿边界规整，血肿长轴与矢状位平行。（3）多田公式[血肿量（ml）= 0.50 × 血肿最大面积长轴（cm）× 血肿最大面积短轴（cm）× 扫描层数（层厚1 cm）]计算出血量为25～35 ml。（4）年龄35～75岁。（5）均为引流术后病例。（6）本研究经天津市环湖医院道德伦理委员会审核批准，所有患者或其家属均知情同意并签署知情同意书。

2. 排除标准 （1）非高血压脑出血。（2）出血累及丘脑或破入脑室。（3）术前已有脑疝形成。（4）入院后实验室检查显示存在凝血功能障碍。（5）伴发明显的循环或呼吸功能障碍。（6）存在脑卒中既往史。（7）患者或其家属拒绝接受术后早期康复治疗。

3. 一般资料 选择2017年1月–2018年2月在天津市环湖医院神经外科住院治疗并行引流术的基底节区出血患者共80例，男性47例，女性33例；年龄36～74岁，平均（53.51 ± 10.63）岁；发病至入院时间2～48 h，中位时间24.00（9.50，24.00）h；出血量25～35 ml，平均（30.88 ± 3.80）ml；入院时Glasgow昏迷量表（GCS）评分3～15分，平均（10.93 ± 3.31）分；美国国立卫生研究院卒中量表（NIHSS）评分为8～24分，平均（14.34 ± 3.25）分；发病至手术时间24～72 h，平均为（37.49 ± 12.85）h；术后残留血肿量0～16 ml，平均（9.66 ± 2.99）ml。所有患者均于引流术后随机（随机数字表法）分为早期康复治疗组（早期康复组，40例）和常规康复治疗组（对照组，40例），两组患者性别、年龄、发病至入院时间、出血量、入院时GCS和NIHSS评分、发病至手术时间、术后残留血肿量差异均无统计学意义（P > 0.05，表1），具有可比性。

二、研究方法

1. 常规治疗 两组患者均于发病24 h内经额入路行引流术，操作方法参见文献[8]，术后常规予以脱水降低颅内压、营养神经、抗高血压、降糖等对症药物治疗。

2. 康复治疗 早期康复组患者于术后第2天即开始康复治疗，对照组则于术后第7天开始治疗，两组康复治疗方案相同。康复治疗前所有患者生命体征平稳[9]，体温 < 38 ℃，心率40～130次/min，收缩压90～180 mm Hg（1 mm Hg = 0.133 kPa）、舒张压 ≤ 110 mm Hg，脉搏血氧饱和度（SpO_2）≥ 0.90。（1）患侧肢体综合训练：包括良肢位摆放、翻身训练、体位转移、关节活动度保持、四肢和躯干肌肉力量训练等，训练时间为30 min。（2）床边Motomed智能下肢运动训练系统：以训练患者下肢运动功能、维持下肢肌力和关节基本功能为目的，训练时间为15 min。（3）患侧肢体中频电刺激治疗：旨在增加患

表1 早期康复组与对照组患者临床资料的比较

Table 1. Comparison of general data between 2 groups

Item	Control (N = 40)	ER (N = 40)	Statistic value	*P* value
Sex [case (%)]			0.052	0.820
Male	24 (60.00)	23 (57.50)		
Female	16 (40.00)	17 (42.50)		
Age ($\bar{x} \pm s$, year)	55.43 ± 10.75	51.60 ± 10.40	-1.645	0.104
Duration [*M* (P_{25}, P_{75}), h]	24.00 (6.00, 24.00)	24.00 (24.00, 48.00)	-0.945	0.345
Bleeding volume ($\bar{x} \pm s$, ml)	31.13 ± 2.65	30.63 ± 4.69	-0.587	0.560
GCS ($\bar{x} \pm s$, score)	10.38 ± 3.11	11.48 ± 3.44	1.500	0.138
NIHSS ($\bar{x} \pm s$, score)	14.55 ± 3.31	14.13 ± 3.21	-0.583	0.562
Duration from onset to operation ($\bar{x} \pm s$, h)	35.68 ± 12.75	39.30 ± 12.85	1.266	0.209
Residual hematoma ($\bar{x} \pm s$, ml)	10.13 ± 2.78	9.20 ± 3.17	-1.390	0.168

