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关节镜下清理术联合腓骨截骨术治疗膝关节骨性关节炎的疗效及对炎症因子的影响*

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摘要 目的:探讨采用关节镜下清理术联合腓骨截骨术治疗膝关节骨性关节炎(KOA)的疗效及对炎症因子的影响。**方法:**选取2015年3月~2017年12月期间右江民族医学院附属河池医院收治的KOA患者99例,根据手术方式的不同将患者分为A组(n=46,关节镜下清理术治疗)和B组(n=53,关节镜下清理术联合腓骨截骨术治疗),比较两组患者手术时间、术中出血量、住院时间,比较两组术前、术后6个月、术后1年疼痛情况、膝关节功能恢复情况、膝关节相关角,比较两组术前、术后1个月炎症因子变化,记录两组术后并发症发生情况。**结果:**B组手术时间长于A组($P<0.05$),两组术中出血量、住院时间比较无差异($P>0.05$)。B组术后6个月、术后1年视觉疼痛模拟(VAS)评分低于A组,美国特种外科医院(HSS)、膝关节评分及美国膝关节协会(KSS)评分则高于A组($P<0.05$)。两组患者术后1个月白介素-6(IL-6)、肿瘤坏死因子- α (TNF- α)均较术前降低,且B组低于A组($P<0.05$)。B组术后6个月、术后1年膝关节相关角[股骨干与股骨双髁连线夹角(F角)、股骨胫骨角(FT角)、胫股关节间隙角(JS角)]均低于术前以及A组同时点($P<0.05$)。两组术后并发症发生率比较差异无统计学意义($P>0.05$)。**结论:**KOA患者经关节镜下清理术、腓骨截骨术联合治疗后,疗效显著,可有效改善患者疼痛及膝关节功能,降低炎症因子水平,手术方案安全且可改善患者下肢力线。

关键词:关节镜下清理术;腓骨截骨术;膝关节骨性关节炎;疗效;炎症因子

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Effect of Arthroscopic Debridement Combined with Fibular Osteotomy on Knee Osteoarthritis and Its Influence on Inflammatory Factors*

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ABSTRACT Objective: To investigate the efficacy of arthroscopic debridement combined with fibular osteotomy in the treatment of knee osteoarthritis (KOA) and its effect on inflammatory factors. **Methods:** 99 patients with KOA who were admitted to Hechi Hospital Affiliated to Youjiang Medical University for Nationalities from March 2015 to December 2017 were selected, and they were divided into group A (n=46, arthroscopic debridement) and group B (n=53, arthroscopic debridement combined with fibular osteotomy) according to different surgical methods. The operation time, intraoperative bleeding volume and hospitalization time were compared between the two groups. The pain, knee function recovery and knee joint angle were compared between the two groups before operation, 6 months after operation and 1 year after operation. The changes of inflammatory factors before operation and 1 month after operation were compared between the two groups. The incidence of postoperative complications was recorded in the two groups. **Results:** The operation time of group B was longer than that of group A ($P<0.05$). There was no significant difference in intraoperative bleeding volume and hospitalization time between the two groups ($P>0.05$). Visual analogue pain (VAS) score in group B was lower than that in group A at 6 months after operation and 1 year after operation, while Hospital special surgery (HSS), knee joint score and American knee society score (KSS) score were higher than those in group A ($P<0.05$). The levels of interleukin-6 (IL-6) and tumor necrosis factor- α (TNF- α) were lower in the two groups at 1 month after operation than those before operation, and those in the group B were lower than those in the group A ($P<0.05$). The knee joint angle (F angle), femoral tibial angle (FT angle), tibiofemoral joint gap angle (JS angle) of group B were lower than those of before operation and group A at simultaneous time point ($P<0.05$). There was no significant difference in the incidence of complications between the two groups ($P>0.05$). **Conclusion:** Arthroscopic debridement combined with fibular osteotomy in the treatment of KOA has a definite effect. It can effectively relieve pain, improve knee function, reduce the levels of

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inflammatory factors, the surgical procedure is safe and can improve the lower limb force line of patients.

