

· 临床研究 ·

放射状体外冲击波穴位疗法对老年膝骨关节炎患者的疗效及作用机制

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【摘要】目的 探讨放射状体外冲击波穴位疗法在老年膝骨关节炎(KOA)患者治疗中的应用价值,并分析其作用机制。**方法** 选择上海中医药大学附属曙光医院2018年1月到2019年6月收治的108例老年KOA患者为研究对象,根据随机数表法将患者分为药物组和冲击波组,各54例。药物组采用药物治疗,冲击波组采用放射状体外冲击波穴位疗法。比较2组治疗前后疼痛视觉模拟评分(VAS)、Lysholm评分、血清超氧化物歧化酶(SOD)、肿瘤坏死因子- α (TNF- α)水平及相关并发症发生率。采用SPSS 20.0统计软件进行数据分析。根据数据类型分别采用 t 检验、方差分析或 χ^2 检验进行组间比较。**结果** 冲击波组治疗后VAS评分低于药物组,治疗后及6个月后Lysholm评分高于药物组($P < 0.05$)。治疗后冲击波组SOD高于药物组, TNF- α 低于药物组($P < 0.05$)。冲击波组并发症发生率与药物组比较,差异无统计学意义($P > 0.05$)。**结论** 与药物治疗相比,放射状体外冲击波穴位疗法能促进关节功能恢复,这可能与其进一步减轻氧化应激与炎症反应有关。

【关键词】 骨关节炎;膝;放射状体外冲击波;超氧化物歧化酶;炎症

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Radial extracorporeal shock wave acupoint therapy for elderly patients with knee osteoarthritis and analysis of its mechanism

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【Abstract】 Objective To explore the application value of radial extracorporeal shock wave acupoint therapy in the treatment of the elderly patients with knee osteoarthritis (KOA) and to analyze its mechanism. **Methods** The study selected 108 elderly KOA patients admitted to Shuguang Hospital Affiliated to Shanghai University of Traditional Chinese Medicine from January 2018 to June 2019. They were randomized into drug group and shock wave group, with 54 in each group. The former was treated with drug therapy, and the latter with radial extracorporeal shock wave acupoint therapy. The visual analogue scale (VAS), Lysholm score, serum superoxide dismutase (SOD), tumor necrosis factor- α (TNF- α) and the incidence of related complications were compared between the two groups before and after treatment. SPSS statistics 20.0 was used for data analysis. According to different data type, t test, analysis of variance or χ^2 test was used for data comparison between two groups. **Results** The VAS score of the shock wave group was lower than that of the drug group after treatment, and the Lysholm score was higher than that of the drug group after treatment and 6 months later ($P < 0.05$). After treatment, the SOD of the shock wave group was higher than that of the drug group, and TNF- α was lower than that of the drug group ($P < 0.05$). There was no statistically significant difference in the complication rate between the shock wave group and the drug group ($P > 0.05$). **Conclusion** Compared with drug therapy, radial extracorporeal shock wave acupoint therapy can promote the recovery of joint function, which may be related to its further reduction of oxidative stress and inflammation.

【Key words】 osteoarthritis, knee; radial extracorporeal shock wave; superoxide dismutase; inflammation

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膝骨关节炎(knee osteoarthritis, KOA)可致病变关节出现钝痛、酸胀、活动受限等症状。有研究认为关节镜清术具有创伤小、安全、可重复等特点,能

促进膝关节症状改善^[1],但也有研究指出该术式并不能改变 KOA 的病程与性质,其临床应用存在争议^[2]。近年来,中医在骨科疾病治疗中取得较大进

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展,如何将中西医理论结合,最大限度提高 KOA 的疗效与治疗安全性是目前的重点研究课题。体外冲击波对关节炎、股骨头坏死有治疗作用,有学者提出利用西医体外冲击波刺激中医理论中的穴位,改善关节不适症状^[3]。本研究对老年 KOA 患者进行放射状体外冲击波穴位疗法治疗,观察其疗效,为临床治疗提供思路,现报道如下。