χ^2 test for comparison of sex, Mann-Whitney *U* test for comparison of duration, and two-independent-sample *t* test for comparison of others。 ER, early rehabilitation, 早期康复; GCS, Glasgow Coma Scale, Glasgow 昏迷量表; NIHSS, National Institutes of Health Stroke Scale, 美国国立卫生研究院卒中量表

肢感觉输入以维持肌容量，训练时间20 min。(4)其他训练项目：包括循序渐进地进行站立训练、步行训练和日常生活活动能力训练等，时间为20 min。(5)对于伴有吞咽障碍和言语障碍的患者，在上述康复项目的基础上增补吞咽和言语训练。(6)对患者及其家属进行必要的康复知识宣教，并教授适宜家庭康复治疗的训练方案。上述康复治疗项目训练时间须累计达到每天，每周6 d，连续训练2周。

3. 评价指标 (1)治疗有效性评价：分别于康复治疗前、治疗2周和3个月随访时对两组患者康复治疗的有效性进行评价。采用Fugl-Meyer评价量表(FMA)对患者运动功能进行评价，包括50项条目，每项分为0～2分共3级[0分，不能完成；1分，部分完成；2分，全部完成]；总评分为100分，评分越高、运动功能越佳。根据Bathel指数(BI)评价患者日常生活活动能力，包括大小便控制、进食、洗澡、修饰、穿衣、如厕、床椅转移、行走、上下楼梯等共10项内容，总评分为100分；其中评分＞60分者生活基本自理，40～60分日常生活需他人帮助，20～40分则日常生活基本依赖他人。康复治疗后3个月时采用改良Rankin量表(mRS)[10]进行临床预后评价，0级为无症状；1级，有症状但无明显神经功能障碍，能够独立完成日常工作和生活；2级为轻残，虽不能完成发病前所有活动但生活基本自理；3级为中残，日常生活需他人帮助但能够独立行走；4级为中残或重残，不能独立行走，日常生活不能完全自理；5级为重残，卧床，大小便失禁，日常生活依赖他人。(2)康复治疗的安全性评价：于发病2周后对各项训练方式的安全性进行评价，重点记录肺部感染、下肢静脉血栓和再出血等并发症发生率。

4. 统计分析方法 采用SPSS 19.0统计软件进行数据处理与分析。计数资料以相对数构成比(%)或率(%)表示，采用χ^2检验；等级资料采用Wilcoxon秩和检验。呈正态分布的计量资料以均数±标准差($\bar{x} \pm s$)表示，行两独立样本的*t*检验；两组患者康复治疗前后运动功能和日常生活活动能力的比较，采用重复测量设计的方差分析，两两比较行LSD-*t*检验。呈非正态分布的计量资料以中位数和四分位数间距[$M(P_{25}, P_{75})$]表示，采用Mann-Whitney *U*检验。以$P \leqslant 0.05$为差异具有统计学意义。

结 果

两组患者治疗2周和3个月随访时FMA评分($P = 0.000, 0.000$)和BI评分($P = 0.000, 0.000$)均高于治疗前，其中3个月随访时FMA评分($P = 0.000$)和BI评分($P = 0.000$)高于治疗2周时，表明无论早期康复治疗还是常规康复治疗均可改善患者引流术后的运动功能和日常生活活动能力；但早期康复组患者FMA评分($P = 0.008$)和BI评分($P = 0.010$)高于对照组，提示脑出血患者于术后早期即接受康复治疗对其运动功能和日常生活活动能力的改善获益更大(表2～4)。

治疗后3个月时，对照组(40例)mRS分级2级者1例(2.50%)、3级23例(57.50%)、4级15例(37.50%)、5级1例(2.50%)；早期康复组(40例)0级3例(7.50%)、1级1例(2.50%)、2级6例(15%)、3级25例(62.50%)、4级5例(12.50%)；两组预后差异有统计学意义($Z = -3.591, P = 0.000$)。

