

·临床研究·

全膝关节置换术中髌骨置换与髌骨截骨疗效的病例对照研究

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【摘要】 目的:比较人工全膝关节置换术髌骨截骨和髌骨置换的疗效,为临床治疗提供参考。方法:2004 年 4 月至 2011 年 4 月行人工全膝关节置换术 52 例(54 膝),分为髌骨置换组和髌骨截骨组。髌骨置换组 24 例 24 膝,其中男 13 例,女 11 例,年龄 53~78 岁;髌骨截骨组 28 例 30 膝,男 16 例,女 12 例,年龄 55~79 岁。术后对其进行临床评价,包括膝关节评分(HSS 评分系统),髌骨评分(Feller 评分标准),膝关节活动度(ROM),患者满意度,髌骨相关并发症。结果:术后随访 20~80 个月,平均 56 个月。髌骨置换组 HSS 评分由术前 38.4±8.2 提高为末次随访时的 91.2±8.6,Feller 评分由 13.6±6.2 提高为 25.2±4.2,膝前痛分数由 3.9±3.2 提高为 11.2±3.7,ROM 由(78±26)°提高为(108±18)°。髌骨截骨组 HSS 评分由术前 39.5±8.4 提高为末次随访时的 91.0±8.5,Feller 评分由 13.4±6.5 提高为 25.6±4.0,膝前痛分数由 3.7±3.1 提高为 11.3±3.6,ROM 由(76±27)°提高为(110±19)°。术后满意度髌骨置换组 91%,髌骨截骨组 89%;髌骨相关并发症髌骨置换组 16.7%,髌骨截骨组 10.0%。两组术后 HSS 评分、Feller 评分、膝前痛分数及 ROM 比较差异无统计学意义,患者满意度比较差异无统计学意义,两组髌骨相关并发症比较差异有统计学意义,髌骨截骨组低于髌骨置换组。结论:全膝关节置换术中髌骨置换与髌骨截骨均能明显改善膝关节功能和减轻疼痛,髌骨相关并发症与髌骨的处理方式有关,但术后膝前痛及患者满意度与髌骨的处理方式无关。

【关键词】 关节成形术,置换,膝; 髌骨; 膝关节; 病例对照研究

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Comparison of therapeutic effects between patella replacement and patella osteotomy in total knee arthroplasty: a case-control study TANG Xiao-bo, DONG Pei-long, and WANG Jian. Department of Orthopaedics, Jianhu Hospital Affiliated to Nantong University, Yancheng 224700, Jiangsu, China

ABSTRACT Objective: To compare therapeutic effects between patella replacement and patella osteotomy in total knee arthroplasty. **Methods:** From April 2004 to April 2011, 52 patients (54 knees) were enrolled in the clinical trial of total knee arthroplasty, who received patella replacement (24 knees, including 13 males and 11 females, ranging in age from 53 to 78 years old) or patella osteotomy (30 knees, including 16 males and 12 females, ranging in age from 55 to 79 years old). The average follow-up period was 56 months, ranging from 20 to 80 months. The American HSS Score for knee, the Feller score for patella, range of motion (ROM) for knee, patient satisfaction and complications related to the patella were used to evaluate therapeutic effects. **Results:** In the patella replacement group, the preoperative and final follow-up HSS scores of patients were 38.4±8.2 and 91.2±8.6 respectively; Feller scores were 13.6±6.2 and 25.2±4.2; scores of anterior knee pain were 3.9±3.2 and 11.2±3.7; ROM were (78±26)° and (108±18)°. In the patella osteotomy group, the preoperative and final follow-up HSS scores of patients were 39.5±8.4 and 91.0±8.5 respectively; Feller scores were 13.4±6.5 and 25.6±4.0; scores of anterior knee pain were 3.7±3.1 and 11.3±3.6; ROM were (76±27)° and (110±19)°. In the patella replacement group, patient's satisfaction was 91%, and complication related to the patella was 16.7%; in the patella osteotomy group, patient's satisfaction was 89%, and complications related to the patella was 10.0%. There were no statistically significant differences in final follow-up HSS scores, Feller scores, scores of anterior knee pain and ROM between the two groups. However, there was no significant difference of patient's satisfaction between them. There was statistically significant difference of patella-related complications between the two groups, and the complication rate in the patella replacement group was higher than that in the patella osteotomy group. **Conclusion:** Total knee arthroplasty with patella replacement or patella osteotomy dramatically relieves pain and improves the knee function. Patella-related complications are associated with its treatment methods, but post-operative anterior knee pain and patient's satisfaction are not related to treatment methods of the patella.

