

· 临床研究 ·

钢丝内固定治疗后交叉韧带胫骨止点撕脱骨折

卢华定, 曾春, 董云旭, 蔡道章, 温小粤

(中山大学附属第三医院骨科, 广东 广州 510630)

【摘要】 目的:应用钢丝通过钻孔牵拉内固定治疗后交叉韧带胫骨止点撕脱骨折,评价疗效。方法:2003 年 1 月至 2009 年 6 月,28 例膝关节后交叉韧带胫骨止点撕脱骨折患者,男 19 例,女 9 例;年龄 16~55 岁,平均 35.3 岁。X 线检查示骨折移位:Ⅱ度 10 例,Ⅲ度 18 例。采用膝关节后内侧倒“L”形入路切开复位,以钢丝内固定治疗,术后可调节支具固定,术后 2 周在 CPM 辅助下膝关节被动伸屈训练,4 周在支具保护下下地部分负重,术后 6 周拆除支具。结果:25 例患者获随访,时间 6~24 个月,平均 15 个月。X 线片示骨折复位满意,所有患者获得骨性愈合,膝关节稳定,Lachman 试验阴性,未发生骨折不愈合和关节僵硬等并发症。伸膝活动度正常,屈膝活动度(136±12)°。采用 Lysholm 膝关节评分法评估,术前(41.80±6.16)分,术后 6 个月(94.10±8.26)分,术前术后比较,差异有统计学意义($t=26.667, P<0.01$)。术后评定优 22 例,良 2 例,可 1 例。结论:应用膝后内侧倒“L”形入路以钢丝内固定治疗后交叉韧带胫骨止点撕脱骨折具有安全有效、内固定可靠、费用少等优点,可有效重建膝关节的稳定,恢复膝关节功能,是治疗后交叉韧带胫骨止点撕脱骨折较理想的选择。

【关键词】 膝关节; 后交叉韧带; 骨折; 骨折固定术,内

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Treatment of tibial avulsion fracture of the posterior cruciate ligament with open reduction and steel-wire internal fixation LU Hua-ding, ZENG Chun, DONG Yun-xu, CAI Dao-zhang, WEN Xiao-yue. Department of Orthopaedics, the 3rd Affiliated Hospital of Sun Yat-san University, Guangzhou 510630, Guangdong, China

ABSTRACT **Objective:** To study the curative effects of the treatment of tibial avulsion fracture of the posterior cruciate ligament with open reduction and steel-wire internal fixation. **Methods:** From January 2003 to June 2009, 28 patients of tibial avulsion fracture of the posterior cruciate ligament were treated with open reduction and steel-wire internal fixation through posteromedial inverted "L" approach. There were 19 males and 9 females with an average age of 35.3 years old ranging from 16 to 55 years. The X-ray examination showed that there were Ⅱ degree displaced in 10 cases and Ⅲ degree in 18 patients. The affected lower extremity was put in a controlled hinge knee brace after operation. The patients were asked to do passive extension and flexion of the knee joint with the assistance of a CPM 2 weeks after operation, and allowed to be partial weight-bearing as tolerated with the hinged brace locked in extension if concomitant injuries allowed 4 weeks postoperatively. The brace were removed 6 weeks later. **Results:** Among them, 25 patients were followed up for 6 to 24 months with an average of 15 months. The X-ray examination showed satisfactory reduction, and bony union was obtained in all the patients. The Lachman test was negative in all patients. No complications such as malunion or joint stiffness were found. The extension of affected knee was normal and its flexion were (136±12)°. According to Lysholm knee score system, it was preoperatively (41.80±6.16) and (94.10±8.26) six months after surgery respectively. Twenty-two cases were excellent, 2 cases good and 1 fair. **Conclusion:** Treatment of tibial avulsion fracture of the posterior cruciate ligament with open reduction and internal fixation with wires through posteromedial inverted "L" approach is a safe, effective method, due to its stable fixation and relatively low expense. It is believed as an ideal choice for tibial avulsion fracture of the posterior cruciate ligament.

KEYWORDS Knee joint; Posterior cruciate ligament; Fractures; Fracture fixation, internal

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后交叉韧带 (posterior cruciate ligament, PCL) 胫骨止点撕脱骨折是 PCL 损伤中最常见的一种类型。近年来随着体育运动的普及以及交通事业的迅猛发展,高能量损伤导致的 PCL 胫骨止点撕脱骨折也有

增多趋势。保守治疗往往会因复位困难或者复位不全导致后交叉韧带松弛,引起膝关节后向不稳及旋转不稳,并进一步导致膝关节创伤性关节炎,严重影响膝关节功能^[1-2]。手术治疗方法较多,包括开放或关节镜下缝合或螺钉固定等,传统膝后正中“S”状切口显露复杂,螺钉对小骨块撕脱固定欠牢固,缝线固定骨块稳定性不好,早期功能锻炼受限。关节镜下操