康复治疗后有45例(56.25%，45/80)患者发生肺部感染，其中对照组27例(67.50%，27/40)、早期康复组18例(45%，18/40)，组间差异具有统计学意义($\chi^2 = 4.114, P = 0.043$)；下肢静脉血栓4例均发生于对照组(10%，4/40；校正$\chi^2 = 2.368, P = 0.124$)；再出血6例(7.50%)，对照组3例(7.50%，3/40)、早期康复组3例(7.50%，3/40；$\chi^2 = 0.000, P = 1.000$)。

讨 论

既往研究表明，基底节区出血患者的预后与其

表2 早期康复组与对照组患者康复治疗前后FMA和BI评分的比较($\bar{x} \pm s$,评分)

Table 2. Comparison of FMA and BI scores between 2 groups before and after treatment ($\bar{x} \pm s$, score)

Group	N	Before rehabilitation (1)	After 2-week rehabilitation (2)	3 months after rehabilitation (3)	Group	N	Before rehabilitation (1)	After 2-week rehabilitation (2)	3 months after rehabilitation (3)
FMA					BI				
Control	40	11.50 ± 5.50	25.50 ± 8.12	52.28 ± 10.59	Control	40	12.38 ± 8.62	31.25 ± 8.75	57.88 ± 11.26
ER	40	12.00 ± 6.19	30.12 ± 10.21	62.05 ± 14.90	ER	40	14.62 ± 8.58	36.12 ± 10.46	67.00 ± 16.16

FMA,Fugl-Meyer Assessment Scale,Fugl-Meyer评价量表;BI,Barthel Index,Barthel指数;ER,early rehabilitation,早期康复

表3 早期康复组与对照组患者康复治疗前后FMA和BI评分的重复测量设计的方差分析表

Table 3. ANOVA of repeated measurement design for FMA and BI scores of 2 groups before and after treatment

Source of variation	*SS*	df	*MS*	*F* value	*P* value	Source of variation	*SS*	df	*MS*	*F* value	*P* value
FMA						BI					
Treatment	1 570.817	1.000	1 570.817	7.505	0.008	Treatment	1 760.417	1.000	1 760.417	7.029	0.010
Time	85 586.308	1.389	61 595.955	1106.542	0.000	Time	96 772.708	1.590	60 859.041	874.739	0.000
Treatment × time	786.058	1.389	565.721	10.163	0.001	Treatment × time	481.458	1.590	302.783	4.352	0.022
Error between groups	16 325.183	78.000	209.297			Error between groups	19 535.833	78.000	250.459		
Error within group	6 032.967	108.379	55.665			Error within group	8 629.167	124.029	69.574		

FMA,Fugl-Meyer Assessment Scale,Fugl-Meyer评价量表;BI,Barthel Index,Barthel指数。The same for table below

发病时年龄、出血部位、出血量、入院时GCS评分和治疗方法等因素有关[11-12],本研究在排除上述因素的影响后,首次对基底节区出血患者引流术后康复治疗开始时间对运动功能和日常生活活动能力的影响进行探讨,观察结果显示,两组患者治疗2周和3个月随访时FMA和BI评分均高于治疗前,3个月随访时FMA和BI评分高于治疗2周时,表明引流术后无论早期康复治疗还是常规康复治疗均可改善脑出血患者的运动功能和日常生活活动能力,但以术后早期(≤2天)接受康复治疗患者运动功能和日常生活活动能力的改善更为显著。

基底节区是高血压脑出血的常见部位,患者大多伴有严重的神经功能缺损症状,早期施行血肿穿刺置管引流术可有效解除血肿压迫效应、减轻炎症反应和血肿周围水肿程度,从而改善神经功能[13-16];尽管如此术后仍有部分患者遗留运动、吞咽或言语功能障碍等,且早期卧床时间越长、预后越差[17]。而康复治疗则是降低脑出血病残率的有效方法,也是治疗过程中不可或缺的重要环节[18]。然而,引流术后早期即开始进行康复治疗与缺血性卒中相比更具挑战性。因为脑出血患者在康复治疗过程中需接受多项神经功能评价和血流动力学监测,以防止治疗过程中因运动量或运动强度不当引起的血流动力学或颅内压的异常波动,诱发再出血或神经功能障碍加重[19-20]。

