

·临床研究·

单孔微型钢板内固定治疗第 1 掌指关节侧副韧带损伤伴骨折

王西迅¹, 孙德骏¹, 陈旭辉², 李钧¹, 崔岩¹, 胡继超¹, 舒正华¹, 何健¹, 丁潮琪¹, 陈波¹

(1. 中国人民武装警察部队浙江省总队医院手足显微外科, 浙江 嘉兴 314000; 2. 浙江新安国际医院, 浙江 嘉兴 314000)

【摘要】 目的:探讨应用单孔微型钢板内固定治疗第 1 掌指关节侧副韧带损伤伴骨折的临床效果。方法:应用单孔微型钢板内固定治疗第 1 掌指关节侧副韧带损伤伴骨折共 22 例,男 16 例,女 6 例;年龄 18~53 岁,平均 28.5 岁。受伤至手术时间 2 h~2 个月,平均 6 d。均为第 1 掌指关节侧副韧带损伤伴骨折,右手 13 例,左手 9 例。闭合伤 18 例,开放伤 4 例。新鲜损伤 (<2 周)18 例,陈旧损伤 (>2 周)4 例。拇指近节基底尺侧副韧带损伤伴骨折 16 例,桡侧副韧带损伤伴骨折 6 例,其中同时伴拇短展肌、拇短屈肌腱止点损伤 4 例。撕脱骨折块大小为 3.0 mm×4.0 mm~6.0 mm×7.0 mm。结果:22 例术后切口均 I 期愈合,随访 6 个月~5 年,平均 2.5 年。根据 Saetta 等疗效评定标准评价拇指功能,优 20 例,良 2 例。结论:应用单孔微型钢板内固定治疗第 1 掌指关节侧副韧带损伤伴骨折是一种行之有效的办法。

【关键词】 指骨; 骨折; 侧副韧带; 内固定器

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Internal fixation with one-hole microplate for the treatment of collateral ligament injuries of the metacarpophalangeal joint of the thumb combined with fracture WANG Xi-xun*, SUN De-tao, CHEN Xu-hui, LI Jun, CUI Yan, HU Ji-chao, SHU Zheng-hua, HE Jian, DING Chao-qi, and CHEN Bo. *Zhejiang Provincial Corps Hospital of Chinese Peoples Armed Police Forces, Jiaxing 314000, Zhejiang, China

ABSTRACT Objective: To study clinical effects of one-hole microplate internal fixation for the treatment of collateral ligament injuries of the metacarpophalangeal joint of the thumb combined with fracture. **Methods:** Twenty-two patients (16 males, 6 females) with collateral ligament injuries of the metacarpophalangeal joint of the thumb combined fracture were treated with one-hole microplate internal fixation. The age of the patients ranged from 18 to 53 years old with a mean age of 28.5 years old. The duration from injury to surgery ranged from 2 hours to 2 months, and the mean time was 6 days. All the patients had collateral ligament injuries combined with fracture of the metacarpophalangeal joint of the thumb. Thirteen patients had injuries in the right hand and 9 patients had injuries in the left hand. There were 18 cases of closed wound and 4 cases of open wound. Eighteen patients had fresh injuries (<2 weeks) and 4 had old injuries (>2 weeks). Sixteen patients had injuries in the ulnar collateral ligament of the thumb combined with fracture, 6 patients had radial collateral ligament injuries of the thumb combined with fracture, 4 cases of which were complicated with injuries of abductor pollicis brevis and the end of the flexor pollicis brevis tender. The size of the avulsed fragment was about 3.0 mm×4.0 mm to 6.0 mm×7.0 mm. **Results:** The incisions of 22 patients healed by first intention. The follow-up periods ranged from 6 months to 5 years old, with an average of 2.5 years old. The thumb function was evaluated by Saetta and other evaluation criteria, and 20 patients got an excellent result and 2 good. **Conclusion:** The application of one-hole microplate internal fixation in treating collateral ligament injuries with fracture of the metacarpophalangeal joint of the thumb is an effective method.