KEYWORDS Arthroplasty, replacement, knee; Patella; Knee joint; Case-control studies

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髌骨置换最早出现于 20 世纪 70 年代,降低了全膝关节置换术(total knee arthroplasty,TKA)术后膝前痛发生率,却增加了假体失败、髌骨骨折、关节不稳、髌韧带损伤等并发症。临床上对 TKA 中是否置换髌骨仍存在很大争论,髌骨不置换不意味着无须处理已形成共识。本研究对 2004 年 4 月至 2011 年 4 月 52 例(54 膝)TKA 中两种处理髌骨方式的临床结果进行回顾性分析。

1 资料与方法

1.1 纳入与排除标准 纳入标准:退行性膝关节骨性关节炎或膝关节类风湿性关节炎行单侧或双侧人工全膝关节置换的患者。排除标准:①既往伸膝装置有手术史;②合并下肢其他关节功能障碍的患者;③髌骨半脱位或脱位的患者。

1.2 一般资料与分组 本研究 52 例(54 膝),单膝置换 50 例,双膝同时置换 2 例,骨性关节炎 45 例,类风湿性关节炎 7 例。分两组:髌骨置换组 24 例(24 膝)和髌骨截骨组 28 例(30 膝)。髌骨置换组男 13 例,女 11 例,年龄 53~78 岁;髌骨截骨组男 16 例,女 12 例,年龄 55~79 岁。两组患者术前临床资料比较见表 1,具有可比性。

表 1 两组行全膝关节置换术患者术前临床资料比较
Tab.1 Comparison of peroperative clinical data between two groups of patients receiving total knee arthroplasty

组别	例数(例)	性别(例)		年龄($\bar{x}\pm s$,岁)
		男	女	
髌骨置换组	24	13	11	65.4±12.6
髌骨截骨组	28	16	12	67.3±11.9
检验值	-	$\chi^2=0.19$		$t=0.12$
P 值	-	>0.05		>0.05

1.3 手术方法 人工关节假体均为美国精技公司的不保留后交叉韧带的后方稳定型假体,髌骨表面置换采用骨水泥固定的全聚乙烯假体,股骨及胫骨假体用骨水泥固定。手术在硬膜外或全身麻醉下由同一主刀医师完成,大腿上充气止血带,膝前正中纵行切口,髌内侧进入关节,切除滑膜、半月板及交叉韧带,部分切除髌下脂肪垫。根据患者情况松解内外侧副韧带及后关节囊以取得软组织平衡。股骨假体按髌上轴连线,外旋 3°~5°,外翻 6°放置;胫骨假体垂直于胫骨轴线,后倾 5°。电切髌骨周围软组织,部分去除髌骨神经支配。髌骨置换组:平行髌骨的前面截骨,留下的髌骨厚度 1 cm 以上。为了优化髌骨轨道,一般内置髌骨假体,髌骨置换后总厚度不超过原厚度。髌骨截骨组:截除髌骨周围骨赘,截除髌骨外

侧 1~1.5 cm,修整关节面,将髌骨恢复至 Wiberg 形态学分型^[1] II 型,使之与股骨假体滑车匹配,术中以“无拇指技术”评定髌骨轨迹,根据需要行外侧支持带松解。充分止血,术中放置引流管。

1.4 围手术期处理 所有患者接受相同的围手术期的治疗方案。术前 1 d 预防性应用低分子肝素,术前 30 min 静脉应用抗生素至术后 2 d。术后冰袋冷敷,弹性绷带包扎下肢,24~48 h 拔除引流管。术后当天开始膝关节 CPM 锻炼及股四头肌等长训练,术后 24 h 开始部分负重行走,膝关节主动屈伸训练,预防性应用低分子肝素 10~14 d。

1.5 观测指标与疗效评价方法 术后患者均获随访,时间 20~80 个月,平均 56 个月,采用 HSS 评分系统^[2]进行膝关节评分,采用 Feller 等^[3]评分标准进行髌骨评分(满分 30 分,包括膝前痛分数 15 分,功能 10 分,股四头肌肌力 5 分),测量膝关节活动度(ROM)。采用 Barrack 等^[4]制定的问卷调查表对患者满意度进行评价,比较两组髌骨相关并发症。

