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锁骨远端锁定钢板治疗 Neer II 型锁骨远端骨折的疗效及对肩关节功能恢复的影响 *

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摘要 目的:探讨锁骨远端锁定钢板治疗 Neer II 型锁骨远端骨折的疗效及对肩关节功能恢复的影响。**方法:**回顾性分析 2015 年 7 月~2017 年 10 月期间四川省泸州市中医医院收治的 107 例 Neer II 型锁骨远端骨折患者的临床资料, 其中行锁骨钩钢板治疗的 53 例患者作为对照组, 行锁骨远端锁定钢板治疗的 54 例患者作为研究组。比较两组术后 1 年的临床疗效, 记录两组患者手术时间、术中出血量、手术切口长度、骨折愈合时间, 比较两组术前、术后 5 周、术后 10 周肩关节功能情况, 记录并发症发生情况。**结果:**研究组术后 1 年优良率为 90.74%(49/54), 显著高于对照组患者的 64.15%(34/53)($P<0.05$)。两组患者手术时间、术中出血量、手术切口长度以及骨折愈合时间比较差异无统计学意义($P>0.05$)。两组患者术后 5 周、术后 10 周肩关节功能、肩关节活动度、X 线评定、患侧肩部疼痛、关节稳定性评分高于术前, 且术后 10 周高于术后 5 周($P<0.05$); 研究组术后 5 周、术后 10 周上述指标评分高于对照组($P<0.05$)。研究组术后并发症总发生率为 7.41%(4/54), 低于对照组的 32.08%(17/53)($P<0.05$)。**结论:**锁骨远端锁定钢板治疗 Neer II 型锁骨远端骨折安全有效, 可有效改善患者肩关节功能, 促进术后恢复。

关键词:锁骨远端锁定钢板; Neer II 型锁骨远端骨折; 疗效; 锁骨钩钢板; 肩关节功能

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Treatment of Neer type II Distal Clavicle Fracture with Distal Clavicle Locking Plate and Its Effect on Shoulder Joint Function Recovery*

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ABSTRACT Objective: To investigate the effect of distal clavicle locking plate in the treatment of Neer type II distal clavicle fracture and its effect on shoulder joint function recovery. **Methods:** The clinical data of 107 patients with Neer type II distal clavicular fractures admitted to Luzhou Hospital of Traditional Chinese Medicine, Sichuan Province from July 2015 to October 2017 were retrospectively analyzed. 53 patients treated with clavicle hook plate were taken as control group and 54 patients treated with distal clavicle locking plate were taken as study group. The clinical efficacy of the two groups was compared one year after operation. The operation time, intraoperative bleeding volume, length of operative incision and fracture healing time were compared between the two groups. The shoulder joint function was compared between the two groups before operation, 5 weeks after operation and 10 weeks after operation, and the postoperative complications were recorded in both groups. **Results:** The excellent and good rate was 90.74% (49/54) in the research group 1 year after operation, which was significantly higher than 64.15% (34/53) in the control group ($P<0.05$). There were no significant differences in operative time, intraoperative bleeding volume, length of operative incision and fracture healing time between the two groups ($P>0.05$). The shoulder joint function, shoulder joint mobility, X-ray evaluation, shoulder pain and joint stability scores of the two groups at 5 weeks after operation and 10 weeks after operation were higher than those before operation, those at 10 weeks after operation were higher than those at 5 weeks after operation ($P<0.05$). The scores of the above indexes in the research group at 5 weeks after operation and 10 weeks after operation were higher than those in the control group ($P<0.05$). The total incidence of postoperative complications in the research group was 7.41% (4/54), which was significantly lower than that 32.08% (17/53) in the control group ($P<0.05$). **Conclusion:** Distal clavicle locking plate is effective in the treatment of Neer type II distal clavicle fracture. It can effectively improve the shoulder function of patients, and it can promote postoperative recovery.

Key words: Distal clavicle locking plate; Neer type II distal clavicle fracture; Curative effect; Clavicle hook plate; Shoulder joint function

