

艾灸联合功能锻炼在全膝关节置换术后康复治疗中的应用

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摘要 目的:探讨艾灸联合功能锻炼在全膝关节置换(total knee arthroplasty, TKA)术后康复治疗中的应用价值。**方法:**将 240 例接受 TKA 的膝骨关节炎(knee osteoarthritis, KOA)患者随机分为联合治疗组(120 例)和功能锻炼组(120 例),前者采用艾灸联合功能锻炼治疗,后者单纯采用功能锻炼治疗。TKA 后 2 d 开始艾灸治疗,选取梁丘穴和足三里穴,每穴灸 15 min,每日上午 8 时和下午 4 时各灸 1 次,连续治疗 7 d 为 1 个疗程,共治疗 2 个疗程。TKA 后 1~14 d 进行踝泵训练和卧位膝关节主动屈伸锻炼,TKA 后 3~14 d 进行坐位膝关节主动屈伸锻炼。采用徒手肌力检查分级标准评定下肢肌力,采用视觉模拟量表(visual analogue scale, VAS)评定患膝静息痛和运动痛,采用美国特种外科医院(Hospital for Special Surgery, HSS)膝关节功能评分标准评价患膝运动功能。记录患者首次主动直腿抬高时间、首次下床时间,观察不良反应发生情况。**结果:**联合治疗组 1 例患者,因吸入艾灸烟雾后出现胸闷、咳嗽症状而退出研究;功能锻炼组 1 例患者,因术后 2 d 下床活动跌倒造成假体周围骨折而退出研究。膝部静息痛 VAS 评分,时间因素和分组因素存在交互效应($F=13.251, P=0.000$);2 组患者膝部静息痛 VAS 评分总体比较,组间差异有统计学意义,即存在分组效应($F=10.528, P=0.009$);术后不同时间点膝部静息痛 VAS 评分的差异有统计学意义,即存在时间效应($F=6.353, P=0.000$);2 组患者膝部静息痛 VAS 评分随时间变化均呈下降趋势,但 2 组的下降趋势不完全一致[(2.59±0.49)分, (2.54±0.43)分, (2.09±0.31)分, (1.99±0.40)分, $F=0.890, P=0.000$; (2.70±0.51)分, (2.68±0.35)分, (2.64±0.40)分, (2.26±0.29)分, $F=3.625, P=0.000$];术后 24 h、48 h,2 组患者膝部静息痛 VAS 评分的组间差异均无统计学意义($t=-0.311, P=0.710$; $t=-0.324, P=0.751$);术后 72 h、96 h,联合治疗组的膝部静息痛 VAS 评分均低于功能锻炼组($t=9.335, P=0.000$; $t=6.640, P=0.000$)。膝部运动痛 VAS 评分,时间因素和分组因素存在交互效应($F=8.741, P=0.003$);2 组患者膝部运动痛 VAS 评分总体比较,组间差异有统计学意义,即存在分组效应($F=9.283, P=0.023$);术后不同时间点膝部运动痛 VAS 评分的差异有统计学意义,即存在时间效应($F=5.336, P=0.000$);2 组患者膝部运动痛 VAS 评分随时间变化均呈下降趋势,但 2 组的下降趋势不完全一致[(3.51±0.66)分, (3.13±0.53)分, (2.59±0.39)分, (2.23±0.38)分, $F=5.632, P=0.000$; (3.63±0.73)分, (3.31±0.59)分, (3.08±0.40)分, (2.71±0.39)分, $F=4.850, P=0.000$];术后 24 h、48 h,2 组患者膝部运动痛 VAS 评分的组间差异均无统计学意义($t=-1.105, P=0.272$; $t=-2.105, P=0.068$);术后 72 h、96 h,联合治疗组的膝部运动痛 VAS 评分均低于功能锻炼组($t=6.015, P=0.000$; $t=6.163, P=0.000$)。下肢肌力评分,时间因素和分组因素存在交互效应($F=10.201, P=0.000$);2 组患者下肢肌力评分总体比较,组间差异有统计学意义,即存在分组效应($F=12.661, P=0.000$);术后不同时间点下肢肌力评分的差异有统计学意义,即存在时间效应($F=8.635, P=0.000$);2 组患者下肢肌力评分随时间变化均呈增高趋势,但 2 组的增高趋势不完全一致[(2.68±0.86)分, (3.00±0.78)分, (3.75±0.63)分, (4.08±0.73)分, $F=6.214, P=0.000$; (2.40±0.81)分, (2.54±1.02)分, (3.31±0.67)分, (3.39±0.65)分, $F=2.553, P=0.000$];术后 24 h、48 h、72 h、96 h,联合治疗组的下肢肌力评分均大于功能锻炼组($t=2.184, P=0.029$; $t=3.390, P=0.001$; $t=4.535, P=0.000$; $t=6.119, P=0.000$)。联合治疗组的首次主动直腿抬高时间及首次下床时间均短于功能锻炼组[(31.03±10.78)h, (47.23±15.78)h, $t=-8.462, P=0.000$; (25.76±7.00)h, (33.12±11.18)h, $t=-8.544, P=0.000$],术后 7 d HSS 膝关节功能评分高于功能锻炼组[(79.55±7.26)分, (70.35±8.10)分, $t=15.041, P=0.001$]。2 组患者均未出现恶心、呕吐、肢体麻木及皮肤烫伤等不良反应。**结论:**对接受 TKA 的 KOA 患者在功能锻炼的基础上进行艾灸治疗,可有效减轻患膝静息痛及运动痛、提高下肢肌力,能够早期进行主动直腿抬高训练、早期下床,有助于促进患膝运动功能恢复,且安全性高。

