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带线锚钉修复三角韧带损伤的效果及对患者踝关节功能的影响*

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摘要 目的: 研究带线锚钉修复三角韧带损伤在踝关节骨折内固定治疗中的作用及对踝关节功能的影响。**方法:** 回顾性分析 2012 年 9 月至 2016 年 8 月本院收治的 72 例踝关节骨折并三角韧带损伤患者并且行切开复位钢板置入内固定, 及采取带线锚钉内固定方式修复三角韧带损伤视为观察组; 另选取同期在本院进行踝关节骨折内固定治疗但不修复三角韧带的 72 例患者视为对照组。分析患者治疗前、治疗后 1 个月、3 个月、6 个月踝关节功能恢复情况, 观察患侧内踝间隙和不良反应。**结果:** 观察组在治疗后 1 个月、3 个月、6 个月的 AOFAS 评分显著高于对照组 ($P < 0.05$)。观察组在治疗后 6 个月后的患侧内踝间隙显著小于对照组 ($P < 0.05$)。**结论:** 带线锚钉修复三角韧带损伤在踝关节骨折内固定治疗中, 可明显降低患侧内踝间隙距离, 可促进患者踝关节功能恢复, 无严重不良反应, 值得进一步广泛推广使用。

关键词: 带线锚钉; 三角韧带; 踝关节; 内固定

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Effect of Wire Anchors on Repairing Triangular Ligament Injury and the Ankle Joint Functions of Patients*

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ABSTRACT Objective: To study the effect of repairing triangular ligament injury with wire anchors on internal fixation of ankle joint fractures and its effect on ankle joint function. **Methods:** 72 cases of naked joint fractures and triangular ligament injuries who were treated in our hospital from September 2012 to August 2016 were retrospectively analyzed, and were treated with open reduction and internal fixation with plate fixation and repair of triangular ligament injury as the observation group. At the same period, for ankle fracture fixation without repairing the triangular ligament of 72 patients in our hospital as control group. Ankle joint function recovery was observed before and after 1 month, 3 months and 6 months treatment, and the side ankle space and adverse reaction were observed. **Results:** The AOFAS scores of the observation group at 1 month, 3 months and 6 months after treatment were significantly higher than the control group ($P < 0.05$). After 6 months treatment, the gap of the medial malleolus in observation group was significantly smaller than the control group ($P < 0.05$). **Conclusion:** The repair of triangular ligament injury with wire anchor can significantly reduce the distance between the medial malleolus and the ankle in the treatment of ankle joint fracture. It can promote the recovery of ankle function and no serious adverse reaction. It is worthy to be further popularized.

Key words: Anastomotic anchorage; Triangular ligament; Ankle joint; Internal fixation

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前言

踝关节主要由距骨、外踝、内踝组合而成, 有较多韧带存在于踝关节处, 对关节发挥着保护作用, 主要包括踝关节外侧韧带和内侧三角韧带^[1]。在踝关节中主要有外翻、内翻、跖屈、背屈活动, 由于不同运动存在着不同外来暴力影响, 极易发生韧带损伤和踝关节骨折^[2]。在内侧中最为主要的稳定结构是三角韧带, 对距骨各个方向的水平移动发挥着控制作用, 包括浅深两层, 其中浅层止于载距突的上部, 深部呈现出扇形, 止于距骨内侧非关节部分^[3,4]。当三角韧带旋转于足内外时, 并且和足相临

近, 极易发生损伤^[5]。相关研究者提出在三角韧带损伤中可采取膝下非负重石膏固定方式, 随之采取行走支具予以治疗^[6], 而修复方案是多种多样的, 为给临床在踝关节骨折内固定中提供更多可借鉴之处, 本文就带线锚钉修复三角韧带损伤在踝关节骨折内固定治疗中的作用及对踝关节功能的影响进行分析, 报道如下。

1 资料与方法

1.1 临床资料

回顾性分析 2012 年 9 月至 2016 年 8 月本院收治的 72 例

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踝关节骨折并三角韧带损伤患者并且行切开复位钢板置入内固定,及采取带线锚钉内固定方式修复三角韧带损伤视为观察组;另选取同期在本院进行踝关节骨折内固定治疗但不修复三角韧带的72例患者视为对照组。其中观察组年龄为21~56岁,平均 (35.84 ± 2.42) 岁;男性40例,女性32例;受伤部位:左侧32例,右侧40例;受伤因素:摔伤12例,车祸伤20例,扭伤40例。对照组年龄为22~57岁,平均 (36.02 ± 2.46) 岁;男性42例,女性30例;受伤部位:左侧33例,右侧39例;受伤因素:摔伤11例,车祸伤21例,扭伤40例。两组患者年龄、性别、受伤部位等临床资料比较无显著性差异($P>0.05$),可比性较强。纳入标准:所有患者均经MR和CT检查后被确诊为踝关节并三角韧带损伤,均属于新鲜闭合骨折,踝关节内侧不稳。排除标准:属于单纯性踝关节骨折,并未合并三角韧带损伤,并且伴有严重内科疾病。

