

· 老年人骨质疏松骨折专栏 ·

保留旋前方肌掌侧微创入路治疗老年桡骨远端骨折的效果

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【摘要】目的 对比保留旋前方肌掌侧微创入路与传统 Henry 入路治疗老年桡骨远端骨折的临床疗效。**方法** 选取 2016 年 1 月至 2019 年 1 月在航天中心医院骨科住院治疗的老年桡骨远端骨折患者 46 例进行回顾性分析。依据治疗方法分为 2 组: 微创组和对照组, 每组各 23 例。微创组采取保留旋前方肌掌侧微创入路锁定钢板螺钉内固定术; 对照组采取传统切开旋前方肌 Henry 掌侧入路钢板螺钉内固定术。比较 2 组患者手术切口长度、术中出血量、手术并发症、术后住院时间、骨折复位情况(掌倾角和尺偏角)及术后 3 个月腕关节功能恢复情况。采用 SPSS 20.0 软件进行数据处理。依据数据类型, 组间比较采用 *t* 检验或 χ^2 检验。**结果** 与对照组相比, 微创组患者的切口长度[(2.4±0.3)和(7.2±1.4)cm]、术中出血量[(13.2±2.1)和(31.2±4.1)ml]和术后住院时间[(4.6±0.9)和(7.5±1.2)d]均显著减少($P<0.05$)。2 组患者术后均未发生手术并发症。微创组患者术后 3 个月的视觉模拟量表(VAS)评分显著低于对照组[(0.5±0.2)和(2.2±0.4)分, $P<0.05$], 而 Gartland-Werley 评分达优率(95.65% 和 73.91%)和腕关节旋前角度(83.8°±10.8° 和 74.6°±9.5°)均显著高于对照组($P<0.05$)。**结论** 保留旋前方肌掌侧微创入路钢板螺钉内固定治疗老年桡骨远端骨折的疗效较好, 且手术切口小, 术中出血量少, 术后 3 个月腕关节整体功能恢复好。

【关键词】 老年人; 旋前方肌; 桡骨远端骨折; 微创

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Curative effect of minimally invasive approach with preservation of palmar side of pronator quadratus in treatment of distal radius fracture in the elderly

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【Abstract】 Objective To compare the clinical efficacy of minimally invasive surgery with preservation of palmar side of pronator quadratus *versus* traditional Henry approach in the treatment of distal radius fractures in the elderly. **Methods** A retrospective study was carried out on 46 elderly patients with distal radius fracture treated in our department from January 2016 to January 2019. The patients were divided into minimally invasive group and control group, with 23 cases in each group. The minimally invasive group was treated by internal fixation with locking plate and screw and preservation of pronator quadratus, while the control group was treated with traditional open Henry volar approach of pronator quadratus muscle combined with internal fixation of plate and screw. The length of incision, intraoperative bleeding volume, complications, length of hospital stay, reduction of fracture and wrist joint function in 3 months after operation were compared between the two groups. SPSS statistics 20.0 was used to perform the statistical analysis. Student's *t* test or Chi-square test was employed in intergroup comparison for different data types. **Results** Compared with the control group, the incision length [(2.4±0.3) *vs* (7.2±1.4)cm] and the intraoperative bleeding volume [(13.2±2.1) *vs* (31.2±4.1)ml] were significantly less, and postoperative length of hospital stay [(4.6±0.9) *vs* (7.5±1.2)d] was obviously shorter in the minimally invasive group ($P<0.05$). No postoperative complications occurred in both groups. The visual analogue scale (VAS) scores of the patients were notably lower in the minimally invasive group than the control group [(0.5±0.2) *vs* (2.2±0.4), $P<0.05$], while the rates of the patients with better Gartland-Werley scores (95.65% *vs* 73.91%) and the wrist pronation angles [(83.8°±10.8°) *vs* (74.6°±9.5°)] were significantly larger in the former group than the latter group ($P<0.05$). **Conclusion** Minimally invasive surgery with preservation of palmar side of pronator quadratus and internal fixation with locking plate and screw exerts good efficacy in the treatment of distal radius fractures in the elderly, with small incision, less intraoperative bleeding, and sound overall wrist function in 3 months after operation.