关键词 骨关节炎;膝;关节成形术;置换;膝;艾条灸;功能锻炼;康复

Application of moxa – moxibustion and functional exercises to knee rehabilitation after total knee arthroplasty

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ABSTRACT Objective: To explore the applied values of moxa – moxibustion combined with functional exercises in knee rehabilitation after total knee arthroplasty (TKA). **Methods:** Two hundred and forty patients with knee osteoarthritis (KOA) were randomly divided into combination therapy group and functional exercise group after TKA, 120 cases in each group. The patients in combination therapy group were treated with moxa – moxibustion combined with functional exercises, and the patients in functional exercise group were treated with monotherapy of functional exercises. Since 2 days after TKA, the moxa – moxibustion was performed at Liangqiu (ST34) and Zusanli (ST36), 15 minutes for each acupoint at 8 AM and 4 PM respectively for consecutive two courses of treatment, 7 days for each course. Ankle pump training and initiative knee flexion and extension exercises were performed in lying position at 1 – 14 days after TKA, and the initiative knee flexion and extension exercises were performed in sitting position at 3 – 14 days after TKA. The muscle strengths of low limbs were evaluated by using manual muscle testing (MMT) grading standard, the knee rest pain and motion pain were evaluated by using visual analogue scale (VAS), and the knee motor function was also evaluated according to Hospital for Special Surgery (HSS) knee function scoring standard. The first initiative straight – leg – raise time and bed rest time were recorded and the adverse reactions were observed. **Results:** One patient in combination therapy group dropped out of the study for chest distress and cough caused by inhaling moxibustion smoke and 1 patient in functional exercise group dropped out of the study for peri – prosthetic fracture caused by tumble after ambulation on postoperative day 2. There was interaction between time factor and group factor in knee rest pain VAS scores ($F = 13.251, P = 0.000$). There was statistical difference in knee rest pain VAS scores between the 2 groups in general, in other words, there was group effect ($F = 10.528, P = 0.009$). There was statistical difference in knee rest pain VAS scores between different timepoints after surgery, in other words, there was time effect ($F = 6.353, P = 0.000$). The knee rest pain VAS scores presented a time – dependent decreasing trend in both of the 2 groups, while the 2 groups were inconsistent with each other in the decreasing trend of knee rest pain VAS scores (2.59 ± 0.49, 2.54 ± 0.43, 2.09 ± 0.31, 1.99 ± 0.40 points, $F = 0.890, P = 0.000$; 2.70 ± 0.51, 2.68 ± 0.35, 2.64 ± 0.40, 2.26 ± 0.29 points, $F = 3.625, P = 0.000$). There was no statistical difference in knee rest pain VAS scores between the 2 groups at 24th and 48th hour after the surgery ($t = -0.311, P = 0.710$; $t = -0.324, P = 0.751$). The knee rest pain VAS scores were low in combination therapy group compared to functional exercise group at 72nd and 96th hour after the surgery ($t = 9.335, P = 0.000$; $t = 6.640, P = 0.000$). There was interaction between time factor and group factor in knee motion pain VAS scores ($F = 8.741, P = 0.003$). There was statistical difference in knee motion pain VAS scores between the 2 groups in general, in other words, there was group effect ($F = 9.283, P = 0.023$). There