

关节镜下桡侧腕短伸肌腱松解联合富血小板血浆治疗慢性肱骨外上髁炎的临床疗效

黄子帅^{1,2}, 张树昂^{1,2}, 王建旭^{1,2}, 杨光², 王健², 丰浩田²

(1. 山东第一医科大学, 山东 济南 250117; 2. 山东第一医科大学附属省立医院骨关节科, 山东 济南 250021)

摘要: **目的** 探讨关节镜下桡侧腕短伸肌腱(extensor carpi radialis brevis, ECRB)松解联合富血小板血浆(platelet-rich plasma, PRP)注射治疗慢性肱骨外上髁炎的临床疗效及安全性。**方法** 回顾性分析2023年9月至2024年3月山东第一医科大学附属省立医院骨关节科收治的慢性肱骨外上髁炎患者20例。根据患者意愿,10例采用关节镜下 ECRB 松解联合 PRP 注射治疗 (PRP 组), 10 例采用单纯关节镜下 ECRB 松解 (松解组)。比较两组患者术前及术后6个月视觉模拟评分(visual analogue scale, VAS)、MAYO 肘关节功能评分(MAYO elbow-performance score, MEPS)、美国肩肘外科医师评分(American shoulder and elbow surgeons score, ASES-S), 以及术后重返工作的时间和并发症。**结果** 两组患者术后6个月的静息VAS评分、活动VAS评分、MEPS评分、ASES-S评分均较术前显著改善($P < 0.01$)。术后6个月两组患者静态VAS评分[(0.40±0.70) vs. (0.60±0.52)]和动态VAS评分[(0.40±0.52) vs. (0.80±0.63)], 差异无统计学意义($P > 0.05$), 术后6个月PRP组的MEPS评分[(94.40±0.52) vs. (92.90±0.88)]和ASES-S评分[(90.60±0.70) vs. (89.60±0.84)]均显著优于松解组, 差异有统计学意义($P < 0.05$)。所有患者末次随访均未出现感染、血管神经损伤等并发症。PRP组术后重返工作时间显著早于松解组[(2.52±0.23)周 vs. (3.08±0.40)周, $P < 0.05$]。**结论** 关节镜下 ECRB 松解联合 PRP 注射治疗慢性肱骨外上髁炎可获得满意疗效, 有效改善肘关节疼痛症状及功能, 同时提前复工时间。

关键词: 肱骨外上髁炎; 桡侧腕短伸肌腱; 关节镜; 富血小板血浆; 松解术

中图分类号: R681.7

文献标志码: A

Clinical effect of arthroscopic extensor carpi radialis brevis release combined with platelet-rich plasma in treatment of Lateral epicondylitis of the humerus

HUANG Zishuai^{1,2}, ZHANG Shu'ang^{1,2}, WANG Jianxu^{1,2},

YANG Guang², WANG Jian², FENG Haotian²

(1. Shandong First Medical University, Jinan 250117, Shandong, China; 2. Department of Orthopaedics, Shandong Provincial Hospital affiliated to Shandong First Medical University, Jinan 250021, Shandong, China)

Abstract: Objective To investigate the clinical efficacy and safety of combining arthroscopic extensor carpi radialis brevis (ECRB) tendon release with platelet-rich plasma (PRP) injection for the treatment of chronic lateral epicondylitis. **Methods** This study retrospectively analysed the clinical data of 20 patients diagnosed with chronic humeral epicondylitis, who were admitted to the Department of Orthopaedics, Provincial Hospital Affiliated to Shandong First Medical University between September 2023 and March 2024. Based on the results of doctor-patient communication, 10 cases were treated with arthroscopic ECRB release combined with PRP injection, while the other 10 cases received arthroscopic ECRB release alone. The study compared the visual analogue scale (VAS) scores, MAYO elbow-performance score (MEPS), and american shoulder and elbow surgeons score (ASES-S) both preoperatively and six months postoperatively between the two groups. In addition, the time to return to work and any complications were evaluated. **Results** The resting VAS score, active VAS score MEPS and ASES-S scores of both groups were sig-