【Key words】 aged; pronator quadratus muscle; distal radius fracture; minimal invasion

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桡骨远端骨折约占所有骨折的1/10,桡骨远端骨折患者约占骨科急诊患者的1/5。由于桡骨远端为常见的骨质疏松部位,故老年人更易发生此类骨折,多为平地跌倒的低能量损伤导致。对于不稳定型桡骨远端骨折,手术治疗逐渐成为骨科医师公认的选择。由于固定可靠、操作简便、并发症少等优点,掌侧 Henry 入路钢板螺钉内固定是目前桡骨远端骨折应用最多的经典手术入路。但此入路术中需切开旋前方肌。研究表明^[1],纵向切开旋前方肌后,无论是否缝合,远期肌肉均会发生不同程度瘢痕化,导致肌肉功能不全,失去控制前臂旋前的功能。再者,由于此术式掌侧钢板远端没有旋前方肌的覆盖,易发生拇长屈肌腱断裂等并发症。所以越来越多的学者对 Henry 入路提出了质疑及看法^[2]。研究表明,术中保留旋前方肌非常重要,可减少拇长屈肌腱断裂风险,利于腕关节功能恢复^[3]。此外,随着社会的发展,人们对生活质量的要求不断升高,桡骨远端骨折患者不仅对骨折的复位、愈合、关节功能有较高的要求,还对切口美观、恢复时间等提出了更高的憧憬。航天中心医院骨科应用经掌侧保留旋前方肌微创入路治疗老年桡骨远端骨折患者,取得了良好的临床疗效,现报道如下。

1 对象与方法

1.1 研究对象

选取2016年1月至2019年1月在我科住院治疗的老年桡骨远端骨折患者46例进行回顾性分析。纳入标准:(1)年龄 ≥ 60 岁;(2)经影像学检查确诊为桡骨远端骨折;(3)闭合型骨折;(4)有手术指征:①骨折成角 $>10^\circ$;②桡骨短缩 >5 mm;③关节面塌陷 >2 mm;④掌侧、背侧皮质粉碎性骨折;⑤复位后再丢失;⑥难以复位。排除有手术禁忌证及资料不全的患者。依据治疗方法分为2组:微创组和对照组,每组各23例。微创组采用保留旋前方肌掌侧微创入路治疗,对照组采用传统 Henry 入路治疗。

1.2 手术方法

2组患者均采用臂丛神经阻滞麻醉。微创组患者采用桡动脉和桡侧腕屈肌间隙微创入路,纵向切口最远端距离远端腕横纹2 cm,切口长度约2 cm;自桡侧腕屈肌和桡动脉间隙显露旋前方肌,横向分离旋前方肌浅头桡骨远端止点,适当向近端牵拉,显露骨折;复位骨折,克氏针临时固定;应用小骨膜剥离器自旋前方肌下方和骨膜间钝性分离,建立插入钢板的通道;解剖锁定钢板,经旋前方肌下方插入,应用螺钉内固定(图1);缝合旋前方肌远端止点。对

对照组采用标准的 Henry 入路,切口长度在6~8 cm,沿桡动脉与桡侧腕屈肌间隙进入,显露旋前方肌;纵向切开旋前方肌桡骨侧附着部,复位骨折,解剖锁定钢板螺钉固定;修补旋前方肌。2组患者均采用皮肤内缝合,并在术后第1天开始手指伸屈功能锻炼,术后第2天开始腕关节屈伸和旋转锻炼。

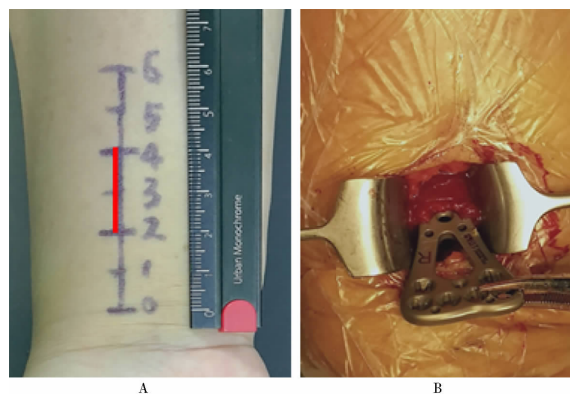


图1 微创入路图示

Figure 1 Illustration for minimally invasive approach

A: preoperative design for incision; B: inserting steel plate under pronator quadratus muscle.