KEYWORDS Phalanx; Fractures; Collateral ligament; Internal fixators

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拇指近节基底部有鱼际肌、侧副韧带、关节囊及伸肌腱等附着,其掌指关节活动范围较大,易出现韧带或肌腱损伤,引起关节撕脱性骨折。由于骨折块为韧带或肌腱的附着点,且为关节面的组成部分,保守

治疗由于韧带或肌腱的牵拉骨折难以复位,外固定难以维持骨折对位,手术行骨折块切除可造成关节面缺损,造成掌指关节不稳及骨关节炎,严重影响拇指功能。骨折内固定目前多采用克氏针、螺钉或张力带,但常因骨折块较小,固定不牢固,不利于早期功能锻炼^[1]。自 2008 年 6 月至 2013 年 8 月应用单孔微型钢板内固定治疗,取得了满意疗效,报告如下。

通讯作者:王西迅 E-mail:xixunwang@163.com

Corresponding author: WANG Xi-xun E-mail:xixunwang@163.com

1 临床资料

本组 22 例,男 16 例,女 6 例;年龄 18~53 岁,平均 28.5 岁。受伤至手术时间 2 h~2 个月,平均 6 d。均为第 1 掌指关节侧副韧带损伤伴骨折,右手 13 例,左手 9 例。致伤原因:机器挤压伤 8 例,跌伤 5 例,扭伤 5 例,撞击伤 4 例。闭合伤 18 例,开放伤 4 例。新鲜损伤(<2 周)18 例,陈旧损伤(>2 周)4 例。拇指近节基底尺侧副韧带损伤伴骨折 16 例,桡侧副韧带损伤伴骨折 6 例,其中同时伴拇短展肌、拇短屈肌腱止点损伤 4 例。撕脱骨折块大小为 3.0 mm×4.0 mm~6.0 mm×7.0 mm。临床表现为拇指掌指关节肿胀,尤其损伤侧肿胀更严重,拇指向桡侧或向尺侧侧偏明显,压痛明显,近节指骨基底有时可有骨擦感,拇指掌指关节不稳,侧向应力试验阳性。X 线片示拇指近节指骨基底部尺侧或桡侧有撕脱骨折块,骨折波及关节面。

2 治疗方法

采用臂丛神经阻滞麻醉,取患者仰卧位,气压止血带控制下手术,尺侧副韧带撕脱骨折取拇指尺背侧“S”形切口^[2]。自掌骨至掌指关节,转向拇指尺掌侧,再向远端,与侧正中中线平行,在切口的远侧部需要向掌侧偏斜,以方便暴露近节指骨掌侧基底部,注意保护桡神经浅支,沿拇长伸肌腱尺侧缘掌侧 3 mm 纵行切开内收肌腱膜。将其拉向掌侧,显露掌指关节的尺侧缘及近节指骨基底部掌侧,暴露骨折端,可见尺侧副韧带附着撕脱骨折块,骨折块波及关节面,同时经常伴尺侧关节囊破裂。清理骨折端后生理盐水反复冲洗骨折端及关节腔,予以骨折块复位。用小血管钳抵压骨折块以维持对位,若骨折块较大时可用直径 0.8 mm 克氏针临时固定骨折端,将史赛克公司生产的单孔微型钢板放置骨折块中央部,于骨块中央部垂直骨折面用钻头钻孔后测量深度,拧入螺钉,直至骨折端固定牢固。术中 C 形臂 X 线透视确定骨折解剖复位,并检查骨折端确保关节面平整,并将破裂的关节囊予以修复,并将损伤的韧带尽可能与周围韧带或关节囊缝合加固。术中可见掌指关节侧向应力试验阴性。若为拇指近节指骨基底桡侧副韧带或肌腱撕脱骨折,则需要取拇指及鱼际的入路^[3]。术中可见桡侧副韧带断裂或拇短屈肌腱、拇短展肌腱附着的撕脱骨折块,骨折块常常移位,尤其肌腱附着的撕脱骨折块由于肌肉牵拉移位更严重,术中予以骨折复位后钢板固定,并修复损伤的肌腱、韧带或关节囊,方法同前。开放伤根据伤口大小及方向做适当延长。

术后患手石膏托固定在拇指功能位 1 周,1 周后去除石膏托进行拇指主动屈曲、对掌、对指功能锻

炼,并辅助物理康复治疗。术后 4 周可进行拇指主动及被动屈曲、对掌、对指功能锻炼。术后康复要循序渐进进行,逐步增大活动幅度,否则可能导致骨折再移位或肌腱、韧带断裂。