was statistical difference in knee motion pain VAS scores between different timepoints after surgery, in other words, there was time effect ($F = 5.336, P = 0.000$). The knee motion pain VAS scores presented a time – dependent decreasing trend in both of the 2 groups, while the 2 groups were inconsistent with each other in the decreasing trend of knee motion pain VAS scores (3.51 ± 0.66, 3.13 ± 0.53, 2.59 ± 0.39, 2.23 ± 0.38 points, $F = 5.632, P = 0.000$; 3.63 ± 0.73, 3.31 ± 0.59, 3.08 ± 0.40, 2.71 ± 0.39 points, $F = 4.850, P = 0.000$). There was no statistical difference in knee motion pain VAS scores between the 2 groups at 24th and 48th hour after the surgery ($t = -1.105, P = 0.272$; $t = -2.105, P = 0.068$). The knee motion pain VAS scores were lower in combination therapy group compared to functional exercise group at 72nd and 96th hour after the surgery ($t = 6.015, P = 0.000$; $t = 6.163, P = 0.000$). There was interaction between time factor and group factor in lower limb muscle strength scores ($F = 10.201, P = 0.000$). There was statistical difference in lower limb muscle strength scores between the 2 groups in general, in other words, there was group effect ($F = 12.661, P = 0.000$). There was statistical difference in lower limb muscle strength scores between different timepoints after surgery, in other words, there was time effect ($F = 8.635, P = 0.000$). The lower limb muscle strength scores presented a time – dependent increasing trend in both of the 2 groups, while the 2 groups were inconsistent with each other in the increasing trend of lower limb muscle strength scores (2.68 ± 0.86, 3.00 ± 0.78, 3.75 ± 0.63, 4.08 ± 0.73 points, $F = 6.214, P = 0.000$; 2.40 ± 0.81, 2.54 ± 1.02, 3.31 ± 0.67, 3.39 ± 0.65 points, $F = 2.553, P = 0.000$). The lower limb muscle strength scores were higher in combination therapy group compared to functional exercise group at 24th, 48th, 72nd and 96th hour after the surgery ($t = 2.184, P = 0.029$; $t = 3.390, P = 0.001$; $t = 4.535, P = 0.000$; $t = 6.119, P = 0.000$). The first initiative straight – leg – raise time and bed rest time were shorter and the HSS knee function scores measured on postoperative day 7 were higher in combination therapy group compared to functional exercise group (31.03 ± 10.78 vs 47.23 ± 15.78 hours, $t = -8.462, P = 0.000$; 25.76 ± 7.00 vs 33.12 ± 11.18 hours, $t = -8.544, P = 0.000$; 79.55 ± 7.26 vs 70.35 ± 8.10 scores, $t = 15.041, P = 0.001$). No adverse reactions such as nausea, vomiting, limb numbness and skin scald were found in the 2 groups. **Conclusion:** The combination therapy of moxa – moxibustion and functional exercises can effectively relieve knee rest pain and motion pain and improve lower limb muscle strength of patients who received TKA for KOA, and it is helpful to the recovery of motor function of affected knee because patients can perform early

initiative straight-leg-raise training and early ambulation. Moreover, it has high safety.

Keywords osteoarthritis; knee; arthroplasty; replacement; knee; moxa stick moxibustion; functional exercise; rehabilitation

全膝关节置换(total knee arthroplasty, TKA)是治疗严重膝关节疾病的常用方法,可以有效缓解关节疼痛、改善关节运动功能。膝骨关节炎(knee osteoarthritis, KOA)多见于中老年人,随着社会老龄化程度的加重, KOA 的发病率逐渐增高。虽然 TKA 治疗严重 KOA 效果良好,但 TKA 的手术创伤较大,术后患者疼痛较为明显,不能早期进行功能锻炼,不利于膝关节运动功能恢复,可增加跌倒风险^[1]。随着快速康复外科理念在骨科临床的应用和发展,TKA 的术后康复要求也逐渐提高,不仅要求减轻患者的疼痛,也要求恢复患膝的运动功能^[2-4]。为此,我们采用艾灸联合功能锻炼对接受 TKA 的 KOA 患者进行了康复治疗,并与单纯采用功能锻炼治疗的临床疗效及安全性进行了比较,现报告如下。