1.3 观察指标

对比2组患者的手术切口长度、手术时间、术中出血量、手术并发症(桡动脉损伤、正中神经损伤、伤口感染、骨折延迟愈合及不愈合)、术后住院时间、骨折复位情况(掌倾角和尺偏角)及术后3个月腕关节恢复情况(疼痛评分、腕关节功能、腕关节旋前及旋后角度)。采用 Gartland-Werley 评分^[4]评价腕关节功能:0~2分为优;3~8分为良;9~20分为可;20分以上为差。采用视觉模拟量表(visual analogue scale, VAS)评分评价疼痛情况。

1.4 统计学处理

采用 SPSS 20.0 软件进行数据处理。计量资料以均数 \pm 标准差($\bar{x} \pm s$)表示,组间比较采用 t 检验。计数资料以例数(百分率)表示,组间比较采用 χ^2 检验。 $P < 0.05$ 为差异具有统计学意义。

2 结果

2.1 2组患者基线资料比较

2组患者基线资料比较差异均无统计学意义($P > 0.05$;表1)。

2.2 2组患者围术期情况比较

与对照组相比,微创组患者的切口长度、术中出血量和术后住院时间均显著减少($P < 0.05$;表2)。2组患者术后均未发生桡动脉损伤、正中神经损伤、感染、骨折延迟愈合及不愈合等手术并发症。

表 1 2组患者基线资料比较

Table 1 Comparison of baseline data between two groups (n=23)

Group	Gender (male/female, n)	Age (years, $\bar{x}\pm s$)	AO/ASIF classification[n(%)]				
			A2	A3	B3	C1	C2
Minimally invasive	4/19	71.3±6.8	2(8.7)	6(26.1)	2(8.7)	8(34.8)	5(21.7)
Control	5/18	72.2±7.0	0(0.0)	7(30.4)	3(11.6)	6(26.1)	7(30.4)

AO: Arbeitsgemeinschaft für Osteosynthesefragen; ASIF: Association for the Study of Internal Fixation.

表 2 2组患者围术期情况比较

Table 2 Comparison of perioperative indicators between two groups (n=23, $\bar{x}\pm s$)

Group	Incision length (cm)	Intraoperative bleeding volume (ml)	Operation time (min)	Postoperative length of hospital stay (d)	Palm inclination angle (°)	Ulnar deflection angle (°)
Minimally invasive	2.4±0.3*	13.2±2.1*	53.7±9.1	4.6±0.9*	10.7±1.9	21.4±3.4
Control	7.2±1.4	31.2±4.1	52.4±12.9	7.5±1.2	11.2±1.3	22.3±4.5

Compared with control group, *P<0.05.

2.3 2组患者术后3个月腕关节恢复情况比较

微创组患者术后3个月的VAS评分显著低于对照组患者[(0.5±0.2)和(2.2±0.4)分],差异有统计学意义(P<0.05)。采用Gartland-Werley评分评价患者术后3个月的腕关节功能,结果显示,微创组评分为优者22例,良者1例;对照组评分为优者17例,良者6例。微创组患者Gartland-Werley评分达优率显著高于对照组[95.65%(22/23)和73.91%(17/23),P<0.05]。微创组和对照组患者术后3个月的腕关节旋前角度分别为(83.8°±10.8°)和(74.6°±9.5°),差异有统计学意义(P<0.05);旋后角度分别为(80.7°±10.3°)和(78.7°±9.3°),差异无统计学意义(P>0.05)。微创组典型病例手术前后X线片如图2所示,术后3个月腕关节照片如图3所示。

3 讨论

桡骨远端骨折的治疗目的包括恢复关节面平整、恢复掌倾角和尺偏角等,从而重建桡骨远端解剖结构,恢复腕关节功能。如何以最小的创伤和生理干扰达到最佳的治疗效果,成为医患共同追求的目标。

掌侧Henry入路钢板螺钉内固定是目前桡骨远端骨折应用最多的经典方法,但此入路需切开旋前方肌,旋前方肌是前臂远端的最深层肌肉,由深浅两头组成,具有稳定远侧尺桡关节的作用^[5]。我们在临床中发现,骨折后旋前方肌肿胀,纵向切开肌肉断端回缩,同时,放置钢板会增大肌肉断端距离,很难恢复其原有解剖形态。所以我们认为,术中保留旋前方肌是必要的。Jung等^[6]通过尸体解剖和影像学研究认为,不切开旋前方肌可以复位骨折并置入螺钉。另有研究表明,旋前方肌覆盖在钢板上,可