nificantly improved six months postoperatively ($P<0.01$). Six months postoperatively, there was no significant difference in static VAS score [(0.40±0.70) vs. (0.60±0.52), $P>0.05$] and dynamic VAS score [(0.40±0.52) vs. (0.80±0.63), $P>0.05$], but MEPS score [(94.40±0.52) vs. (92.90±0.88), $P<0.05$] and ASES-S score [(90.60±0.70) vs. (89.60±0.84), $P<0.05$] in the PRP group were significantly better than those in the release group. No complications, such as infection or vascular and nerve injury, occurred in any patient at the last follow-up. The time to return to work in PRP group was significantly earlier than that in the release group [(2.52±0.23) weeks vs. (3.08±0.40) weeks, $P<0.05$]. **Conclusion** Arthroscopic release of the extensor carpi radialis brevis (ECRB), when combined with platelet-rich plasma (PRP) injection, has been shown to provide satisfactory results in the treatment of chronic lateral epicondylitis. This approach facilitates effective patient recovery, alleviates elbow pain symptoms, improves functional ability, and accelerates the time to return to work.

Key words: Epicondylitis lateralis humeri; Extensor carpi radialis brevis; Arthroscopy; Platelet-rich plasma; Release technique

肱骨外上髁炎是肱骨远端外上髁的桡侧腕短伸肌(extensor carpi radialis brevis, ECRB)肌腱部分骨-肌腱界面的退行性变,由于过度使用和重复性应激活动导致 ECRB 的炎症修复机制失效^[1-2]。目前,非手术治疗仍是治疗的主要手段,包括非甾体抗炎药、矫形治疗、运动疗法和联合富血小板血浆(platelet-rich plasma, PRP)注射^[3]。临床研究表明,PRP 含有大量的生长因子,如血小板源性生长因子(platelet-derived growth factor, PDGF)、转化生长因子 β (transforming growth factor- β , TGF- β)、血管内皮生长因子(vascular endothelial growth factor, VEGF)和胰岛素样生长因子 1(insulin-like growth factor-1, IGF-1)具有促进肌腱愈合的作用,可被用于肱骨外上髁炎治疗,但保守治疗患者约有 5%~10%发展为慢性炎症^[4],最终可能需要手术干预,以缓解限制性症状。目前有多种治疗慢性肱骨外上髁炎的手术技术:经皮治疗、开放手术和关节镜治疗等^[5-7]。然而有研究指出,过度松解导致的 ECRB 医源性损伤可能会对肘部稳定性产生负面影响,仅切除关节囊的方法足以治疗慢性肱骨外上髁炎^[8]。关节镜下 ECRB 松解术能较为全面地检查肘关节、促进快速康复并降低并发症风险^[9-11],但其疗效仍存在争议。本研究探讨关节镜下 ECRB 松解术联合 PRP 术中注射治疗慢性肱骨外上髁炎的临床疗效及安全性。

1 资料与方法

1.1 研究对象

回顾性分析 2023 年 9 月至 2024 年 3 月山东第一医科大学附属省立医院骨关节科 20 例慢性肱骨外上髁炎患者的临床资料,其中男 10 例,女 10 例,35~54 岁,平均(43.85±6.51)岁。10 例采用关节镜

下 ECRB 松解联合 PRP 注射治疗(PRIP 组),10 例采用单纯关节镜下 ECRB 松解(松解组)。纳入标准:①临床诊断为肱骨外上髁炎[肱骨外上髁区压痛,Mills 征(肌腱牵拉试验)阳性;核磁共振检查示肌腱边缘可模糊不清,当肌腱部分撕裂时,可看到水样高信号横穿部分肌腱,使肌腱在形态上变细。当肌腱完全断裂,可看到肌腱连续性中断^[12]];②肘关节和腕关节的活动范围正常;③年龄>18 岁;④保守治疗(包括药物、支具、冲击波、物理治疗)无效的症状至少 6 个月。排除标准:①既往有手术史治疗外上髁炎;②肘关节骨折后遗症,软骨或骨软骨损伤和骨关节炎;③神经功能缺损;④上肢的其他合并症。所有患者术前均签署手术知情同意书。本研究获得山东第一医科大学附属省立医院伦理委员会批准(SWYX:NO.2023-369)。