Key words: Arthroscopic debridement; Fibular osteotomy; Knee osteoarthritis; Efficacy; Inflammatory factors

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前言

膝关节骨性关节炎(Knee osteoarthritis, KOA)是以关节软骨损坏、变性及骨质增生为特征的一种慢性疾病^[1-3]。随着我国老龄化社会的到来,该病的发病率呈逐年递增趋势,以往报道指出^[4],在 65 岁以上的群体中,约有 80%的人群患有 KOA 的症状。目前临床治疗 KOA 主要目的为缓解疼痛、改善关节活动度、防止病情进一步恶化,关节镜下清理术可切除炎性滑膜、游离体以及骨赘等,修正破裂的半月板,改善软骨营养供给^[5,6]。然而关节镜下清理术只可治标不可治本,疗效有待改进。张英泽等学者于 2014 年首次提出“不均匀沉降理论”,认为该理论是 KOA 的重要初发因素,并由此理论研究出腓骨截骨术治疗 KOA^[7],但单纯的腓骨截骨术并不能一并解决 KOA 伴发的游离体、骨赘以及半月板损伤等^[8]。鉴于此,本研究通过探讨上述两种手术联合治疗 KOA 患者的影响,以期临床治疗提供参考。

1 资料与方法

1.1 一般资料

选取 2015 年 3 月~2017 年 12 月期间右江民族医学院附属医院河池医院收治的 99 例 KOA 患者,本次研究已获取我院伦理学委员会批准进行。纳入标准:(1)所有患者均表现出 KOA 的临床症状,且经影像学确诊;(2)临床表现为膝关节疼痛、关节活动时伴有骨摩擦音、晨僵 ≤ 30 min、膝关节处有骨性膨大;(3)Kellgren 分级 I~III 级;(4)经保守治疗无效者;(5)患者及其家属知情本次研究且已签署了知情同意书。排除标准:(1)膝关节多间室呈退行性病变者;(2)合并腰椎疾病或下肢瘫痪者;(3)合并糖尿病或者血糖控制不佳者;(4)感染性膝关节疾病者;(5)随访期间失联者。根据手术方式的不同将患者分为 A 组($n=46$)和 B 组($n=53$),其中 A 组男 26 例,女 20 例,年龄 41~72 岁,平均(52.49 ± 3.26)岁;部位:左膝 21 例,右膝 25 例;Kellgren 分级:I 级 17 例,II 级 16 例,III 级 13 例。B 组男 29 例,女 24 例,年龄 42~70 岁,平均(53.08 ± 4.36)岁;部位:左膝 24 例,右膝 29 例;Kellgren 分级:I 级 18 例,II 级 19 例,III 级 16 例。两组患者基线资料对比无差异($P>0.05$),组间可比。

1.2 方法

两组患者术前均完善相关检查,术前 6h 常规禁饮禁食,手术麻醉方式采用硬腰联合麻醉,体位选取平卧位,患者采用安装体位架固定,并将气囊止血带捆扎于患肢大腿中上段,标记好入路位置。A 组给予关节镜下清理术,患肢抬高,手术区域消毒,往关节腔内注入 60 mL 左右的生理盐水,根据手术入路建立关节镜下膝前外、内侧手术入路操作通道,清除关节腔内磨损脱落的软骨碎片及碎屑,修正退变的半月板组织,取出增生的赘生物及游离体,清理结束后用生理盐水冲洗关节腔。B 组在 A 组基础上给予腓骨截骨术治疗,取腓骨头下约 6 cm 处作一长约 5 cm 纵行切口,逐层切开,入路取腓骨长短肌与比目鱼

肌间隙,钝性分离,于腓骨小头下方 10 cm 处,截取腓骨骨段(2.0 cm 左右),随后使用骨蜡封堵断端。两组术后均放置引流管,无菌敷料包扎。术后第 2d 拔除引流管,并松懈弹力绷带,视患者具体情况行膝关节功能锻炼。

1.3 观察指标

比较两组患者手术时间、术中出血量、住院时间。采用门诊复查等方式对患者随访 1 年,于术前、术后 6 个月、术后 1 年采用视觉疼痛模拟(Visual analogue scale, VAS)评分^[9]、美国特种外科医院(Hospital special surgery, HSS)评分^[10]、膝关节评分及美国膝关节协会(American Knee Society Score, KSS)评分^[11]评价患者疼痛情况、膝关节功能恢复情况。VAS 分数 0~10 分,分数越高,疼痛越剧烈;HSS 包括肌力、功能、疼痛、活动度、屈曲畸形、稳定性等 6 项,共 100 分,分数越高膝关节功能越好;KSS 包括稳定性、疼痛、活动范围这 3 个项目,总分为 100 分,分数越高提示膝关节功能越好。分别于术前、术后 1 个月抽取患者膝关节液 2 mL,经 2800 r/min 离心 8 min,离心半径 10 cm,取上清液,置于 -40℃ 冰箱中待测。采用酶联免疫吸附试验检测白介素-6(Interleukin-6, IL-6)、肿瘤坏死因子- α (Tumor necrosis factor- α , TNF- α)水平,试剂盒购自南京建成生物工程有限公司,严格遵守试剂盒操作进行。于术前、术后 6 个月、术后 1 年拍摄患侧膝关节负重位 X 线片,根据患者 X 线片测量膝关节相关角,包括:膝关节相关角[胫股关节间隙角(JS 角)、股骨干与股骨双髁连线夹角(F 角)、股骨胫骨角(FT 角)]。记录两组并发症情况,包括局部切口感染、神经损伤等。