1 临床资料

1.1 一般资料 纳入研究的患者共 240 例,均为 2016 年 5 月至 2017 年 9 月在山东省文登整骨医院住院治疗的患者。男 95 例,女 145 例。年龄 61 ~ 75 岁,中位数 67 岁。左膝 109 例,右膝 131 例。病程 6 个月至 20 年,中位数 28 个月。试验方案经医院医学伦理委员会审查通过。

1.2 纳入标准 ①符合 KOA 的诊断标准^[5];②骨关节炎 Kellgren-Lawrence 影像学分级^[5]为Ⅳ级;③初次行单侧 TKA,手术由同一组医生完成;④年龄 60 ~ 75 岁;⑤体质量指数 18 ~ 32 kg · m⁻²;⑥采用硬膜外麻醉,麻醉前行股神经阻滞;⑦同意参与本研究,并签署知情同意书。

1.3 排除标准 ①股神经阻滞失败者;②合并心脑血管、肝、肾等严重原发性疾病者;③合并中枢神经或周围神经疾病者;④过敏体质或对艾灸过敏者;⑤其他原因不适合康复治疗者。

1.4 退出标准 ①治疗依从性差者;②出现严重不良反应,不能继续参加试验者;③自行退出者。

2 方法

2.1 分组方法 采用随机数字表将符合要求的患者随机分为联合治疗组和功能锻炼组。

2.2 治疗方法 联合治疗组采用艾灸联合功能锻炼治疗,功能锻炼组单纯采用功能锻炼治疗。

2.2.1 艾灸 TKA 后 2 d 开始艾灸。患者取仰卧位,充分暴露患侧膝关节。按照局部取穴与循经取穴相结合的原则,选取足阳明胃经的梁丘穴和足三里穴。准确定位后,将点燃的纯艾条放入艾灸盒内,距离皮肤 2 cm 左右进行温和灸,每个穴位灸 15 min,温度以患者能耐受为度。每日上午 8 时和下午 4 时各灸 1 次,连续治疗 7 d 为 1 个疗程,共治疗 2 个疗程。

2.2.2 功能锻炼 TKA 后 1 ~ 14 d 进行踝泵训练和卧位膝关节主动屈伸锻炼,TKA 后 3 ~ 14 d 进行坐位膝关节主动屈伸锻炼。踝泵训练每组 15 次,每日 10 组。卧位膝关节主动屈伸锻炼,患者仰卧,先尽量伸直膝关节,然后最大程度屈曲膝关节,维持 5 s,再用力伸直膝关节;坐位膝关节主动屈伸锻炼,患者坐于床边,大腿与地面平行,腘窝部紧靠床沿,小腿自然下垂,双足悬空,最大程度屈曲和伸直膝关节,每个动作维持 5 s;每组 10 次,每日 10 组。

2.3 疗效及安全性评价方法 采用徒手肌力检查分级标准^[6]评定下肢肌力:0 级(0 分),肌肉无收缩,肌力为健侧的 0%;1 级(1 分),肌肉有收缩,但不能使关节活动,肌力为健侧的 10%;2 级(2 分),肌肉收缩能使关节在去除重力条件下进行大范围的活动,肌力为健侧的 25%;3 级(3 分),肌肉收缩能使肢体对抗重力进行活动,但不能对抗阻力,肌力为健侧的 50%;4 级(4 分),肌肉收缩能使肢体对抗重力和部分阻力进行活动,肌力为健侧的 75%;5 级(5 分),肌肉收缩能使肢体对抗重力和强大的阻力,肌力为健侧的 100%。采用视觉模拟量表(visual analogue scale, VAS)评定患膝静息痛和运动痛,采用美国特种外科医院(Hospital for Special Surgery, HSS)膝关节功能评分标准^[7]评价患膝运动功能。记录患者首次主动直腿抬高时间、首次下床时间,观察不良反应发生情况。

2.4 数据统计方法 采用 SPSS23.0 统计软件对所得数据进行统计学分析。2 组患者性别的组间比较采用 χ^2 检验,年龄、体质量指数、术前下肢肌力评分、止血带应用时间、手术时间、HSS 膝关节功能评分、首次主动直腿抬高时间、首次下床时间的组间比较均采用 t 检验,2 组患者术后不同时间点膝部静息痛及运动痛 VAS 评分、下肢肌力评分的比较均采用重复测