1.6 统计学处理 采用 SPSS 13.0 软件进行数据处理,应用配对设计定量资料的 *t* 检验比较两组手术前后 HSS 评分、Feller 评分、膝前痛分数和 ROM。应用 χ^2 检验对术后两组患者满意度及髌骨相关并发症进行比较。应用成组设计定量资料的 *t* 检验比较两组 HSS 评分、Feller 评分、ROM 和膝前痛分数。以 *P*<0.01 为差异有统计学意义。

2 结果

2.1 两组患者术前术后各项评分比较 两组术前术后 HSS 评分、Feller 评分、膝前痛分数及 ROM 比较结果见表 2。髌骨置换组和髌骨截骨组术后末次随访时 HSS 评分、Feller 评分、膝前痛分数及 ROM 均较术前提高,但术前和术后末次随访时两组间比较差异均无统计学意义。

2.2 两组患者满意度和并发症比较 髌骨置换组患者满意度 91%,髌骨截骨组患者满意度 89%,两组比较, $\chi^2=1.028, P>0.01$ 。髌骨置换组术后末次随访时髌骨骨折 1 例,假体松动 2 例,髌骨半脱位 1 例;髌骨截骨组术后末次随访时髌骨骨折 1 例,髌骨弹响 2 例。两组相关并发症比较, $\chi^2=-11.628, P<0.01$,髌骨截骨组并发症发生率低于髌骨置换组。髌骨截骨典型病例见图 1。

3 讨论

刘兴炎等^[5]发现,TKA 能明显减轻疼痛和改善膝关节的功能。本研究发现两组患者术前及末次随访时 HSS 评分、Feller 评分、膝前痛分数及 ROM 均提高,表明 TKA 能明显改善膝关节功能和减轻膝关节疼痛。

表 2 两组行全膝关节置换术患者术前与末次随访时各项指标比较($\bar{x}\pm s$)

Tab.2 Comparison of each index between two groups of patients receiving total knee arthroplasty before operation and at the final follow-up($\bar{x}\pm s$)

组别	例数 (例)	术前				术后末次随访			
		HSS(分)	Feller 评分(分)	膝前痛分数(分)	ROM(°)	HSS(分)	Feller 评分(分)	膝前痛分数(分)	ROM(°)
髌骨置换组	24	38.4±8.2	13.6±6.2	3.9±3.2	78±26	91.2±8.6 ^{a1}	25.2±4.2 ^{a2}	11.2±3.7 ^{a3}	108±18 ^{a4}
髌骨截骨组	28	39.5±8.4	13.4±6.5	3.7±3.1	76±27	91.0±8.5 ^{b1}	25.6±4.0 ^{b2}	11.3±3.6 ^{b3}	110±19 ^{b4}
t 值	-	0.457	0.148	-0.185	0.487	7.123	2.254	1.723	5.784
P 值	-	0.518	0.912	0.896	0.639	>0.01	>0.01	>0.01	>0.01

注:与术前比较,^{a1}t=-35.453,P<0.01;^{a2}t=-12.356,P<0.01;^{a3}t=-10.672,P<0.01;^{a4}t=-41.367,P<0.01;^{b1}t=-29.538,P<0.01;^{b2}t=-14.852,P<0.01;^{b3}t=-11.486,P<0.01;^{b4}t=-39.742,P<0.01

Note:Compared with preoperative results,^{a1}t=-35.453,P<0.01;^{a2}t=-12.356,P<0.01;^{a3}t=-10.672,P<0.01;^{a4}t=-41.367,P<0.01;^{b1}t=-29.538,P<0.01;^{b2}t=-14.852,P<0.01;^{b3}t=-11.486,P<0.01;^{b4}t=-39.742,P<0.01



图 1 患者,女,66 岁,右膝骨性关节炎 1a,1b. 术前正侧位 X 线片示右膝关节周围骨质增生变尖 1c. 术前 CT 横断面示髌骨骨质增生明显,向外侧脱位,轨迹异常 1d,1e. 术后正侧位 X 线片示人工全膝关节假体在位 1f. 术后 CT 横断面示髌骨轨迹良好

Fig.1 A 66-year-old female patient with osteoarthritis on the right knee 1a,1b. Preoperative AP and lateral X-ray films showed hyperosteoarthritis of right knee 1c. Preoperative transverse CT image showed patellar hyperosteoarthritis,lateral dislocation,and abnormal trajectory 1d,1e. Postoperative AP and lateral X-ray films showed total knee prosthesis in good position 1f. Postoperative transverse CT image showed normal trajectory