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前言

锁骨骨折是常见的骨性损伤之一,锁骨远端骨折是指位于锁骨外侧端 1/3 处的骨折^[1,2]。根据 Neer 分型可将锁骨远端骨折分为 I、II、III 型,其中 Neer II 型为最常见类型^[3]。既往相关研究表明^[4],Neer II 型锁骨远端骨折复位困难,若行保守治疗,其骨不愈合发生率可达 30%,故临床上一般对其采取手术方法治疗。以往临床均采用锁骨钩钢板进行固定治疗,虽然其能够提供较强的内固定,然而有关其术后引起的肩关节疼痛、关节活动受限等并发症的相关报道屡见不鲜^[5,6]。随着内固定器械的不断发展,锁骨远端锁定钢板的应用越来越广泛,该术式治疗可避免肩峰下部的侵扰,还可促进患者肩关节功能的恢复^[7,8]。本研究通过回顾性分析我院 107 例患者的临床资料,分别比较锁骨钩钢板和锁骨远端锁定钢板治疗 Neer II 型锁骨远端骨折患者的疗效,以期为临床治疗提供数据支持。

1 资料与方法

1.1 一般资料

回顾性分析 2015 年 7 月~2017 年 10 月期间四川省泸州市中医医院收治的 107 例 Neer II 型锁骨远端骨折患者的临床资料,其中行锁骨钩钢板治疗的 53 例患者作为对照组,行锁骨远端锁定钢板治疗的 54 例患者作为研究组。纳入标准^[9]:(1)锁骨远端骨折类型均经 X 射线检查确诊为 Neer II 型;(2)均表现为肩部肿痛、肩关节活动受限以及可触及骨擦感;(3)均按照医嘱进行相关锻炼并配合医院定期随访;(4)临床病例资料完整者;(5)患者及其家属知情本次研究并签署知情同意书。排除标准:(1)因肩袖损伤或肩周炎等导致的肩关节功能障碍者;(2)受伤前有患侧肢体病史者;(3)合并心肝肾等脏器功能不全者;(4)合并有精神障碍无法配合本次研究者;(5)合并有其他基础性疾病影响日常生活者。其中对照组男 28 例,女 25 例,年龄 21~68 岁,平均(38.46±8.21)岁;致伤原因:重物砸伤 19 例,坠落 15 例,交通事故损伤 19 例;右侧 33 例,左侧 20 例。研究组男 26 例,女 28 例,年龄 22~70 岁,平均(39.28±9.67)岁;致伤原因:重物砸伤 21 例,坠落 14 例,交通事故损伤 19 例;右侧 31 例,左侧 23 例。两组患者一般资料,经比较无统计学差异($P>0.05$),组间可比。四川省泸州市中医医院伦理学委员会已批准本次研究。

1.2 治疗方法

1.2.1 研究组 给予锁骨远端锁定钢板手术治疗,常规麻醉,体位:沙滩椅位,取锁骨外侧段处,作横切口,骨折端暴露完全,选取适宜的远端锁定钢板,骨折复位后,锁骨上方放置钢板,钻

孔探测即可拧入螺钉,锁骨远端骨折处放置 4~6 枚锁定螺钉,锁骨近端放置 3~5 枚锁定螺钉,以维持不同的锁定方向,手术结束后轻微活动肩关节。

1.2.2 对照组 给予锁骨钩钢板手术治疗,常规麻醉,体位:沙滩椅位,患肩稍垫高,于肩峰至锁骨外 1/3 处作一切口,肩锁关节部位暴露完全后,选取适宜型号的锁骨钩钢板,在骨折近端放置 3 枚以上的螺钉。将钩端于肩峰后缘处插入至肩峰下间隙,钢板处于锁骨外侧上缘,钢板下压,随后采用螺钉固定钢板。

1.2.3 术后处理 两组均在 C 臂机透视下查看复位满意后,采用生理盐水冲洗伤口,依次缝合切口。术后依据患者自身具体情况康复训练,通常先以肩锁固定带固定 3 周,3 周后以健侧手托患侧手进行适当的肩关节收缩、屈伸训练,随后逐渐过渡至主动功能锻炼。通过回院复查的方式进行随访 1 年,术后 1 年左右取出内固定物。

1.3 观察指标

1.3.1 疗效 根据 Kalsson 评分^[10]法评定患者术后 1 年的临床疗效,具体如下:优:肩部无疼痛感,肩关节可自由活动,肌力恢复正常,X 线显示肩关节复位良好;良:肩部有轻微痛感,肩关节可作 90°~180° 活动,肌力基本恢复正常,X 线显示肩关节间隙 5~10 mm;差:肩部疼痛感较明显,肩关节无法自由活动,肩臂肌肉无力,X 线显示肩关节锁脱位。优良率=优率+良率。

1.3.2 临床指标 记录两组患者手术时间、手术切口长度、术中出血量、骨折愈合时间。

1.3.3 肩关节功能 于术前、术后 5 周、术后 10 周采用 JOA 评分^[11]法对所有患者肩关节功能进行评定。评分内容主要包括肩关节功能(20 分)、肩关节活动度(30 分)、X 线评定(5 分)、患侧肩部疼痛(30 分)、关节稳定性(15 分),评分越高,肩关节功能越好。