量资料的方差分析。检验水准 $\alpha = 0.05$ 。

3 结果

3.1 分组结果 符合要求的患者共 240 例,联合治疗组和功能锻炼组各 120 例。2 组患者基线资料比较,差异无统计学意义,有可比性(表 1)。

3.2 疗效及安全性评价结果 联合治疗组 1 例患者,因吸入艾灸烟雾后出现胸闷、咳嗽症状而退出研究;功能锻炼组 1 例患者,因术后 2 d 下床活动跌倒造成假体周围骨折而退出研究。膝部静息痛 VAS 评分,时间因素和分组因素存在交互效应;2 组患者膝部静息痛 VAS 评分总体比较,组间差异有统计学意义,即存在分组效应;术后不同时间点膝部静息痛 VAS 评分的差异有统计学意义,即存在时间效应;2 组患者膝部静息痛 VAS 评分随时间变化均呈下降趋势,但 2 组的下降趋势不完全一致;术后 24 h、48 h、72 h、96 h,联合治疗组的膝部静息痛 VAS 评分均低于功能锻炼组(表 2)。膝部运动痛 VAS 评分,时间因素和分组因素存在交互效应;2 组患者膝部运动痛 VAS 评分总体比较,组间差异有统计学意义,即存在分组效应;术后不同时间点膝部运动痛 VAS 评分的差异有统计学意义,即存在时间效应;2 组患者膝部运动痛 VAS 评分随时间变化均呈下降趋势,但 2 组的下降趋势不完全一致;术后 24 h、48 h、72 h、96 h,联合治疗组的膝部运动痛 VAS 评分均低于功能锻炼组(表 3)。下肢肌力评分,时间因素和分组因素存在交互效应;2 组患者下肢肌力评分总体比较,组间差异有统计学意义,即存在分组效应;术后不同时间点下肢肌力评分的差异有统计学意义,即存在时间效应;2 组患者下肢肌力评分随时间变化均呈增高趋势,但 2 组的增高趋势不完全一致;术后 24 h、48 h、72 h、96 h,联合治疗组的下肢肌力评分均大于功能锻炼组(表 4)。联合治疗组的首次主动直腿抬高时间及首次下床时间均短于功能锻炼组,术后 7 d HSS 膝关节功能评分高于功能锻炼组(表 5)。2 组患者均未出现恶心、呕吐、肢体麻木及皮肤烫伤等不良反应。

意义;术后 72 h、96 h,联合治疗组的膝部运动痛 VAS 评分均低于功能锻炼组(表 3)。下肢肌力评分,时间因素和分组因素存在交互效应;2 组患者下肢肌力评分总体比较,组间差异有统计学意义,即存在分组效应;术后不同时间点下肢肌力评分的差异有统计学意义,即存在时间效应;2 组患者下肢肌力评分随时间变化均呈增高趋势,但 2 组的增高趋势不完全一致;术后 24 h、48 h、72 h、96 h,联合治疗组的下肢肌力评分均大于功能锻炼组(表 4)。联合治疗组的首次主动直腿抬高时间及首次下床时间均短于功能锻炼组,术后 7 d HSS 膝关节功能评分高于功能锻炼组(表 5)。2 组患者均未出现恶心、呕吐、肢体麻木及皮肤烫伤等不良反应。

4 讨论

随着 KOA 患者的增多,TKA 的应用逐渐广泛。TKA 术后可出现持续数天或数周的膝部疼痛及无力症状,不利于患肢功能恢复,容易降低患者的满意度^[8]。TKA 术后膝部疼痛的原因主要包括:①手术创伤可引起炎性因子释放,导致疼痛阈值降低;②手术创伤可使脊髓神经元兴奋性增高,出现疼痛过敏^[9];③术后早期进行功能锻炼时股四头肌容易痉挛,可引起患膝疼痛^[10];④术中长时间应用止血带容易压迫软组织,可造成缺血再灌注损伤,致使周围组织水肿,从而出现疼痛症状^[11]。TKA 术后患膝无力的原因主要包括:①术中广泛剥离软组织容易造成膝关节周围