1 对象与方法

1.1 研究对象

选择上海中医药大学附属曙光医院 2018 年 1 月到 2019 年 6 月收治的 108 例老年 KOA 患者为研究对象,根据随机数表法将患者分为药物组和冲击波组,各 54 例。研究方案获医学伦理委员会批准。(1)纳入标准:年龄 ≥ 60 岁,满足 KOA 诊断标准^[4];仅纳入单膝病变者减少误差;认知、精神状态正常;自愿配合检查,知情同意。(2)排除标准:膝关节畸形;膝关节手术史;肝、肾等系统严重受损;代谢性骨病、骨结核、骨肿瘤等;近 2 周内使用过止痛、消炎、激素类药物;血管神经病史;凝血机制异常;膝关节周围组织伴有感染、炎症。2 组一般资料比较,差异无统计学意义($P>0.05$;表 1),具有可比性。

1.2 方法

(1)药物组:采用塞来昔布与双醋瑞因结合治疗。塞来昔布胶囊(辉瑞制药有限公司,国药准字 J20140072,规格:0.2g/粒)口服,200mg/次,1次/d;双醋瑞因胶囊(昆明积大制药股份有限公司,国药准字 J20150097,规格:50mg/粒)口服,50mg/次,2次/d,疗程 12 周。(2)冲击波组:采用放射状体外冲击波穴位疗法治疗。给予患者气动弹道式体外冲击波仪(MP200 型,瑞士史托斯医疗公司)治疗,患者选择仰卧位,选取标准化穴位,包括太冲、三阴交、昆仑、足三里、血海、阴陵泉、阳陵泉、承山穴,联合痛点阿是穴治疗,频率为 8~12 Hz。参考相关文献^[5]提示单侧冲击可达 3000~3500 次,故每个穴位选择冲击 300 次,每次治疗后间隔 4 d 再接受下一次治疗,疗程为 12 周。

1.3 观察指标

(1)疼痛、功能评分:治疗前后及 6 个月后复查时评估。VAS 评分^[6]:总分为 0~10 分,分值越高,疼痛越重。Lysholm 评分^[7]:包括支撑(5 分)、跛行(5 分)、交锁(15 分)、稳定性(25 分)、肿胀(10 分)、疼痛(25 分)、爬楼梯(10 分)、下蹲(5 分)8 个

项目,共计 100 分,分值越高,表明功能恢复越好。(2)血清指标检测:分别在治疗前、治疗后 6 个月采集 4 ml 空腹静脉血,以 4000 转/min 转速离心,时间 10 min,离心半径 8 cm,取上清液存放 -70°C 冰箱待测。经化学比色法检测超氧化物歧化酶(superoxide dismutase, SOD),经酶联免疫吸附法检测肿瘤坏死因子 $-\alpha$ (tumor necrosis factor $-\alpha$, TNF $-\alpha$),试剂盒均购自南京诺尔曼生物。(3)记录 2 组局部感染、神经损伤、皮下淤血发生率。

1.4 统计学处理

采用 SPSS 20.0 统计软件进行数据分析。计量资料采用均数 \pm 标准差($\bar{x}\pm s$)表示,组间比较采用 t 检验或方差分析。计数资料以例数(百分率)表示,组间比较采用 χ^2 检验。 $P<0.05$ 为差异有统计学意义。

2 结果

2.1 2 组患者 VAS、Lysholm 评分比较

2 组患者治疗前 VAS、Lysholm 评分比较,差异无统计学意义($P>0.05$);2 组治疗后及 6 个月后 VAS 评分低于治疗前, Lysholm 评分高于治疗前;2 组 6 个月后 VAS 评分低于治疗后, Lysholm 评分高于治疗后($P<0.05$)。冲击波组治疗后 VAS 评分低于药物组,治疗后及 6 个月后的 Lysholm 评分高于药物组($P<0.05$;表 2)。

2.2 2 组患者血清 SOD、TNF- α 比较

2 组患者治疗前血清 SOD、TNF- α 比较,差异无统计学意义($P>0.05$);治疗后血清 SOD 高于治疗前, TNF- α 低于治疗前,且冲击波组治疗后血清 SOD 高于药物组,而 TNF- α 低于药物组($P<0.05$;表 3)。

