

微型锁定钢板外置治疗近节指骨粉碎性骨折

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【摘要】 目的:探讨采用微型锁定钢板外置联合小切口复位治疗近节指骨粉碎性骨折的临床疗效。方法:自 2018 年 1 月至 2019 年 12 月,采用微型锁定钢板配合小切口切开复位治疗 17 例近节指骨粉碎性骨折患者,其中男 13 例,女 4 例;年龄 16~64(37.2±20.1)岁;2 例伴有软组织挤压开放伤,Ⅰ期急诊清创后固定治疗。术后 6 个月随访时根据美国手外科协会手指总主动屈曲量表(total active flexion scale, TAFS)评价疗效,观察骨折愈合,钉道情况,局部软组织愈合及并发症情况。**结果:**17 例患者均获随访,时间 6~12(9.3±3.6)个月。2 例出现骨折延迟愈合,1 例出现局部皮肤坏死,Ⅱ期植皮修复创面,无外置断钉及感染,皮肤软组织愈合良好,均达到骨性愈合,骨折愈合时间 12~24(15.7±2.1)周。术后 6 个月根据 TAFS 标准评定:优 9 例,良 5 例,差 3 例。**结论:**微型锁定钢板外置联合小切口复位治疗近节指骨粉碎性骨折,皮肤软组织情况良好,操作简便,有利于早期功能锻炼,指间关节活动度好,恢复期功能评分优良率高。

【关键词】 指骨; 骨折,粉碎性; 骨折切开复位

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Micro-locking plate external fixation for the treatment of proximal phalanx comminuted fractures WANG Li-xiang, WANG Nan, XU Liang, and WU Guo-ming. Department of Hand and Foot Surgery, Jiangnan Hospital Affiliated to Zhejiang Chinese Medicine University, Hangzhou 311201, Zhejiang, China

ABSTRACT **Objective:** To explore clinical efficacy of external placement of micro-locking plate combined with small incision reduction in treating proximal phalanx comminuted fractures. **Methods:** From January 2018 to December 2019, 17 patients with proximal phalanx comminuted fractures were treated with micro-locking plate combined with small incision open reduction, including 13 males and 4 females, aged from 16 to 64 years old with an average of (37.2±20.1) years old. Two patients were accompanied by soft tissue extrusion and opening injuries, which were treated with fixed treatment after the first-stage emergency debridement. Curative effect was evaluated according to total active flexion scale (TAFS) of American Hand Surgery Association at 6 months after operation; and fracture healing, nailing, local soft tissue healing, complications were observed. **Results:** All patients were followed up from 6 to 12 months with an average of (9.3±3.6) months. Two patients occurred delayed union, 1 occurred local skin necrosis and was treated with the second-stage skin grafting to repair wound surface. No external screw breakage or infection was reported, skin soft tissue healed favorably and reached bony union, the union time from 12 to 24 weeks with an average of (15.7±2.1) weeks. According to TAFS standard, 9 patients got excellent result, 5 good and 3 poor at 6 months after operation. **Conclusion:** External micro-locking plate combined with small incision reduction in treating proximal phalanx comminuted fracture, which has advantages of good condition of skin and soft tissue, simple operation, early functional exercise, good range of motion of interphalanx joint, and function score of recovery period is high.

KEYWORDS Finger phalanges; Fractures, comminuted; Open fracture reduction

指骨骨折为临床常见的手部损伤,击打伤或碾压伤等直接暴力常导致近节指骨骨干的粉碎性骨折,伴随着不同程度软组织损伤。常规切开复位内固定术,微型钢板内置后,一定程度上影响肌腱的滑动,增加早期活动的难度,造成关节僵硬^[1]。而单纯克氏针固定,因不稳易造成骨折延迟愈合及骨折不愈合^[2]。而支具固定,因粉碎骨折难以支撑维持良好

的位置,导致旋转畸形及对位对线欠佳。自 2018 年 1 月至 2019 年 12 月,采用微型锁定钢板外置治疗 17 例近节指骨粉碎性骨折患者,现报告如下。

1 临床资料

本组 17 例单一近节指骨粉碎性骨折患者,男 13 例,女 4 例,年龄 16~64(37.2±20.1)岁;11 例为单纯指骨骨干粉碎性骨折,6 例累及关节面的指骨骨折;示指 9 例,中指 3 例,环指 5 例;压砸伤 8 例,击打伤 5 例,交通事故 3 例,其他伤 1 例;2 例伴有软组织挤压开放伤,Ⅰ期急诊清创后固定治疗。本研究已通过