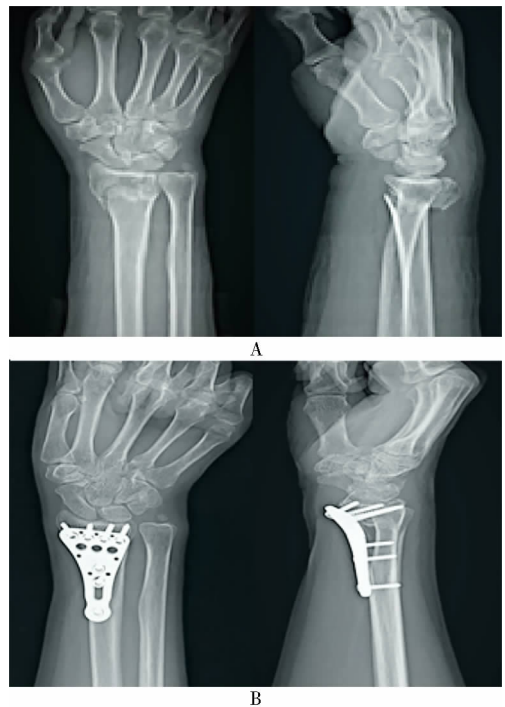


图 2 微创组典型病例腕关节 X 线检查
Figure 2 X-ray examination of wrist joint for one typical case in minimally invasive group
A: preoperation; B: 3 months after operation.

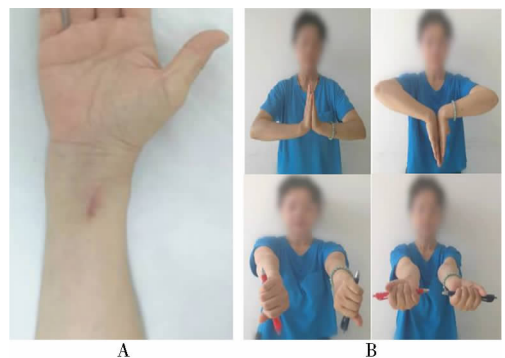


图 3 微创组典型病例术后3个月效果
Figure 3 Outcome of one typical case at 3 months after operation in minimally invasive group
A: incision of wrist joint; B: function of wrist joint.

避免拇长屈肌腱磨损及传统 Henry 掌侧入路术后引起的拇长屈肌腱断裂^[7-9]。闵捷等^[10]通过解剖学及临床研究表明,应用微创接骨板技术(minimally invasive plate osteosynthesis, MIPO)保留旋前方肌钢板螺钉固定桡骨远端骨折可行,患者腕关节功能恢复满意。由于该技术不仅需要术者对腕部解剖结构非常熟悉,更要求术者掌握术中如何在保护旋前方肌的基础上复位固定骨折,所以目前国内研究较少。本研究采用经掌侧保留旋前方肌微创入路治疗老年桡骨远端骨折患者,结果表明,与对照组相比,微创组患者的切口长度、术中出血量、术后住院时间、术后3个月的VAS评分均显著减少($P < 0.05$),而术后3个月的Gartland-Werley评分达优率和腕关节旋前角度均显著增加($P < 0.05$)。

笔者总结了保留旋前方肌手术技术需要注意的几个问题。(1)因为骨折后旋前方肌肿胀,且可能存在一定的肌纤维损伤,为了避免进一步损伤,术中要时刻有保护旋前方肌的意识,避免过度牵拉。(2)部分桡骨远端骨折患者为旋前方肌自桡骨远端掌侧面和骨膜连接处横行撕裂,对于此类患者,术中可将此裂口向桡侧、尺侧适当分离,然后将旋前方肌稍向近端拉开,即可显露大部分骨折断端。(3)若骨折未引起旋前方肌撕裂,可自旋前方肌桡骨远端掌侧面和骨膜连接处锐性切开,显露复位骨折。(4)骨折复位技术需要通过牵引、腕关节掌背伸及尺偏手法复位技巧,并结合克氏针撬拨技术完成,无需暴露所有骨折端,以减少旋前方肌损伤。(5)可应用小骨膜剥离器在旋前方肌下方和骨膜间建立通道,放置钢板螺钉内固定。自旋前方肌下方插入钢板时可适当向尺侧倾斜放入,完全放入后再调整至正常位置。(6)对于C型骨折可选用多角度锁定钢板固定^[11]。

综上,采用保留旋前方肌的微创入路治疗老年桡骨远端骨折是安全有效的,值得临床推广。本研究的缺陷在于样本量较少,对于该术式的临床疗效及安全性尚需要进一步验证。

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