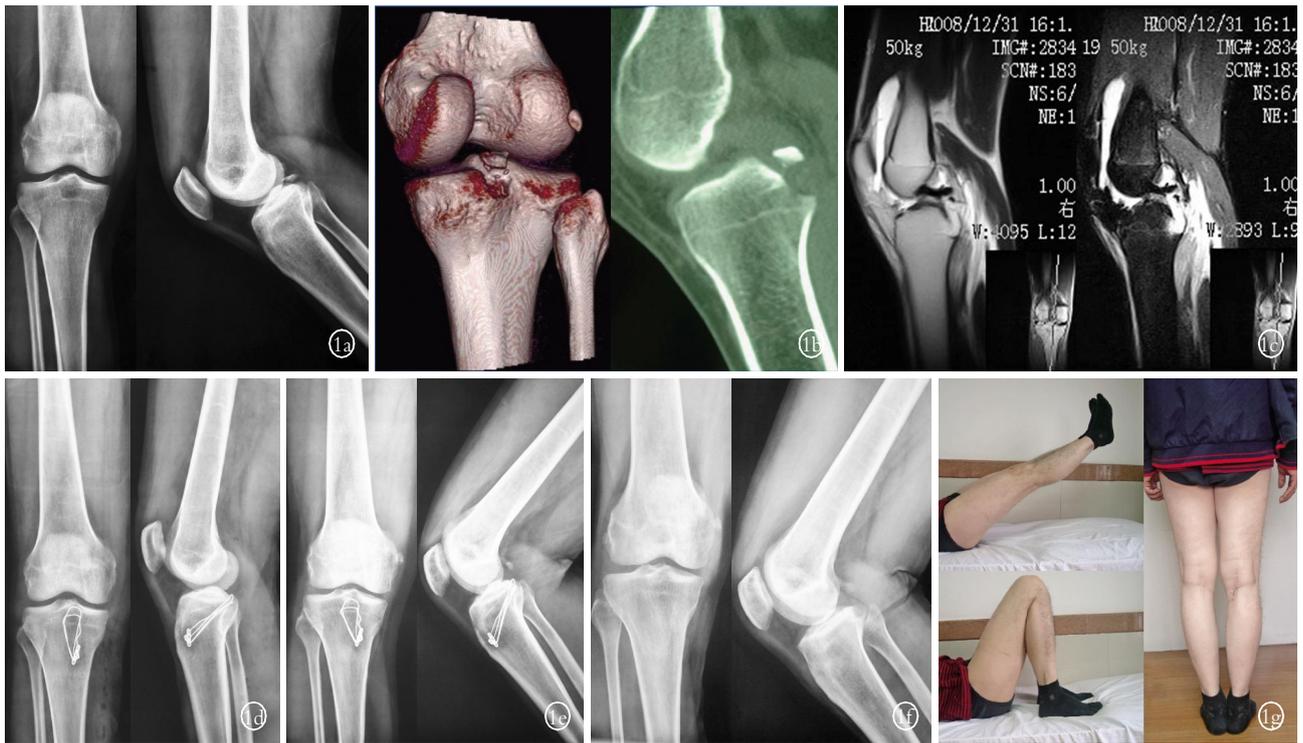


图 1 男, 37 岁, 膝关节外伤后疼痛, 伸直受限, 体检后抽屉试验阳性 **1a-1c.** 术前正侧位 X 线片 (1a)、CT (1b)、MR (1c) 示后交叉韧带胫骨止点撕脱骨折, 骨折块向上方移位 **1d.** 术后 X 线片示骨折复位满意 **1e.** 术后 3 个月骨折愈合 **1f.** 术后 4 个月拆除钢丝 **1g.** 术后 3 个月患膝关节活动良好

Fig.1 A 37-year-old man with knee joint pain after injury, knee extension limited and posterior drawer test positive **1a-1c.** AP and lateral X-ray (1a), CT (1b) and MR (1c) showed PCL avulsion fracture, and the fragment displaced upward **1d.** Postoperative X-ray showed satisfactory reduction of the fracture **1e.** X-ray showed bone united 3 months after operation **1f.** The wires were removed 4 months after operation **1g.** Range of motion 3 months after operation showed full active extension and satisfactory range of motion of the affected knee