3 结果

本组 22 例术后切口均 I 期愈合,术后随访 6 个月~5 年,平均 2.5 年。治疗后 X 线片示骨折线消失,关节面平整,关节间隙正常,掌指关节对合良好,侧向应力试验阴性。所有患者疼痛症状消失,无红肿,拇指感觉正常,掌指关节屈曲 38°~60°,平均 46°,恢复正常工作及生活。根据 Saetta 等^[4]疗效评定标准评价拇指功能:优,患指恢复正常,能轻易完成开启瓶盖之类的动作;良,关节活动轻度受限,在开启瓶盖时局部有轻微不适,但能完成动作,并可完成持笔、持筷及开启门锁等精细动作;可,活动中度受限,不能完成开启瓶盖动作,虽可持笔、持筷,但伴局部疼痛;差,活动严重受限,治疗后症状无改善或加重。本组优 20 例,良 2 例。典型病例见图 1-3。



图 1 患者,男,42 岁,撞击伤致右手第 1 掌指关节尺侧副韧带损伤
1a. 正位 X 线片示右拇指掌指关节间隙尺侧不对称 1b. 侧向应力正位 X 线片示右拇指掌指关节尺侧间隙增大,呈半脱位

Fig. 1 A 42-years-old male had ulnar collateral ligament injury of the metacarpophalangeal joint of the thumb in the right hand caused by an impact injury 1a. AP X-ray showed the radial and ulnar space in the metacarpophalangeal joint of the right thumb were asymmetric 1b. Lateral stress AP X-ray showed the ulnar space in the metacarpophalangeal joint of the right thumb increased with subluxation

4 讨论

4.1 拇指掌指关节侧副韧带及肌腱止点撕脱骨折的损伤特点、诊断要点及修复的必要性

拇指尺、桡侧副韧带及肌腱止点撕脱骨折是一种常见损伤,通常在桡偏暴力、尺偏暴力或挤压暴力的作用下,导致侧副韧带及肌腱止点撕脱骨折。由于拇指在手部功能中发挥作用最大,而掌指关节是拇指最主要的关节,因此拇指掌指关节损伤会对手功



图 2 患者,女,46 岁,机器挤压伤致右手第 1 掌指关节桡侧副韧带损伤伴开放骨折 2a. 外伤致右拇指开放损伤 2b. 术中见第 1 掌指关节桡侧副韧带损伤合并拇短展肌、拇短屈肌腱止点损伤伴开放骨折 2c. 术中应用单孔微型钢板内固定治疗 2d. 术前 X 线片 2e. 术后 X 线片 2f, 2g, 2h. 术后拇指功能恢复良好

Fig.2 A 46-years-old female had radial collateral ligament injury of the metacarpophalangeal joint of the right thumb with open fracture caused

by a machine crush 2a. Open injury of the right thumb caused by trauma 2b. Radial collateral ligament injury of the metacarpophalangeal joint of the thumb complicated with injuries of abductor pollicis brevis and the end of flexor pollicis brevis tendon, as well as open fractures showed in operation 2c. One-hole microplate internal fixation was used intraoperatively 2d. Preoperative X-ray 2e. Postoperative X-ray 2f, 2g, 2h. The functional recovery of the thumb was good

能造成较大影响。拇指因为近节指骨基底的曲率半径比较大,拇指掌指关节内在稳定性较低,关节的稳定性依靠关节囊、韧带、肌腱等软组织,关节的侧方有强大的固有侧副韧带,为掌指关节提供了稳定性。一侧副韧带损伤后,导致掌指关节该侧不稳定,查体见侧向应力试验阳性,检查时,需要完全伸直掌指关节,紧握掌指关节的远近端进行检查,在屈曲位检查不准确,并且需要与对侧进行对比。X 线片显示:拇指掌指关节间隙尺侧不对称(图 1a);侧向应力正位 X 线片示:右拇指掌指关节损伤侧间隙增大,呈半脱位(图 1b)。拇指掌指关节侧向应力 X 线摄片与膝关节侧方应力摄片诊断膝关节内侧副韧带损伤有同样的优点,操作很简单,花费低廉,诊断确切,适于基层医院推广^[5]。拇指掌指关节尺侧副韧带损伤的发生率明显高于桡侧副韧带损伤^[6]。因为侧副韧带及肌腱止点靠近关节面,撕脱骨折常常波及关节面,并伴随关节囊破裂,导致关节面不稳及后期出现

创伤性关节炎,出现拇指掌指关节疼痛、功能受限。由于韧带及肌腱失去止点,肌腱止点损伤常常导致拇指活动无力,侧副韧带损伤导致关节不稳,出现长期关节肿胀、疼痛,因此拇指掌指关节撕脱骨折常需要切开复位内固定手术治疗,争取解剖性修复,以获得更好的中远期效果^[7]。