在van Wijk等[21]和Bernhardt等[22-23]的随机对照临床试验——极早期康复试验Ⅱ(AVERTⅡ)中,脑出血患者于发病后极早期(<24小时)即开始康复训练,结果显示这些患者的住院时间和并发症发生率均显著低于其他患者且安全有效[21-23]。然而进一步开展的平行、单盲、多中心随机对照试验——AVERTⅢ试验结果则未取得同样的疗效。该项研究纳入258例(12.26%,258/2104)脑出血患者,治疗组(142例)于常规治疗后18.50小时开始进行高强度的康复训练(31 min/次、6.5次/d,共训练201.50分钟),发病后3个月时的分析结果提示早期高强度康复治疗组患者预后更差[24]。表明脑出血发病24小时内开始康复治疗虽然安全有效,但须严格掌握训练强度,应以循序渐进为宜。脑出血患者离床活动有效性和安全性的研究显示,脑出血7天内进行循序渐进的翻身、床边坐位、床椅转移、床边立位等康复训练有利于患者早日离床活动[10]。国内首项多中心随机对照临床试验——脑出血早期康复治疗研究对发病48小时内的脑出血患者分别进行神经肌肉电刺激、日常生活活动能力等多项康复训练(训练频率≥16次/月、60 min/次),发病后6个月随访时早期康复组患者生存率更高、神经功能结局更佳[11]且安全、有效,但该研究未纳入经手术治疗的脑出血患者。本研究中,我们对40例基底节区出血患者于引流术后第2天即开始综合运动训练,发病

表4 早期康复组与对照组患者康复治疗前后FMA和BI评分的两两比较

Table 4. Paired comparison of FMA and BI scores at different time points

Paired comparison	FMA		BI	
	t value	*P* value	*t* value	*P* value
(1) 对(2)	-16.288	0.000	-20.188	0.000
(1) 对(3)	-45.638	0.000	-48.938	0.000
(2) 对(3)	-29.350	0.000	-28.750	0.000

后2周时其再出血发生率与常规康复组之间并无明显差异，表明脑出血后早期康复治疗是安全的；而且引流术后的早期康复治疗对改善患者神经功能结局大有裨益。目前有关早期康复治疗改善神经功能结局的机制尚不明确[25]，推测可能与减少卧床对骨骼肌肉、心血管、呼吸系统和免疫系统的负性作用，以及提高神经可塑性有关。动物实验显示，大鼠于脑出血后4天时进行运动训练可获得较好的运动功能恢复和行走能力，而脑出血后2周时进行运动训练的大鼠其运动功能的恢复较差[26-27]。脑出血后早期施行康复治疗可能尚与抑制血肿周围神经元凋亡，以及神经干/祖细胞向病灶周围迁移、神经再生和脑源性神经营养因子(BDNF)水平升高等因素有关[28-30]，这些基础研究为脑出血后早期康复治疗提供了分子水平的理论基础。目前临床常用的康复治疗方法包括神经肌肉电刺激、日常生活活动能力训练、循序渐进的体位转移训练和力量训练等，不过这些训练方法的有效性及安全性尚待进一步的临床研究加以证实。

脑出血后早期卧床易发生不活动相关并发症，如肺部感染、泌尿系统感染、下肢静脉血栓等。本组病例均于引流术后早期即进行康复治疗如良肢位摆放和翻身训练等，有效降低肺部感染发生率；以及早期肢体被动活动和下肢Motomed智能训练系统，降低下肢静脉血栓发生率，但组间差异未达到统计学意义，考虑与本研究样本量较小有关，尚待进一步扩大样本量深入研究。

综上所述，基底节区出血患者若于引流术后第2天即进行康复治疗不仅安全、有效，并可在改善运动功能和日常生活活动能力的同时，有效降低肺部感染发生率且不增加再出血风险。脑出血患者术后康复治疗的介入时间是否可以更早、是否适用于其他部位出血和其他手术方式、以何种康复治疗方法能够更好地改善患者预后等问题，尚待进一步的临床研究提供更为可靠的证据。

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（收稿日期:2018-11-24）

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