表 1 2 组膝骨关节炎全膝关节置换术后患者的基线资料

组别	样本量 (例)	性别(例)		年龄 ($\bar{x} \pm s$, 岁)	体质量指数 ($\bar{x} \pm s$, $\text{kg} \cdot \text{m}^{-2}$)	术前下肢 肌力评分 ($\bar{x} \pm s$, 分)	止血带 应用时间 ($\bar{x} \pm s$, min)	手术时间 ($\bar{x} \pm s$, min)	术前 HSS 膝关节功能评分 ($\bar{x} \pm s$, 分)
		男	女						
联合治疗组	120	47	73	65.42 \pm 5.61	26.34 \pm 2.14	4.56 \pm 0.21	52.12 \pm 6.78	61.53 \pm 10.56	47.62 \pm 7.46
功能锻炼组	120	48	72	64.95 \pm 6.12	26.07 \pm 1.91	4.61 \pm 0.30	50.89 \pm 7.81	62.68 \pm 10.93	47.30 \pm 7.30
检验统计量		$\chi^2 = 0.093$		$t = 0.185$	$t = 0.639$	$t = -1.009$	$t = 0.235$	$t = 1.594$	$t = 0.204$
P 值		0.761		0.854	0.524	0.317	0.647	0.114	0.839

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表 2 2 组膝骨关节炎全膝关节置换术后患者膝部静息痛视觉模拟量表评分

组别	样本量 (例)	静息痛视觉模拟量表评分($\bar{x} \pm s$, 分)					F 值	P 值
		术后 24 h	术后 48 h	术后 72 h	术后 96 h	合计		
联合治疗组	119	2.59 \pm 0.49	2.54 \pm 0.43	2.09 \pm 0.31	1.99 \pm 0.40	2.34 \pm 0.33	0.890	0.000
功能锻炼组	119	2.70 \pm 0.51	2.68 \pm 0.35	2.64 \pm 0.40	2.26 \pm 0.29	2.59 \pm 0.41	3.625	0.000
合计	238	2.63 \pm 0.50	2.61 \pm 0.38	2.35 \pm 0.36	2.09 \pm 0.35	2.43 \pm 0.40	6.353 ¹⁾	0.000 ¹⁾
检验统计量		$t = -0.311$	$t = -0.324$	$t = 9.335$	$t = 6.640$	10.528 ¹⁾	$F = 13.251^{2)}$, $P = 0.000^{2)}$	
P 值		0.710	0.751	0.000	0.000	0.009 ¹⁾		

1)主效应的 F 值和 P 值;2)交互效应的 F 值和 P 值

表 3 2 组膝关节炎全膝关节置换术后患者膝部运动痛视觉模拟量表评分

组别	样本量 (例)	运动痛视觉模拟量表评分($\bar{x} \pm s$, 分)					F 值	P 值
		术后 24 h	术后 48 h	术后 72 h	术后 96 h	合计		
联合治疗组	119	3.51 ± 0.66	3.13 ± 0.53	2.59 ± 0.39	2.23 ± 0.38	2.98 ± 0.56	5.632	0.000
功能锻炼组	119	3.63 ± 0.73	3.31 ± 0.59	3.08 ± 0.40	2.71 ± 0.39	3.21 ± 0.77	4.850	0.000
合计	238	3.58 ± 0.69	3.23 ± 0.55	2.88 ± 0.39	2.50 ± 0.37	3.01 ± 0.46	5.336 ¹⁾	0.000 ¹⁾
检验统计量		$t = -1.105$	$t = -2.105$	$t = 6.015$	$t = 6.163$	9.283 ¹⁾	$F = 8.741^{2)}$,	
P 值		0.272	0.068	0.000	0.000	0.023 ¹⁾	$P = 0.003^{2)}$	

1) 主效应的 F 值和 P 值; 2) 交互效应的 F 值和 P 值

表 4 2 组膝关节炎全膝关节置换术后患者下肢肌力评分

组别	样本量 (例)	下肢肌力评分($\bar{x} \pm s$, 分)					F 值	P 值
		术后 24 h	术后 48 h	术后 72 h	术后 96 h	合计		
联合治疗组	119	2.68 ± 0.86	3.00 ± 0.78	3.75 ± 0.63	4.08 ± 0.73	3.52 ± 0.58	6.214	0.000
功能锻炼组	119	2.40 ± 0.81	2.54 ± 1.02	3.31 ± 0.67	3.39 ± 0.65	2.96 ± 0.83	2.553	0.000
合计	238	2.51 ± 0.85	2.89 ± 0.80	3.61 ± 0.69	3.91 ± 0.63	3.33 ± 0.24	8.635 ¹⁾	0.000 ¹⁾
检验统计量		$t = 2.184$	$t = 3.390$	$t = 4.535$	$t = 6.119$	12.661 ¹⁾	$F = 10.201^{2)}$,	
P 值		0.029	0.001	0.000	0.000	0.000 ¹⁾	$P = 0.000^{2)}$	