1.3.4 并发症 记录两组术后并发症发生情况,包括肩峰下撞击综合征、肩峰下磨损、骨折畸形或不愈合、钢板螺钉拔出、肩关节外展受限疼痛等。

1.4 统计学方法

应用 SPSS 23.0 统计软件分析数据,其中计数资料采用率的形式表示,进行卡方检验;计量资料经检验均符合正态分布,采用均值±标准差表示,采用 t 检验,检验水准 $\alpha=0.05$ 。

2 结果

2.1 两组临床疗效比较

研究组术后 1 年优良率为 90.74%(49/54),高于对照组患者的 64.15%(34/53),组间比较差异有统计学意义($P<0.05$),详见表 1。

表 1 两组临床疗效比较[n(%)]

Table 1 Comparison of clinical efficacy between the two groups[n(%)]

Groups	Excellent	Good	Bad	Excellent and good rate
Control group(n=53)	21(39.62)	13(24.53)	19(35.85)	34(64.15)
Research group(n=54)	33(61.11)	16(29.63)	5(9.26)	49(90.74)
χ^2				10.869
P				0.001

2.2 两组临床指标比较

愈合时间比较差异无统计学意义($P>0.05$),详见表 2。

两组患者手术时间、术中出血量、手术切口长度以及骨折

表 2 两组临床指标比较($\bar{x} \pm s$)

Table 2 Comparison of clinical indicators between the two groups($\bar{x} \pm s$)

Groups	Operation time(min)	Intraoperative bleeding volume(mL)	Length of operative incision (cm)	Fracture healing time (weeks)
Control group(n=53)	98.23± 8.78	103.71± 12.75	8.63± 0.93	8.54± 0.85
Research group(n=54)	96.77± 10.67	101.63± 9.78	8.54± 0.88	8.48± 0.91
t	0.772	0.948	0.514	0.352
P	0.442	0.345	0.608	0.725

2.3 两组患者肩关节功能评分比较

两组患者术后 5 周、术后 10 周上述指标评分均高于术前,且术

两组患者术前肩关节功能、肩关节活动度、X 线评定、患侧
肩部疼痛、关节稳定性评分比较差异无统计学意义($P>0.05$);

后 10 周高于术后 5 周($P<0.05$);研究组术后 5 周、术后 10 周
上述指标评分高于对照组($P<0.05$),详见表 3。

表 3 两组患者肩关节功能评分比较($\bar{x} \pm s$,分)

Table 3 Comparison of shoulder function scores between two groups of patients($\bar{x} \pm s$, scores)

Groups	Time	Shoulder joint function	Shoulder joint mobility	X-ray evaluation	Shoulder pain	Joint stability
Control group (n=53)	Before operation	13.06± 0.84	18.35± 1.65	2.78± 0.52	20.02± 2.48	11.74± 0.63
	5 weeks after operation	14.54± 0.85 ^a	22.78± 1.52 ^a	3.54± 0.48 ^a	22.62± 4.58 ^a	12.45± 0.61 ^a
	10 weeks after operation	17.35± 1.03 ^{ab}	26.64± 1.25 ^{ab}	4.16± 0.47 ^{ab}	25.22± 3.18 ^{ab}	14.24± 0.57 ^{ab}
Research group (n=54)	Before operation	13.56± 0.90	18.24± 1.55	2.83± 0.66	20.11± 3.59	11.58± 0.65
	5 weeks after operation	16.23± 0.92 ^{ac}	24.12± 1.24 ^{ac}	4.12± 0.64 ^{ac}	25.56± 6.50 ^{ac}	13.56± 0.34 ^{ac}
	10 weeks after operation	18.84± 0.96 ^{abc}	28.53± 0.95 ^{abc}	4.67± 0.18 ^{abc}	28.57± 1.21 ^{abc}	14.65± 0.38 ^{abc}

Note: compared with before operation, ^a $P<0.05$; compared with 5 weeks after operation, ^b $P<0.05$; compared with control group, ^c $P<0.05$.