1.2 方法

对照组进行踝关节骨折内固定治疗时但不修复三角韧带。观察组患者均采用切开复位钢板置入内固定治疗,随之采取带线锚钉内固定修复三角韧带损伤。患者完成硬膜外麻醉或常规腰麻后,取患者仰卧位,最先为踝关节前内侧切口,随之予以三角韧带探查,探查部位包括三角韧带深层和浅层。三角韧带损伤包括起点、中点、止点损伤,在距骨止点损伤于三角韧带深层距骨附着止点位置予以钻孔处理,将带线锚钉完全置入距骨内。使用克氏针于内踝尖处钻2个小骨孔,从内踝骨孔处把一对缝线穿出直至收紧打结。若患者属于内踝附着点撕脱情况,在内踝处放置带线锚钉,对缝线予以韧带褥式缝合后予以收紧打结。当联合固定下胫腓或后踝、外踝后,对所有缝线予以打结

处理,在内翻位对缝线进行打结固定。所有患者在完成修复术后予以常规抗感染等治疗,使用石膏托固定。治疗1个月后,指导患者开展踝关节主动活动,治疗3个月对患者进行常规物理治疗以及指导患者完成逐步负重行走。

1.3 观察指标

所有患者在治疗后进行为期6个月的随访,对所有患者予以正侧位X射线以及踝关节CT检查。对骨折愈合以及手术切口情况予以观察。使用美国足踝外科学会(AOFAS)^[7]的后足与踝功能评分对患者治疗前、治疗后1个月、3个月、6个月踝关节功能恢复情况进行评价,满分为100分,其中足的排列为10分,功能为50分,疼痛为40分。包括下列标准,优:90~100分;良:75~89分;可:50~74分;差:50分以下。所有患者于治疗前后均需进行重力应力X射线检查,并对患侧内踝间隙进行测量,并对患者修复术后不良情况予以观察比较。

1.4 统计学处理

本次实验数据处理选择SPSS11.5软件包进行,计量资料用 $(\bar{x} \pm s)$ 来表示,采用t检验,其 $P<0.05$ 表明差异具有统计学意义。

2 结果

2.1 治疗前后踝关节 AOFAS 评分情况

治疗前,两组患者的AOFAS评分比较无显著性差异($P>0.05$),治疗后1个月、3个月、6个月,两组患者的AOFAS评分较治疗前明显上升,其中观察组在治疗后1个月、3个月、6个月的AOFAS评分显著高于对照组($P<0.05$),见表1。

表1 治疗前后踝关节 AOFAS 评分情况 $(\bar{x} \pm s, \text{分})$
Table 1 AOFAS of ankle joint before and after treatment $(\bar{x} \pm s, \text{points})$

Groups	Time	
Observation group	Before treatment	47.43 $\pm$ 4.02
	After treatment for 1 month	55.43 $\pm$ 5.12**
	After treatment for 3 months	68.32 $\pm$ 6.65**
	After treatment for 6 months	74.21 $\pm$ 2.12**
Control group	Before treatment	47.48 $\pm$ 4.06
	After treatment for 1 month	51.94 $\pm$ 4.45*
	After treatment for 3 months	61.43 $\pm$ 5.02*
	After treatment for 6 months	68.98 $\pm$ 5.64*

Note: Compared with before treatment, * $P<0.05$; compared with control group after treatment, ** $P<0.05$.