4.2 拇指近节基底部撕脱骨折内固定选择优缺点

拇指尺、桡侧副韧带及肌腱止点撕脱骨折骨块较小,往往不被重视,误诊、误治均可能因为掌指关节不稳定导致拇指严重残疾及慢性疼痛^[8]。目前常用的方法有外固定及切开复位内固定。外固定的固定效果常常不够确切,因骨折片受韧带或肌腱牵拉骨折解剖复位困难,导致关节面不平整。切开复位内固定相对外固定而言,骨折对位比较满意,但内固定的稳定性各异。常用的内固定方式有克氏针内固定、螺钉内固定及张力带内固定等,单枚克氏针固定不能控制旋转,固定不够牢固,且克氏针没有螺纹,针



图 3 患者,女,14 岁,扭伤致右手第 1 掌指关节尺侧副韧带损伤伴骨折 **3a**. 术中见第 1 掌指关节尺侧副韧带损伤伴骨折 **3b**. 所用单孔微型钢板 **3c,3d**. 术中应用单孔微型钢板内固定并修复尺侧副韧带 **3e**. 术前 X 线片 **3f**. 术后 X 线片 **3g,3h,3i**. 术后拇指功能恢复良好

Fig.3 A 14-years-old female had ulnar collateral ligament injury of metacarpophalangeal joint of the right thumb combined with fracture caused by sprain **3a**. Ulnar collateral ligament injury of metacarpophalangeal joint of the thumb with fracture was seen intraoperatively **3b**. The one-hole microplate that had been used **3c,3d**. Ulnar collateral ligament with fracture was fixed and repaired by one-hole microplate internally preoperatively **3e**. Preoperative X-ray **3f**. Postoperative X-ray **3g,3h,3i**. The functional recovery of thumb was good

体光滑,容易松动,无法早期功能康复,导致关节僵硬。两枚克氏针固定因骨折块小,难固定,易碎裂。单枚螺钉内固定因螺钉尾部钉帽小,骨折块小,不能对骨折端产生有效的加压作用,骨折块固定稳定性不够,肌腱牵拉可能导致骨折块从螺钉尾部滑出。张力带内固定能有效对抗肌腱的拉力,但对骨折及关节面对位的维持作用有限。应用单孔微型钢板内固可对骨折端产生有效加压,其钢板相当于螺钉的垫片,能增加螺钉对骨折块加压的受力面,增加固定的牢固度,保持关节面精确对位,且防止骨块从螺钉尾部脱出,钢板钩可钩住另一骨折端,增加骨折稳定性,有利于早期功能锻炼。

本方法的缺点是对于骨折块过于细小或骨折块严重粉碎的患者无法拧入螺钉,因而无法有效固定,此时应用克氏针丝线张力带内固定比较合适^[9]。术

中对助手配合要求较高,不但要维持解剖复位,而且要求钻孔一次成功,否则骨片碎裂无法固定。另外,单孔微型钢板材料费用较克氏针或张力带高。

4.3 应用单孔微型钢板内固定治疗拇指近节基部撕脱骨折的适应证、手术要点及注意事项

单孔微型钢板内固定主要适用于指骨关节部位韧带或肌腱附着处的撕脱骨折,骨折波及关节面且骨折移位明显,骨折块较大患者。通常为骨折波及关节面超过 10%或骨折移位超过 2 mm,对于骨折块细小及移位不明显的撕脱骨折且关节侧向稳定者,可行石膏托或指骨夹板固定。术前应拍拇指掌指关节正位侧向应力 X 线片,以判断掌指关节的侧向稳定性。术中要力求解剖复位,夹持骨块时要轻柔,以防骨块碎裂。骨折块复位后,用蚊式血管钳抵压骨折块以维持对位,若骨折块较大时可用直径 0.8 mm 克氏

针做临时固定;术中用钻头钻孔前要检查关节面,确保骨折解剖复位关节面平整;钻孔要轻柔,避免使用暴力,否则容易导致骨块碎裂;固定力求一次成功,反复钻孔将导致螺钉松动或骨块碎裂,无法固定或固定不牢固。螺钉拧入力度及深度要适中,防止螺钉滑丝。术后石膏托固定 1 周,有利于消肿,1 周后肿胀明显消退,即可循序渐进地进行主、被动功能康复。锻炼不可操之过急,防止骨折再移位,导致手术失败。若术中发现骨折端不够稳定,要适当延长石膏固定时间。

总之,应用单孔微型钢板内固定治疗第 1 掌指关节侧副韧带损伤伴骨折是一种疗效确切、简单的治疗方法。

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