2.4 两组术后并发症发生情况比较

的 32.08%(17/53),组间比较差异具有统计学意义($P<0.05$),详

研究组术后并发症总发生率为 7.41%(4/54), 低于对照组

见表 4。

表 4 两组术后并发症发生情况比较[n(%)]

Table 4 Comparison of postoperative complications between the two groups[n(%)]

Groups	Subacromial impingement syndrome	Acromion wear	Fracture deformity or nonunion	Plate and bolt pull-out	Abduction pain of shoulder joint	Total incidence
Control group(n=53)	3(5.66)	2(3.77)	2(3.77)	4(7.55)	6(11.32)	17(32.08)
Research group(n=54)	1(1.85)	1(1.85)	0(0.00)	1(1.85)	1(1.85)	4(7.41)
χ^2						10.318
P						0.001

3 讨论

锁骨远端骨折时,胸锁乳突肌、重力以及胸肌牵拉导致骨折端明显移位,尤其是喙锁韧带断裂的锁骨远端骨折,更容易导致骨折不愈合或者延迟愈合^[12]。锁骨远端骨折治疗主要取决于骨折分型,其中 Neer 分型 I 型骨折的喙锁韧带完好,Neer 分型 II 型骨折断端处于喙锁韧带内侧,喙锁韧带断裂,Neer 分型 III 型骨折断端处于喙锁韧带外侧^[13,14]。因此,Neer 分型 I 型、III 型骨折本身较为稳定,可采取非手术治疗,而 Neer 分型 II 型因其为不稳定骨折,手法复位困难,不愈合风险高,临床多采用切

开复位内固定治疗^[15,16]。目前临床多采用锁骨钩钢板、锁骨远端锁定钢板治疗 Neer 分型 II 型锁骨远端骨折,其中锁骨钩钢板将尖钩插入肩峰下间隙内,借助钢板下压力量使胸锁乳突肌对锁骨的向上牵引力减小,成功复位骨折端,有利于早期功能锻炼^[17,18],然而该技术式常出现过度复位现象,致使肩锁关节产生疼痛,不利于患者肩关节功能恢复^[19]。随着骨科内固定物的发展,锁骨远端锁定钢板治疗日益增多,其优势主要体现为:(1)钢板位于骨膜外,最大程度的减少了对骨膜以及皮质骨血供的影响;(2)术中无需暴露肩锁关节;(3)钢板具有预先塑性设计特点,贴合性佳^[20-22]。然而锁骨远端锁定钢板也存在可能出现术

后再次脱位,甚至钢板从喙突处脱出的缺陷,本研究通过对比上述两种术式的治疗效果,以为临床术式选择提供参考。

本研究结果显示,研究组术后优良率高于对照组,提示锁骨远端锁定钢板治疗 Neer II 型锁骨远端骨折,可进一步提高临床疗效,这与李杰等人^[23]研究结果基本一致。分析其原因,锁骨钩钢板型号及钩的折弯角度较为单一,无法提供个性化钢板,加之个体化肩峰的解剖学差异,致使钢板贴合度差^[24],而锁骨远端锁定钢板材料为钛合金,可有效与组织相容,减少接骨板对周围组织的影响,有效提升疗效^[25]。另外,两组患者手术时间、术中出血量、手术切口长度以及骨折愈合时间比较差异无统计学意义,表明两种术式均可有效治疗 Neer II 型锁骨远端骨折。同时两组患者术后肩关节功能各项评分均呈逐渐上升的趋势,且研究组高于对照组,提示两种术式均可有效改善患者肩功能,但锁骨远端锁定钢板治疗改善效果更佳。究其原因,锁骨远端锁定钢板外侧小螺钉可较为自由的进行多方向锁定,维持了螺钉的把持力,可使得早期内固定更佳牢固,在此坚强的固定基础上,钢板位于骨膜外,减少了钢板和骨折面的频繁接触,很大程度减少了对血供的影响,有利于骨痂的形成,进而促进患者术后康复,改善患者肩关节功能^[26-28]。此外锁骨远端锁定钢板治疗可有效降低术后并发症发生率,主要在于:(1)术中对肩锁关节影响较小,无须插入锁骨钩,可减少正常肩锁关节后方组织干扰及损伤;(2)钢板外侧锁定小螺钉可进行多方向锁定,可提供高度稳定内固定^[29,30]。值得注意的是,临床实施锁骨远端锁定钢板治疗时若发现存在韧带损伤,必须及时进行修复,以保证关节稳定性,且术后应积极开展适当锻炼及理疗,以促进患者的进一步康复。

综上所述,锁骨远端锁定钢板治疗 Neer II 型锁骨远端骨折,疗效确切,肩关节功能恢复效果更佳,且术后并发症少。但是锁骨远端锁定钢板容易受远端骨块大小、骨质疏松程度的影响,存在一定的局限性,临床选择治疗术式时应视患者骨折具体情况而定,以达到最佳的治疗效果。

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