1) 主效应的 F 值和 P 值; 2) 交互效应的 F 值和 P 值

表 5 2 组膝关节炎全膝关节置换术后患者首次主动直腿抬高时间、首次下床时间及术后 7 d HSS 膝关节功能评分

组别	样本量 (例)	首次主动直腿抬高时间 ($\bar{x} \pm s$, h)	首次下床时间 ($\bar{x} \pm s$, h)	术后 7 d HSS 膝关节功能评分 ($\bar{x} \pm s$, 分)
联合治疗组	119	31.03 ± 10.78	25.76 ± 7.00	79.55 ± 7.26
功能锻炼组	119	47.23 ± 15.78	33.12 ± 11.18	70.35 ± 8.10
t 值		-8.462	-8.544	15.041
P 值		0.000	0.000	0.001

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软组织损伤, 致使局部血液循环障碍、新陈代谢减慢, 导致肌张力及肌力下降^[12]; ②术中应用止血带可影响股四头肌的肌张力, 术后容易出现下肢无力症状^[13]; ③股神经阻滞麻醉可影响股四头肌肌力恢复。

目前, 以股神经阻滞麻醉为主的多模式镇痛是 TKA 的常用镇痛方法, 虽然镇痛效果良好, 但容易影响患肢运动神经和感觉神经功能恢复, 不利于早期进行功能锻炼, 且股四头肌肌力下降容易增加跌倒风险^[14-15]。Sharma 等^[16]研究发现, 采用股神经阻滞麻醉的 TKA 患者, 其术后跌倒的发生率为 1.6%。Jaeger 等^[17]招募 12 例男性健康志愿者进行相关研究, 发现股神经阻滞麻醉后志愿者的股四头肌肌力下降 49%。

肌无力属于中医“痿证”范畴, 《素问·痿论》载有: “脾气热, 则胃干而渴, 肌肉不仁, 发为肉痿”, 说明肌肉萎缩或无力与脾胃有关, 因此“治痿者独取阳明”, 而“阳明者, 五脏六腑之海也, 主润宗筋, 宗筋主束骨而利机关也”。足阳明胃经的经脉循行为“以下

髀关, 抵伏兔, 下入膝腘中”, 因此其多数腧穴位于膝关节周围。研究表明, 选取足阳明胃经的相关腧穴进行治疗, 可以缓解膝关节疼痛及无力症状^[18]。梁丘穴是足阳明胃经的郄穴, 足三里穴是足阳明胃经的合穴, 艾灸两穴可以通经活络、调和气血。艾灸是中医传统外治法中的一种, 具有温阳补虚、行气活血、散寒止痛、消瘀散结及拔毒泄热等作用^[19]。艾叶性味苦、辛、温, 具有纯阳之性, 易于燃烧, 且火力温和, 是重要的施灸材料。研究表明, 艾灸可集热疗、光疗和药物治疗于一体, 能有效减轻炎症反应, 提高痛阈值^[20-21]。张强等^[22]研究发现, 电针梁丘、犊鼻、伏兔和足三里穴, 可以减轻动力髌螺钉内固定术后患肢肿胀及疼痛程度, 有助于促进患肢肌力恢复。陈钢等^[23]研究发现, 电针血海、梁丘、犊鼻、内膝眼和阳陵泉穴, 可以减轻 TKA 术后疼痛症状, 能够提高患者对康复训练的积极性, 有助于促进患肢功能恢复。但是笔者认为, 对于接受 TKA 治疗的 KOA 患者, 术后早期不应针刺犊鼻和内膝眼穴, 因为两穴靠近手术切

口,针刺治疗不当容易引起膝关节感染,可于距离切口较远处取穴,并用艾灸代替针刺。

本研究结果表明,对接受 TKA 的 KOA 患者在功能锻炼的基础上进行艾灸治疗,可有效减轻患膝静息痛及运动痛、提高下肢肌力,能够早期进行主动直腿抬高训练、早期下床,有助于促进患膝运动功能恢复,且安全性高。

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