1.2 方法

1.2.1 手术技术

患者健侧卧位,麻醉成功后,碘伏消毒患侧上肢,无菌手套及黏贴巾包裹手腕至前臂中段,铺设防水无菌巾单,术肢上无菌驱血环,术肢屈肘 90°置于台侧。标准近端前内侧入路进镜(30°镜),见滑膜增生和 ECRB 损伤。使用刨削器清理增生的滑膜,使用刨削器和射频松解并清理 ECRB 止点。通过二步离心法提取 5 mL PRP。在关节镜 ECRB 松解术后,将提取的 PRP 通过前外侧入路注入。缝合切口,加压包扎。术后康复阶段不再注射 PRP。

1.2.2 评价指标

记录两组患者术前及术后 6 个月静态及动态视觉模拟评分(visual analogue scale, VAS)、MAYO 肘关节功能评分(MAYO elbow-performance score, MEPS 评分)和美国肩肘外科医师评分(American shoulder and elbow surgeons score, ASES-S)。随访时询问患者术后重返工作的时间(周)。

通过检查血常规+血清淀粉样蛋白 A+血沉判断患者有无感染,通过缝合前镜下探查及出院前检查上肢肌电图及血管超声评估患者有无血管神经损伤。

1.3 统计学处理

采用 SPSS 29.0 统计学软件。资料呈正态分布

以 $\bar{x}\pm s$ 表示,采用 t 检验进行组间比较;不服从正态分布时以 $M(P_{25}, P_{75})$ 表示,组内手术前后比较采用配对 t 检验。采用 Wilcoxon 秩和检验。 $P<0.05$ 为差异有统计学意义。