1.4 统计学方法

研究数据录入 SPSS23.0 软件处理,计量资料用均数 $\pm$ 标准差表示,行 t 检验,计数资料以率表示,行卡方检验,检验标准设置为 $\alpha=0.05$ 。

2 结果

2.1 两组患者围术期指标比较

B 组手术时间长于 A 组($P<0.05$),A、B 两组术中出血量、住院时间比较无差异($P>0.05$),详见表 1。

2.2 两组 VAS、HSS、KSS 评分比较

两组术前 VAS、HSS、KSS 评分比较无差异($P>0.05$),两组术后 6 个月、术后 1 年 VAS 评分呈下降趋势,HSS、KSS 评分呈升高趋势($P<0.05$),B 组术后 6 个月、术后 1 年 VAS 评分低于 A 组,HSS、KSS 评分则高于 A 组($P<0.05$),详见表 2。

2.3 两组膝关节液炎性因子比较

术前两组 IL-6、TNF- α 比较无差异($P>0.05$),两组术后 1 个月 IL-6、TNF- α 均较术前降低,且 B 组低于 A 组($P<0.05$),详见表 3。

2.4 两组膝关节相关角比较

两组患者术前 F 角、JS 角、FT 角比较无统计学差异($P>0.05$),A 组术后 6 个月、术后 1 年 F 角、JS 角、FT 角与术前比

较无统计学差异($P>0.05$),B 组术后 6 个月、术后 1 年 F 角、JS 角、FT 角均低于术前以及 A 组同时间点($P<0.05$),详见表 4。

表 1 两组围术期指标比较($\bar{x}\pm s$)
Table 1 Comparison of perioperative indicators between two groups($\bar{x}\pm s$)

Groups	Operation time(min)	Intraoperative bleeding volume (mL)	Hospitalization time(d)
Group A(n=46)	74.23± 8.47	44.12± 5.92	3.15± 0.48
Group B(n=53)	86.59± 9.59	45.24± 4.17	3.27± 0.52
t	6.749	1.099	1.187
P	0.000	0.275	0.238

表 2 两组 VAS、HSS、KSS 评分比较($\bar{x}\pm s$,分)
Table 2 Comparison of VAS, HSS and KSS scores between the two groups($\bar{x}\pm s$, score)

Groups	VAS score			HSS score			KSS score		
	Before operation	6 months after operation	1 year after operation	Before operation	6 months after operation	1 year after operation	Before operation	6 months after operation	1 year after operation
Group A (n=46)	7.53± 0.38	5.38± 0.69 ^a	3.13± 0.35 ^{ab}	48.39± 6.17	54.24± 5.39 ^a	61.45± 6.02 ^{ab}	47.28± 8.48	55.53± 7.38 ^a	62.38± 7.69 ^{ab}
Group B (n=53)	7.48± 0.42	3.43± 0.31 ^a	1.69± 0.28 ^{ab}	47.91± 5.08	58.28± 5.42 ^a	66.05± 5.87 ^{ab}	46.71± 7.09	61.48± 6.42 ^a	70.43± 6.31 ^{ab}
t	0.617	18.541	22.728	0.424	3.708	3.843	0.364	4.290	5.720
P	0.538	0.000	0.000	0.672	0.000	0.000	0.716	0.000	0.000

Note: Compared with before operation, ^a $P<0.05$; compared with 6 months after operation, ^b $P<0.05$.

表 3 两组膝关节液炎症因子比较($\bar{x}\pm s$)
Table 3 Comparison of inflammatory factors in knee joint fluid between two groups($\bar{x}\pm s$)

Groups	IL-6(pg/mL)		TNF-α(pg/mL)	
	Before operation	1 months after operation	Before operation	1 months after operation
Group A(n=46)	68.50± 11.35	31.39± 4.17 ^a	35.24± 5.39	23.45± 4.02 ^a
Group B(n=53)	68.39± 9.28	20.31± 5.08 ^a	34.98± 5.42	15.05± 3.87 ^a
t	0.053	11.749	0.239	10.579
P	0.958	0.000	0.812	0.000

Note: Compared with before operation, ^a $P<0.05$.