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2 治疗方法

完善常规术前准备,指固有神经阻滞麻醉。碘伏消毒,常规铺无菌单。先行指骨骨折闭合手法复位,侧方 1~2 cm 切口切开暴露骨折端,切口于桡侧尺侧皆可。复位后直径 0.8 mm 克氏针临时固定,C 形臂 X 线机透视对位对线良好, 屈曲掌指关节观察形态未见明显邻指撞击及旋转后, 体表安置微型锁定钢板,选择适宜长度的直行或者“T”形微型锁定钢板。于骨折远、近端分别置入 2~3 枚锁定螺钉,微型锁定钢板与皮肤预留 5 mm 的空隙。拔除克氏针,再次 C

形臂 X 线机透视,复位及固定良好后,冲洗穿刺口,纱布缠绕包扎钉道,完成手术。部分患者可留置克氏针增加骨折端稳定度。

术后 8 周门诊手术室拆除微型锁定钢板。如出现异常,予以延长固定时间至 12 周。典型病例图片见图 1、图 2。

3 结果

3.1 疗效评价标准

术后 6 个月根据美国手外科协会手指总主动屈曲量表(total active flexion scale, TAFS)^[3]进行疗效评价; 其中掌指关节及指间关节主动屈曲度>220°为



图 1 患者,男,51 岁,右示指近节指骨粉碎性骨折 1a,1b. 术前右手正侧位 X 线片示右示指近节指骨干粉碎性骨折伴成角移位 1c. 术中图片示微型锁定钢板外固定,2 cm 切口复位 1d. 术后 3 d 正位 X 线片示右示指近节指骨骨折微型锁定钢板外固定,指骨对位对线良好 1e,1f. 术后 3 d 外观图示右示指指间关节屈伸功能早期锻炼,近端指间关节主动屈曲达 90° 1g,1h. 术后 7 个月外观图示早期拆除外置微型钢板后,右示指屈伸功能恢复良好 1i. 术后 9 个月正位 X 线片示骨折断端对位对线良好,骨质愈合良好

Fig.1 A 51-year-old male patient with comminuted fracture of the right proximal phalanx 1a,1b. Postoperative AP and lateral X-rays on the right hand showed comminuted fracture of the right proximal phalanx with angular displacement 1c. Intraoperative picture showed external fixation with micro-locking plate, reduction with 2 cm incision 1d. Postoperative AP X-ray at 3 days showed fracture of proximal phalanx of the right index finger was externally fixed with micro-locking plate, and phalanx was on good alignment 1e,1f. Postoperative appearance at 3 days showed early flexion and extension of the right interphalangeal joint was exercised, and active flexion of proximal interphalangeal joint reached 90° 1g,1h. Postoperative appearance at 7 months showed flexion and extension function of the right finger recovered well after early removal of external micro plate 1i. Postoperative AP X-ray at 9 months showed good alignment and bone healing



图 2 患者,男,32 岁,右示指近节指骨粉碎性骨折,局部软组织肿胀,皮肤挫伤 2a,2b。术前右手 CT 重建示右示指近节指骨干粉碎性骨折伴成角移位 2c,2d。术后 3 d 右手正侧位 X 线片示右示指近节指骨骨折微型锁定钢板外固定,指骨对位对线良好显示“T”形微型锁定钢板外置固定 2e,2f。术后 10 个月右手正侧位 X 线片示骨折愈合良好,早期拆除外置微型锁定钢板 2g,2h。术后 12 个月外观图示右示指屈伸功能恢复良好

Fig.2 A 32-year-old male patient presented with comminuted fracture of the proximal phalanx of the right index finger with local soft tissue swelling and skin contusion 2a,2b. Preoperative CT reconstruction of right hand showed comminuted fracture of the proximal phalanx of the right finger with angular displacement 2c,2d. Postoperative AP and lateral X-rays at 3 days showed the fracture of proximal phalanx of the right finger was externally fixed with a micro-locking plate, and phalanx alignment was good, indicating the external fixation with T-shaped micro-locking plate 2e,2f. Postoperative AP and lateral X-rays at 10 months showed fracture healed well and external micro-locking plate was removed at early stage 2g,2h. Postoperative appearances at 12 months showed flexion and extension function of the right finger recovered well