2.3 2 组患者并发症发生率比较

2 组患者疾病相关并发症发生率比较,差异无统计学意义($\chi^2=0.177, P=0.674$)。其中冲击波组 1 例患者有 ≥ 2 种并发症,并发症发生率为 2(3.70%);药物组 2 例患者有 ≥ 2 种并发症,并发症发生率为 4(7.41%)。详见表 4。

2.4 典型病例分析

患者李某,女,67 岁,1 个月前,患者运动后出现双侧膝关节酸胀、疼痛,遂就诊行 MRI 检查确诊为膝骨关节炎(图 1A)。首先外用活血止痛药,嘱休息,症状未见缓解,针对其病情行放射状体外冲击波穴位疗法治疗,完成 7 次治疗后,膝关节酸痛症状解除,可持续行走 30 min 以上,无膝关节疼痛。复查 MRI 提示损伤部位恢复良好(图 1B)。

表 1 2组患者基线资料比较

Table 1 Comparison of baseline data between two groups (n = 54)

Group	Gender(n)		Age (years, $\bar{x}\pm s$)	Course of disease (month, $\bar{x}\pm s$)	Affected side(n)		VAS (points, $\bar{x}\pm s$)	Lysholm function (points, $\bar{x}\pm s$)
	Female	Male			Left	Right		
Shock wave	32	22	69.83±5.31	13.53±4.42	23	31	6.23±1.75	47.91±8.69
Drug	34	20	70.42±6.68	15.02±3.86	25	29	6.11±1.62	48.95±9.03
t/χ^2	0.156		0.508	1.866	0.150		0.370	0.610
P value	0.693		0.613	0.065	0.699		0.712	0.543

VAS: visual analogue scale.

表 2 2组患者 VAS 和 Lysholm 评分比较

Table 2 Comparison of VAS and Lysholm scores between two groups (n = 54, points, $\bar{x}\pm s$)

Group	VAS			Lysholm		
	Before treatment	After treatment	6 months later	Before treatment	After treatment	6 months later
Shock wave	6.23±1.75	2.34±0.65 ^{*△}	2.04±0.16 ^{*#}	47.91±8.69	58.93±7.54 ^{*△}	72.39±9.72 ^{*#△}
Drug	6.11±1.62	2.91±0.48 [*]	2.08±0.14 ^{*#}	48.95±9.03	54.04±6.31 [*]	66.45±7.93 ^{*#}
t/F	0.370	5.184	1.383	0.610	3.655	3.480
P value	0.712	0.000	0.170	0.543	0.000	0.001

VAS: visual analogue scale. Compared with before treatment, ^{*} $P < 0.05$; compared with after treatment, [#] $P < 0.05$; compared with drug group, [△] $P < 0.05$.

表 3 2组患者血清 SOD 和 TNF-α 比较

Table 3 Comparison of serum SOD and TNF-α between two groups (n = 54, $\bar{x}\pm s$)

Group	SOD (mIU/L)		TNF-α (ng/ml)	
	Before treatment	After treatment	Before treatment	After treatment
Shock wave	113.92±14.17	160.93±17.52 ^{*#}	35.15±4.72	17.42±3.16 ^{*#}
Drug	116.41±15.30	145.92±18.24 [*]	34.96±3.91	19.78±4.86 [*]
t	0.877	4.361	0.228	2.992
P value	0.382	0.000	0.820	0.004

SOD: superoxide dismutase; TNF-α: tumor necrosis factor-α. compared with before treatment, ^{*} $P < 0.05$; compared with drug group, [#] $P < 0.05$.