宜选择安全而简单有效的方法。传统的膝关节后正中“S”形切口须解剖腘窝部的重要血管、神经, 操作费时, 存在损伤血管、神经的可能; 为了充分暴露后交叉韧带的胫骨止点, 常需分离或切断部分腓肠肌的内侧头, 导致术后腓肠肌无力^[4-5]; 或致迟发性血管损伤^[6]、瘢痕粘连压迫神经等, 目前已较少使用。20 世纪 80 年代中后期开始采用关节镜下或关节镜辅助下进行 PCL 胫骨止点撕脱骨折复位螺钉或缝合线及钢丝内固定^[7-8], 关节镜下手术避免了切开腘窝组织, 可同时探查膝关节内合并损伤, 以及可通过缝合线固定小骨折片, 手术创伤小, 为许多学者所推崇。但手术须同时建立膝关节前侧及后内、后外侧入路, 由于患者体位和关节内后纵隔对骨折端显露的影响, 使得通过后内、外侧入路进行的操作较为繁琐, 存在陡峭的学习曲线^[9]; 也不能完全消除血管神经损伤的风险; 而且并不适合膝部软组织损伤严重的患者, 因术中液体外渗不仅影响视野, 而且存在引发骨筋膜室综合征的可能^[5]。对于大的完整骨块尚好操作, 如果撕脱骨折为 2~3 块的粉碎性骨折, 操作十分困难、费时, 较难普及。我们认为, PCL 胫骨止点撕脱骨折的关节镜下手术尤需以掌握可靠的开放手

术技术为基础。本组采用膝后内侧倒“L”形切口, 沿腓肠肌内侧头与半膜肌间隙进入, 向外侧牵开腓肠肌内侧头, 无须解剖血管神经, 粗大的肌腹可以保护腘窝神经血管, 切口较小, 操作简便、省时, 创伤小, 术后关节功能恢复快^[10]。其主要缺陷是难以充分显露后交叉韧带的胫骨后外侧附着部及后外侧关节囊, 因粗大的腓肠肌肌腹的阻挡, 常难以在后外侧垂直于骨折面钻孔, 如采用螺钉固定, 可导致固定不稳定^[5-6]。因此, 对骨折块靠近后外侧部时, Jazayeri 等^[4]采用纵向分离腓肠肌内侧头肌纤维入路, 不仅可保护腘窝神经血管, 并可获得充分显露。

3.2 内固定物选择 PCL 胫骨止点撕脱骨折可用松质骨螺钉、可吸收钉、钢丝或缝合线固定。螺钉可用于大的骨折块, 但对于撕脱骨折块小或有多个骨折块的患者, 螺钉固定很困难, 且螺钉的二次手术取出仍需分离膝关节后方形成的瘢痕组织。Shino 等^[9]报道了螺钉激惹现象, 患膝在深屈曲位出现疼痛, 提倡所有患者取出螺钉, 并介绍了关节镜下由前向后螺钉固定 PCL 撕脱骨块。可吸收螺钉的应用虽然免去二次手术取钉, 但存在价格昂贵及固定不够坚强的缺点, 不利于膝关节早期康复训练。杨永兴等^[11]对

影响可吸收螺钉固定 PCL 撕脱骨折疗效的原因进行了分析,认为撕脱骨块过小不能牢固固定、可吸收螺钉钉帽断裂、术后外固定拆除过早造成膝关节不稳是导致疗效不佳的主要原因,要求在屈膝 30°位外固定 6 周后拆除,因可吸收螺钉抗扭转作用较差,外固定拆除后早期不宜进行四肢旋转运动。应用双股钢丝内固定可对螺钉固定困难的小骨折块或同时有多个骨折块的患者进行良好的复位固定,可将骨折块加压于骨缺损处,坚强牢固。另外,骨折愈合后钢丝取出容易,只需在胫前内侧做小切口即可,适合在基层医院推广。如采用缝合线固定,在缝线通过骨隧道及打结过程中有出现断裂及拉紧程度有限的缺点^[12],我们体会难以达到骨折块之间的加压,固定不够坚强。

3.3 手术体会和注意事项 ①骨折块须解剖复位,以免韧带松弛。②对于与韧带相连的细小骨块,不予轻易除掉,用线缝合于原位及关节囊,尽量以钢丝横跨于骨折块,尽可能多地恢复交叉韧带的止点,增强术后疗效。③由于钢丝横跨骨折块,无论骨折块大小或粉碎,均可采用本法。但由于钢丝强度有限,不能选择过细的钢丝,术中在胫前皮下扭结钢丝时,应同时观察钢丝压迫骨折块的紧张度,适可而止,以免钢丝扭结处发生断裂。④术中以前交叉韧带重建定位器导向钻孔,两个骨隧道出口之间应距离 1 cm 左右,为防止骨吸收后出现固定松动,我们将 2~3 孔的指骨小钢板置于胫骨前,钢丝穿过钢板螺钉孔扭结。⑤对青少年骨骺线未闭合者,应先于胫骨前内侧做约 2 cm 纵行切口,直视下看见骺板软骨后,再于上方定位穿克氏针。⑥由于钢丝易发生金属疲劳断裂,因此,密切随访,骨折一旦愈合,应尽早去除钢丝,时间在术后 4~6 个月为宜。

3.4 术后康复 PCL 胫骨止点撕脱骨折固定时间过长,易致膝关节僵硬,术后早期功能锻炼对关节功能康复至关重要,在稳定固定的前提下,可调式支具的应用及 CPM 辅助下的膝关节活动锻炼有效促进膝关节功能康复^[6]。本组患者在合并伤允许的情况下,在支具保护下早期进行膝关节活动锻炼,功能恢复满意。

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