优,180°~220°为良,<180°为差。

3.2 治疗结果

17 例患者均获得随访,时间 6~12 (9.3±3.6)个月。采用微型钢板外置固定期间,未出现断钉及松动现象,未出现钉道感染现象。17 例患者均 I 期愈合,骨折愈合时间 12~24(15.7±2.1)周。无明显旋转及成角畸形和感染发生。2 例患者骨折延迟愈合,再次手术拆除外置微型钢板,予以植骨内固定,6 个月后骨折愈合;1 例患者局部皮肤坏死,II 期植皮修复创面。术后 8~12 周拆除外置微型锁定钢板。术后 6 个月根据 TAFS 量表,本组优 9 例,良 5 例,差 3 例。

4 讨论

4.1 指骨骨折传统切开复位内固定存在的缺陷

直接暴力引起的近节指骨骨折是临床较为常见的手部骨折类型,手术固定能尽量恢复指骨良好的

力线及形态,恢复指间关节及掌指关节的活动度^[4]。其不足有如下几点:(1)传统的切开复位微型钢板固定,对于粉碎性骨折,局部血运破坏严重^[5]。(2)钢板的置入会增加皮肤缝合的张力,影响手指伸肌腱的滑动,限制手指早期功能锻炼,影响功能的恢复,增加关节僵硬的风险^[6]。(3)克氏针虽然是临床最常用的内固定置入物,但单独使用,不能提供坚强的内固定,容易出现骨折移位,造成指骨形态的改变。

4.2 微型锁定钢板外置治疗的优缺点

微型钢板外置治疗指骨骨折的优点如下:(1)与切开复位微型钢板内置固定相比,只需要小切口手术切开,这样既能充分保护骨折端血运又保护了局部软组织的完整。(2)微型钢板外置可以尽量减少对伸肌腱的刺激,为指间关节及掌指关节锻炼提供良好的条件^[7]。术后早期活动即可达到掌指关节及指

间关节屈曲 60°。(3)无须二次住院手术取出内固定物,减小了患者的经济负担。微型锁定钢板占位小,减小对早期功能锻炼的阻碍。(4)螺钉可以根据情况增加,增加固定的骨皮质层数,从而增加稳定性^[8]。该术式也存在一定的缺点:(1)微型钢板外置是对指骨骨折的桥接固定,固定相对稳定,无法做到微型钢板内置的绝对稳定固定。(2)外置固定虽然可以早期锻炼,但因外置的钉道及外露钉体在护理上存在不便,给患者生活带来不适,也增加了感染的风险^[9]。(3)本组术中并未应用经皮置钉技术,因为指骨周围神经血管肌腱密度高,拧入时螺钉的旋转容易绞伤周围解剖组织。

4.3 本研究治疗体会

(1)指骨骨折常发生于骨干或者骨干近关节部位,粉碎性骨折常因压砸伤伴有不同程度的软组织损伤,随着患者对于功能要求及患指舒适度要求的提高,微型钢板外置提供了一种尽量较少内植入物的治疗方案。(2)该手术方法适应于近节指骨粉碎性骨折,未累及指间关节或掌指关节面,伴有或者不伴有软组织损伤。(3)微型钢板外置可以尽量减少对肌腱的刺激,减少局部组织瘢痕粘连。(4)经皮复位固定,很难复位指骨的旋转移位及细微的成角畸形。而指骨细微的旋转及成角都会导致手指外形及功能的改变^[10],所以仍然选择小切口切开,肉眼直视下复位。(5)术后需要观察螺钉钉道情况,对于开放性指骨骨折,需要定期消毒钉道。术后感染是外固定治疗粉碎性骨折中的常见并发症,微型锁定钢板外置的钉道感染也不容忽视^[11]。

综上所述,应用微型锁定钢板外置联合小切口复位治疗单一近节指骨粉碎性骨折,操作简便,稳定性较好,肌腱影响小,可行早期功能锻炼,最大限度保证指间关节及掌指关节的活动度。外置钢板可早期门诊拆除,降低患者费用,值得临床应用。

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