表 4 2组患者疾病相关并发症发生率比较

Table 4 Comparison of incidence of disease-related complications between two groups [n = 54, n (%)]

Group	Local infection	Nerve injury	Subcutaneous congestion	≥2 complications	Total
Shock wave	1(1.85)	0(0.00)	2(3.70)	1(1.85)	2(3.70)
Drug	3(5.56)	1(1.85)	2(3.70)	2(3.70)	4(7.41)

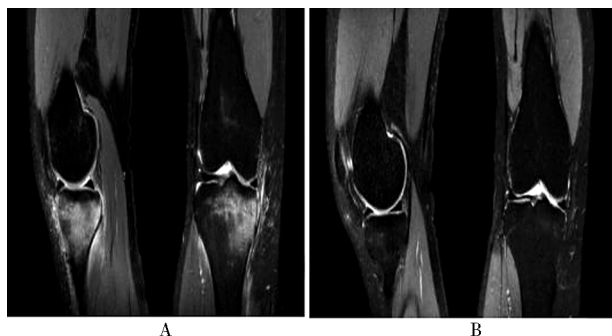


图 1 患者治疗前后 MRI 影像图

Figure 1 MRI images before and after treatment

A: MRI images of the patient before treatment shows massive bone contusion in the upper tibia, grade II injury in the anterior and posterior angles of lateral meniscus of both knees, and a small amount of effusion in bilateral knee joints. B: on MRI images after treatment, the original meniscus injury of knee joint and bone contusion of upper tibia are significantly improved.

3 讨论

KOA 在天气寒冷时易急性发作,可致多种致炎因子水平增高,如 TNF-α 在关节出现炎症后表达增高,促进软骨基质破坏,有利于滑液微晶体生成,进一步加重关节炎程度^[8]。若未能尽早治疗,则会加重局部活动受限与疼痛程度。KOA 属于中医“痹证”范畴,主要特点为活动不利、关节疼痛,病因多为瘀血阻滞、寒湿阻络,中医可通过针灸刺激穴位达到疏通经络的目的。而体外冲击波也能对穴位进行刺激,在腰膝酸软病症治疗中有所应用^[9]。本研究将体外冲击波与中医穴位理论结合,发挥二者优势。

本研究结果显示,与药物组相比,冲击波组总体疗效更好,且治疗后 VAS 评分更低,而疗程结束时及 6 个月后 Lysholm 评分更高。在冲击波穴位治疗

中,医师根据相关理论选择了多个穴位,包括太冲、三阴交、昆仑、足三里、血海、阴陵泉、阳陵泉、承山等下肢主穴,并联合痛点阿是穴治疗。太冲、三阴交、昆仑通气活络、强筋壮骨;足三里调养筋脉,生津活血;血海补气益血,舒经止痛;阴陵泉、阳陵泉为膝周要穴,对筋骨有调养作用;承山是肉与筋骨集结的部位,属于祛湿要穴。通过放射状体外冲击波刺激上述穴位,能补益气血、舒经通脉、疏风散寒、活血止痛,达到标本兼治的目的。关节镜清理术虽然也有一定效果,但不适宜广泛清理,否则可能导致膝关节内环境紊乱,疗效欠佳。

本研究结果显示,与药物组相比,冲击波组治疗后血清SOD明显增高,而TNF- α 降低,表明放射状体外冲击波穴位治疗能减轻氧化应激与机体炎症。承山可祛风寒湿,主治关节不利,经体外冲击波对该穴位进行刺激,能使冲击波的渗透作用增强,更深入地对膝关节内环境予以调节,缓解疼痛,消除肿胀,减轻氧化应激^[10]。阿是穴不存在固定位置,随着病情好转,其穴位点会发生变化,这类穴位点通常与酸麻肿胀等反应有关,经体外冲击波刺激阿是穴,能促进血液循环,疏通经脉,缓解疼痛,促进炎症好转^[11]。因此,采用放射状体外冲击波穴位治疗能更有效减轻KOA患者的氧化应激与炎症反应。本研究结果显示,2组疾病相关并发症率比较,差异无统计学意义,表明2种方案均对并发症发生有一定控制作用。

综上所述,放射状体外冲击波穴位疗法在老年KOA治疗中应用价值较高,其总体疗效优于药物保守治疗,能更有效减轻氧化应激及机体炎症。

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