2.2 治疗前后患侧内踝间隙情况分析

治疗前,两组患者的患侧内踝间隙比较无显著性差异($P>0.05$),治疗后6个月,对患者予以重力应力X射线检查,和治疗前相比,两组患者的患侧内踝间隙明显缩小,其中观察组在治疗后6个月后的患侧内踝间隙显著小于对照组($P<0.05$),见表2。

2.3 两组不良反应情况

在所有患者中暂未发生血管损伤、神经损伤等,手术切口均属于一期愈合,在术后未发生感染情况。通过随访发现患者

骨折愈合,未发生骨折不愈合、松动、内固定断裂等不良事件,然而患者伴有相应的踝关节功能受限情况。

3 讨论

三角韧带在踝关节内侧中是一种能起着稳定作用的韧带结构,对距骨在踝穴的正常解剖位置具有重要维持作用,避免距骨外翻脱位,足踝部运动及负重功能的发挥和三角韧带的完整性密切相关^[8,9]。三角韧带受损后,距骨会朝外旋转,胫骨下关节面和距骨上关节面呈现出内开放角。当发生踝关节骨折伴三

表 2 治疗前后患侧内踝间隙情况($\bar{x} \pm s$, mm)Table 2 Ipsilateral medial malleolus space of patients in the two groups before and after treatment($\bar{x} \pm s$, mm)

Groups	Time	Ipsilateral medial malleolus space
Observation group	Before treatment	4.87± 0.47
	After treatment for 6 months	3.69± 0.38**
Control group	Before treatment	4.87± 0.47
	After treatment for 6 months	4.24± 0.41*

Note: Compared with before treatment, *P<0.05; compared with control group after treatment, **P<0.05.

角韧带损伤后,会严重损伤踝穴的稳定性。降低胫距接触面积,局部发生应力集中现象,易出现各种关节退行性变化^[10,11]。三角韧带,特别是深层的完整性,对距骨在踝穴内正常运动方面以及踝关节动态稳定性的维持方面发挥着极其重要作用。在踝关节骨折合并三角韧带中是否需给予修复治疗,以及如何修复是目前众多学者急需解决的问题^[12]。大多数学者提出内侧缝合和探查,一旦发生损伤后需及时采取措施予以处理,然而不同情况又不同修复方案^[13]。单纯的急性三角韧带损伤常伴有踝关节骨折、距骨骨软损伤、下胫腓联合损伤^[15,16]。一旦不能采取适当的措施予以治疗极有可能导致踝关节慢性不稳定。有研究者提出在三角韧带损伤中,下胫腓和外踝骨折联合复位后关节稳定性以及对位得以恢复,也无需采取手术治疗修补三角韧带^[17]。

在踝关节骨折合并三角韧带损伤修复治疗中较为常见的方式为止点深埋法、缝线固定等方式。然而此种方式存在操作难度,并且易给患者带来较大损伤,需花费患者较长的时间完成石膏外固定,给患者术后恢复带来困难。带线锚钉主要是高低螺纹设计,属于较为特殊的一种钛钉,末端带尾线,有着较强的保持力。在进行韧带修复治疗中,骨组织中可将锚钉全部埋入,操作简单,并不会给患者带来严重损伤^[18]。并且锚钉可直至牢固的抓持骨质,并保证韧带愈合过程不受到任何影响^[19]。相关研究者使用缝合锚钉方式在踝关节三角韧带附着点断裂患者中予以治疗,经 AOFAS 评分发现优良率较高,并且操作方便易行,属于有效的修复方式^[20]。本次研究结果表明,带线锚钉修复三角韧带损伤在踝关节骨折内固定治疗后 1、3、6 个月发现患者的 AOFAS 评分较治疗前呈现出逐渐升高的趋势,其中治疗后 1、3、6 个月的 AOFAS 评分明显高于治疗前,并且明显比未进行三角韧带修复术治疗的患者高,提示三角韧带修复术在短期内并不会给患者踝关节功能带来影响,并且术后长期效果较好。经修复治疗后 6 个月发现患者的患侧内踝间隙较治疗前明显降低,明显比未进行三角韧带修复术治疗的患者低,表明带线锚钉修复具有较好的距骨复位效果,明显缩小患侧内踝间隙,踝关节稳定性较好。在所有患者术中暂未发生血管损伤、神经损伤等,手术切口均属于一期愈合,术后未发生感染、不愈合、松动、内固定断裂等不良事件,然而患者伴有相应的踝关节功能受限情况,提示在踝关节骨折合并三角韧带损伤中予以切开复位内固定并带线锚钉修复三角韧带方式相结合能获取较好的效果。在修复过程中,患者骨组织中可将带线锚钉完全埋入,并不会给软组织带来刺激性影响,并且术后无需取出,因而可降低术后并发症发生的概率。

总之,带线锚钉修复三角韧带损伤在踝关节骨折内固定治疗中,可明显降低患侧内踝间隙距离,可促进患者踝关节功能恢复,无严重不良反应,值得进一步广泛推广使用。

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