2.5 两组并发症比较

A 组术后发生 1 例膝关节内粘连、3 例局部切口感染、1 例神经损伤, 并发症总发生率为 10.87%(5/46),B 组术后发生 5 例局部切口感染、2 例膝关节内粘连、2 例神经损伤, 并发症总发生率为 16.98%(9/53),两组术后并发症发生率比较差异无统计学意义($\chi^2=0.758$, $P=0.384$)。

表 4 两组膝关节相关角比较($\bar{x}\pm s$)
Table 4 Comparison of knee joint correlation angles between two groups($\bar{x}\pm s$)

Groups	F angle(°)			JS angle(°)			FT angle(°)		
	Before operation	6 months after operation	1 year after operation	Before operation	6 months after operation	1 year after operation	Before operation	6 months after operation	1 year after operation
Group A (n=46)	83.59± 5.21	83.65± 4.74	83.68± 4.79	3.14± 0.89	3.09± 0.67	3.11± 0.76	182.57± 3.52	182.27± 3.26	182.28± 8.59
Group B (n=53)	83.40± 4.10	80.47± 5.46 ^a	80.73± 4.71 ^a	3.12± 0.73	1.59± 0.42 ^a	1.52± 0.57 ^a	182.49± 4.49	178.10± 2.92 ^a	178.30± 7.62 ^a
t	0.203	3.071	3.084	0.116	12.042	12.986	0.098	6.713	2.443
P	0.840	0.003	0.003	0.908	0.000	0.000	0.922	0.000	0.016

Note: Compared with before operation, ^a $P<0.05$.

3 讨论

KOA 的病因未明,一般认为该病与年龄、肥胖、劳损、创伤等因素有关,其主要病理改变为软骨损伤,且呈不可逆性^[12,13]。大多数轻症患者可选择保守治疗,然而国外的学者认为^[14,15],KOA 的主要发病原因为骨内高压状态以及机械性因素致使胶原构架分解、蛋白多糖紊乱,故而多倾向于采取手术治疗,以此来消除机械因素、降低骨内压等问题。关节镜下清理术是治疗 KOA 最为流行的术式,创伤小、术后恢复快,但该手术方式对膝关节现有结构无法改变,且无法改善治疗后的关节面应力分布,只能治标无法治本,且伴随着时间的延长易失去疗效^[16-18]。KOA 患者常伴有不同程度的内翻畸形,下肢力线内移,在站立及行走过程中,形成恶性循环^[19,20]。而腓骨近端截骨术可在关节外适当改变下肢生物力线,改善膝关节内侧关节面负荷问题,缓解膝关节疼痛,但因其不能对关节内病变予以处理,单独使用存在一定的局限性^[21-23]。鉴于此,本研究通过设置对照试验,以期 KOA 的临床治疗提供参考。

本次研究结果表明,B 组术后疼痛缓解、膝关节功能改善均优于 A 组,可见关节镜下清理术联合腓骨截骨术治疗 KOA,效果显著,可有效改善膝关节功能,缓解疼痛,分析其原因,关节镜下清理术可使致病的机械因素清除,在一定程度上缓解患者疼痛、恢复患者膝关节功能^[24,25]。同时,在人体正常解剖结构中,因外侧平台与腓骨连接紧密,导致腓骨难以活动,同时完整的腓骨支撑作用将肌肉的收缩作用吸收,而经腓骨近端截骨术截骨后,腓骨近端可在肌肉收缩力的作用下向远端移动,有效拉进胫骨外侧平台与股骨外侧髁的距离,有效减轻内侧间隙压力,进而有效调整关节面负重,使膝关节的负重区域均衡分布,极大的减轻了由内侧间隙变窄损伤造成的疼痛^[26,27]。同时两组患者术后 1 个月 IL-6、TNF- α 均较术前降低,且 B 组低于 A 组,可见该联合治疗可有效减轻膝关节炎性反应,关节镜下清理术中大量的冲洗可改善关节腔内的炎性环境,而腓骨截骨术可巩固关节镜下清理术的治疗效果,抑制炎症反应^[28,29]。临床治疗中,X 线特征是诊断骨关节疾病的重要客观指标,F 角、JS 角、FT 角均可直观的反映 KOA 患者关节形态^[30],本次结果中经关节镜下清理术联合腓骨截骨术治疗的 KOA 患者,其术后 6 个月、术后 1 年 F 角、JS 角、FT 角均低于术前以及 A 组同时时间点,膝关节的相关角下肢力线持续恢复再一次证实了该方案的可行性。另本研究两组术中出血量、住院时间、并发症发生率对比无差异,仅手术时间稍长,可见关节镜下清理术联合腓骨截骨术治疗,创伤较小,安全性佳,患者术后恢复快。

综上所述,KOA 患者经关节镜下清理术、腓骨截骨术联合治疗后,疗效显著,可有效减轻患者疼痛及局部炎症反应,改善下肢力线、膝关节功能,延缓 KOA 的发展。

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(上接第 1969 页)

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