3.1 髌骨处理方式 对 TKA 中髌骨的处理方式至今仍存在争议^[6]。目前 TKA 中髌骨处理的方式有:全部置换髌骨、全部不置换髌骨以及选择性髌骨置换,当髌骨表面软骨尚完好或髌骨厚度<18 mm,则不予置换髌骨^[7]。而选择髌骨不置换时,可以选择行髌骨截骨手术,即截除髌骨周围骨赘,截除髌骨外侧 1~1.5 cm,修整关节面,将髌骨恢复至 Wiberg II 型,使之与股骨假体滑车匹配。在本研究中,术前摄髌骨轴位片或行 CT 检查,评价髌骨形态及轨迹,术中以“无拇指技术”评定髌骨运动轨迹。选择髌骨置换的情况有:术前严重膝前痛者,8 膝;髌骨关节软骨严重破

坏者,12 膝;类风湿性关节炎滑膜严重病变导致关节软骨破坏者,4 膝。不选择髌骨置换而选择截骨的情况有:严重骨质疏松者;髌骨较小者;髌骨较薄者(剩余髌骨厚度<1 cm);髌骨关节软骨尚好者。关于髌骨置换患者的选择标准目前仍有相当多的争议,很难找到有关髌骨置换指征的统一意见。

3.2 膝前痛的原因 膝前痛是评价 TKA 效果的重要指标。但膝前痛是多种因素共同作用的结果,不能将术后的膝前痛简单归咎于髌骨置换与否。孙强等^[8]发现髌骨置换与否与膝前疼痛减轻的差别无统计学意义,但却增加了其他并发症,如假体松动、假

体失败、髌骨骨折、髌韧带损伤等。张元民等^[9]研究显示,对骨关节炎患者行 TKA, 术中进行髌骨成形能明显减少术后膝前痛的发生。髌骨周围去神经化并不能改变髌骨形态以及髌骨运行轨迹异常, 无法避免髌股关节高接触应力造成的软骨下骨内压升高^[10]。Bourne 等^[11]研究发现, 无论是否进行髌骨置换, 膝前痛的发生率都在 10% 左右。髌骨形态的不同会对髌骨轨迹产生不同的影响, 髌骨形态异常是髌骨轨迹异常重要原因之一。本研究中的髌骨截骨术是通过截骨后使之恢复至 Wiberg II 型。髌骨 Wiberg I、II 型为稳定型, III、IV 型为不稳定型。罗吉伟等^[12]研究发现, 国人髌骨 Wiberg II 型占大多数 (90%)。本研究中髌骨截骨组术前和末次随访时膝前痛分数相比明显提高, 差异有统计学意义, 说明髌骨截骨确实能减轻膝前痛的发生率, 原因为通过截除髌骨外侧 1~1.5 cm, 使髌骨形态恢复为 Wiberg II 型, 而 Wiberg II 型为稳定型, 恢复了髌骨运行轨迹, 减低了软骨下骨内压, 从而降低了膝前痛的发生率。两组术后膝前痛分数及患者满意度比较, 差异无统计学意义, 说明了术后膝前痛与髌骨的处理方式无关。

3.3 髌骨相关并发症 髌骨相关并发症包括: 髌骨骨折, 假体松动, 髌骨坏死, 髌骨半脱位及脱位, 髌骨弹响等。髌骨置换组术中创伤较大, 且是平行髌骨的前面截骨, 截骨较多, 对髌骨周围血供破坏较多, 术中使用骨水泥固定髌骨假体; 而髌骨截骨组改变了髌骨形态, 恢复了髌骨运行轨迹。故髌骨置换组容易造成髌骨骨折、假体松动、髌骨坏死, 髌骨截骨组术后不易发生髌骨脱位及半脱位, 本研究中两组髌骨相关并发症比较差异有统计学意义, 说明髌骨相关并发症与髌骨的处理方式有关。

通过对本研究的总结及分析, 笔者认为全膝关节置换术中髌骨置换与髌骨截骨均能明显改善膝关节功能和明显减轻疼痛, 髌骨相关并发症与髌骨的处理方式有关, 但术后膝前痛及患者满意度与髌骨的处理方式无关。

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