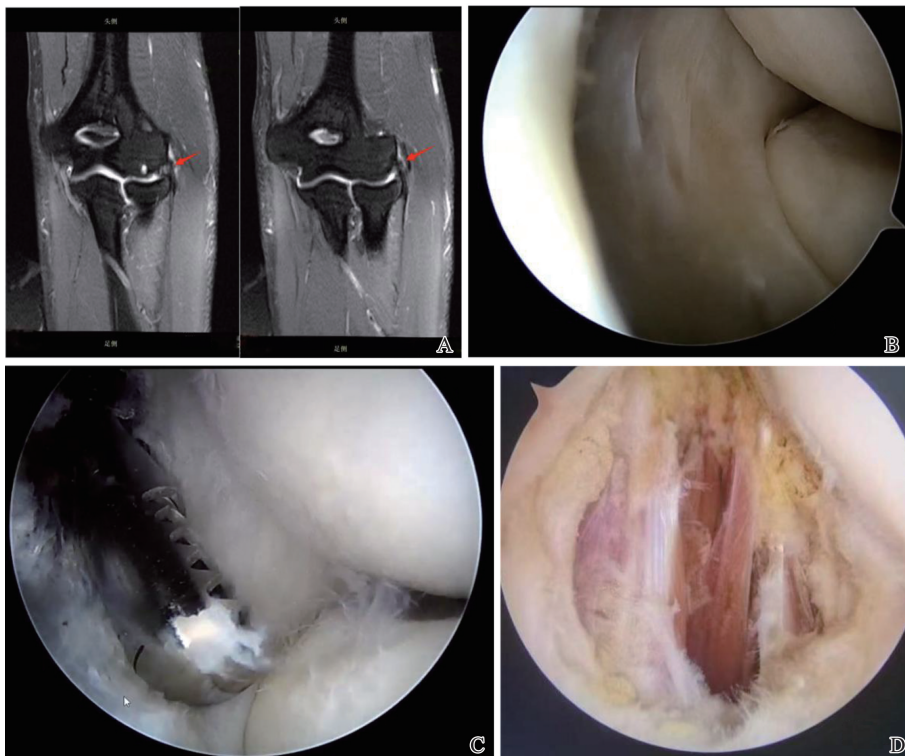


图1 肱骨外上髁炎患者影像学 and 关节镜下表现

A: 患者术前肘关节 MR 示肱骨外上髁 ECRB 附着处存在高信号; B: 关节镜下可见滑膜增生及 ECRB 损伤; C: 使用刨削器松解 ECRB; D: ECRB 松解完成后镜下观。

Figure 1 Imaging and arthroscopic data of patients with lateral epicondylitis of the humerus

A: Preoperative MR of the elbow showed high signal intensity at the ECRB attachment of the lateral epicondyle of the humerus; B: Arthroscopy revealed synovial hyperplasia and damage to the ECRB; C: Release of the ECRB with a刨削器; D: Arthroscopic view after release of the ECRB.

2 结果

2.1 两组患者一般资料比较

两组患者年龄、体质量指数 (body mass index, BMI)、病程、性别比例以及损伤侧别均差异无统计学意义 ($P>0.05$)。见表 1。

2.2 两组术前与术后 6 个月临床评分的比较

两组患者术后 6 个月 VAS 评分较术前显著降

低 ($P<0.001$), 术后 6 个月 MEPS 和 ASES-S 评分较术前显著提升 ($P<0.001$)。PRP 组与松解组相比术前静态及动态 VAS 评分、MEPS 评分和 ASES-S 评分均无明显差异 ($P>0.05$)。两组患者均获 6 个月随访。术后 6 个月 PRP 组静态和动态 VAS 评分相较于松解组差异无统计学意义 ($P>0.05$), PRP 组 MEPS 和 ASES-S 评分显著高于松解组 ($P<0.05$)。见表 2。

表 1 两组患者基本资料比较

Table 1 Comparison of the basic data between the two groups of respondents

指标	PRP 组	松解组	P
年龄/年	41.90±5.51	45.80±6.21	0.155
BMI	24.87±2.59	23.37±2.17	0.178
病程/月	8.70±1.49	8.60±1.58	0.886
性别(男/女)	6/4	4/6	0.371
侧别(左/右)	1/9	3/7	0.264

表2 两组患者术前与术后6个月临床评分组间和组内的比较

Table 2 Between-group and within-group comparisons of clinical scores between the two groups preoperatively and 6 months postoperatively

指标	时间点	PRP 组	松解组	<i>P</i>
静态 VAS	术前	5.50±1.08	5.70±0.82	0.647
	术后 6 个月	0.40±0.70	0.60±0.52	0.476
	<i>P</i>	<0.001	<0.001	
动态 VAS	术前	6.30±1.06	5.90±0.99	0.395
	术后 6 个月	0.40±0.52	0.80±0.63	0.139
	<i>P</i>	<0.001	<0.001	
MEPS	术前	51.60±1.17	52.40±1.51	0.202
	术后 6 个月	94.40±0.52	92.90±0.88	<0.001
	<i>P</i>	<0.001	<0.001	
ASES-S	术前	55.70±1.49	56.00±1.56	0.666
	术后 6 个月	90.60±0.70	89.60±0.84	0.010
	<i>P</i>	<0.001	<0.001	

2.3 两组术后并发症及重返工作时间的比较

两组患者均未出现术后并发症,包括血管神经损伤、感染及下肢深静脉血栓形成。PRP 组手术后返回工作岗位的时间显著低于松解组[(2.52±0.23)周 vs. (3.08±0.40)周, $P<0.01$]。

3 讨论

肱骨外上髁炎的治疗主要以减轻患肢疼痛为目标,同时改善患者的肢体功能和提高生活质量。皮质类固醇注射是目前广泛使用的治疗方法之一,可在数周内显著缓解疼痛症状。研究发现,注射皮质类固醇后的 26 周效果比注射生理盐水较差,在中后期会产生不良影响^[13-14]。与类固醇注射相比,PRP 注射治疗具有良好的长期疗效。类固醇注射短期内(1~2 个月)在缓解疼痛和改善上肢功能方面效果优于 PRP,而在 6 个月及 1 年后,PRP 注射在疼痛缓解和上肢功能改善方面的效果显著优于类固醇,同时,类固醇注射可能带来不良反应,如组织退化^[15-19]。Gautam 等^[20]研究发现,联合 PRP 注射后肌腱形态的改善大于联合皮质类固醇注射后。

非手术治疗超过 6 至 12 个月后无明显改善的患者需要手术治疗。近年研究结果显示,患者术前的 VAS 疼痛评分在休息时为 5.2 分,日常活动时为 6.3 分,而术后休息时降为 1.0 分,日常活动时降为 1.3 分,另一项研究中患者的快速上肢功能评分从术前平均 49.6 分提高到术后 16.5 分^[21-24],表明关节镜下 ECRB 松解术可显著改善肱骨外上髁炎患者的肘关节疼痛症状和功能。本研究两组患者术后 6 个月的静态 VAS 评分和动态 VAS 评分均较术前显著下降,术后 6 个月 MEPS 评分和 ASES-S 评分

均较术前显著提升;所有患者完成手术后均未出现并发症。表明关节镜下 ECRB 松解术在减轻慢性肱骨外上髁炎患者的疼痛、改善患者肘关节功能的同时也具有良好的安全性。研究发现,接受关节镜手术的肱骨外上髁炎患者满意度和返回工作岗位时间均显著优于接受开放手术的患者^[25]。Li 等^[26]研究发现,关节镜下 ECRB 松解术同时清创肘关节外侧副韧带相较于单纯松解 ECRB 不会影响患者满意度和返回工作岗位时间。本研究结果显示,联合 PRP 组患者术后 6 个月的 VAS 评分与松解组相比无明显差异,但前者具有较高的 MEPS 评分和 ASES-S 评分,以及较短的重返工作时间。表明关节镜下 ECRB 松解联合 PRP 注射治疗慢性肱骨外上髁炎在缓解疼痛方面与单纯松解无明显差异,然而,前者能够有效地促进肘关节功能的恢复,并缩短重返工作所需时间。目前,针对慢性肱骨外上髁炎患者治疗后恢复工作所需的时间尚未形成统一的标准,从 1~24 周均有报道^[27-28]。Solheim 等^[29]研究发现,轻体力劳动者一般可以在 2~4 周内复工;而对于重体力劳动者,复工所需的时间往往延长至 8~12 周。本研究参与者大部分为轻体力劳动者,平均复工时间为 2~3 周,与之前研究一致。在一项动物实验中,刘斌钰等^[30]发现 PRP 能促进大鼠颅骨新生血管形成,促进颅骨缺损修复。这或许是本研究中 PRP 组具有较短复工时间的原因。

本研究尚存在一些不足之处:①本研究是回顾性研究,可能会引入选择偏倚,所涉及的病例数量较为有限,且随访时间较短,研究结果需要通过多中心的随机前瞻性研究进行进一步验证;②目前如何确定 PRP 中的血小板浓度尚缺乏统一标准,而 PRP 注射的次数以及制备标准也存在差异,这些因素都

可能削弱本研究的可信度。③每个肱骨外上髁炎患者的病因及损伤机制可能存在差异,如何将患者的个人身体素质、病程长短和具体发病机制与治疗结合,以提高关节镜下 ECRB 松解联合 PRP 注射的临床疗效尚需进一步研究。

综上所述,关节镜下 ECRB 松解术联合 PRP 注射治疗慢性肱骨外上髁炎,能够有效缓解疼痛,促进肘关节功能恢复,具有良好的临床疗效与安全性。与单纯 ECRB 松解相比,该方案可以缩短重返工作所需的时间。

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