

LARS 人工韧带与缝线骨锚重建喙锁韧带治疗 锁骨远端不稳定性骨折的疗效比较

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摘要 **目的:**比较 LARS 人工韧带与缝线骨锚重建喙锁韧带 2 种方法治疗锁骨远端不稳定性骨折的疗效。**方法:**42 例锁骨远端不稳定性骨折患者, 男 27 例, 女 15 例; 年龄 32 ~ 79 岁, 中位数 54 岁; 左侧 26 例, 右侧 16 例; 合并骨质疏松症 27 例; 骨折分型: Neer II 型 30 例, III 型 12 例。随机分为 2 组, 分别采用 LARS 人工韧带与缝线骨锚重建喙锁韧带, 观察骨折愈合及肩关节功能恢复情况, 并对 2 组患者的疗效进行比较。**结果:**2 组患者均获随访, 随访时间 6 ~ 16 个月, 中位数 11 个月; 骨折均愈合; 参照 JOA 肩关节疾患治疗成绩判定标准评定疗效, LARS 人工韧带组疗效优于缝线骨锚组, 差异具有统计学意义 ($Z = 7.323, P = 0.034$)。缝线骨锚组 2 例合并骨质疏松症的 Neer II 型骨折患者, 术后 2 个月出现锚钉松动、拔出, 骨折端移位, 改用锁骨钩钢板固定, 4 个月骨折愈合; LARS 人工韧带组 1 例患者, 术后 3 周因跌倒致骨折远端向上移位, 患肢上举时疼痛, 行锁骨远端切除术后, 疼痛消失, 肩关节功能恢复正常。**结论:**LARS 人工韧带重建喙锁韧带是治疗锁骨远端不稳定性骨折的一种理想方法。

关键词 骨折 锁骨 骨折固定术, 内 人工韧带 缝合锚

Comparison of the curative effects between LARS artificial ligaments and suture anchors in the reconstruction of coracoclavicular ligaments for treating unstable distal clavicular fracture DING Hong*, XU Xiao-yue, XU Xin, ZHU Su-hang. *The People's Hospital of Cixi City, Cixi 315300, Zhejiang, China

ABSTRACT **Objective:**To compare the curative effect of LARS artificial ligaments with that of suture anchors in the reconstruction of coracoclavicular ligaments for treating unstable distal clavicular fracture. **Methods:**For 42 patients with unstable distal clavicular fractures, male 27 cases, while female 15 cases; ages from 32 to 79 years with a median of 54 years old; twenty-six cases with left fractures, while the others with right fractures; twenty-seven cases with fractures combined with osteoporosis. For fractures classification, 30 cases in Neer type II, while the others in Neer type III. All the patients were randomly divided into 2 groups, and they were administrated with LARS artificial ligaments and suture anchors to reconstruct coracoclavicular ligaments respectively. The situations of fracture healing and recovery of shoulder joint functions were observed, and the curative effects were compared between the 2 groups. **Results:**Patients in the 2 groups were all followed up for 6–16 months with a median of 11 months, and all the fractures were healed. The curative effects were evaluated in accordance with judging standards specified in JOA shoulder disorders evaluation scores. The curative effect of LARS artificial ligaments was better than that of suture anchors and there was statistical difference between the 2 groups ($Z = 7.323, P = 0.034$). Two months after the operation, 2 patients with Neer type II fractures and osteoporosis in suture anchors group were found with loosen or extracted anchors and displacement of fracture site. They were treated with clavicular hook plate fixation and the fractures healed up 4 months later. Three weeks after the operation, one patient in LARS artificial ligaments group was found with upward displacement of distal broken end of fractured clavicle for tumble. The patient felt pain when uplifting the affected limb, while the pain disappeared and shoulder joint function recovered after distal clavicular resection. **Conclusion:**Coracoclavicular ligaments reconstruction with LARS artificial ligaments is a kind of ideal method in the treatment of unstable distal clavicular fracture.

Key words Fractures, bone; Clavicle; Fracture fixation, internal; Artificial ligaments; Suture anchors

锁骨远端骨折是较为常见的损伤, 喙锁韧带断裂、骨折移位明显的锁骨远端不稳定性骨折, 需采用手术治疗。2009 年 10 月至 2011 年 11 月, 笔者采用 LARS 人工韧带和缝线骨锚 2 种方法重建喙锁韧带治疗锁骨远端不稳性骨折患者 42 例, 并对 2 种方法的

疗效进行了比较, 现总结报告如下。

1 临床资料

锁骨远端骨折患者 42 例, 男 27 例, 女 15 例; 年龄 32 ~ 79 岁, 中位数 54 岁; 左侧 26 例, 右侧 16 例; 合并骨质疏松症 27 例。骨折分型: Neer II 型 30

例,NeerⅢ型 12 例;受伤至手术时间 3~7 d,平均 4.7 d。

2 方法

2.1 分组方法 42 例患者随机分为 2 组,LARS 人

工韧带组 20 例,合并骨质疏松症 19 例;缝线骨锚组 22 例,合并骨质疏松症 8 例。2 组患者性别、年龄、骨折分型及受伤至手术时间的差异均无统计学意义,具有可比性(表 1)。

表 1 2 组患者一般资料比较

组别	例数	性别(例)		年龄(岁)	骨折分型(例)		受伤至手术时间(d)
		男	女		Ⅱ型	Ⅲ型	
LARS 人工韧带组	20	12	8	57±15	13	7	5.7±2.2
缝线骨锚组	22	15	7	54±16	17	5	4.6±2.7
检验统计量		$\chi^2=1.564$		$t=1.431$	$\chi^2=3.382$		$t=2.609$
P 值		0.173		0.126	0.065		0.143

2.2 手术方法

2.2.1 LARS 人工韧带组 采用臂丛神经阻滞麻醉,患者取“沙滩椅”位,沿锁骨前缘切 1 个约 4 cm 长的直切口。越过喙突,清理肩锁关节并切除所有的纤维组织,复位锁骨后,用导针在锁骨近端距喙锁韧带 5 mm 处,分别自上而下、自前向后做 1 个直径 3.5 mm 的骨道,前者即中间通道,后者即侧通道,将 2 根薇乔线对折后分别穿入 2 个通道作为引线,切开肌膜,用骨锉小心地暴露喙突,将直径 4 mm 的 LARS 人工韧带从喙突下穿过后穿进引线线圈,侧韧带束引入侧通道,中韧带束引入中间通道,交替拉动韧带束,调整韧带的紧张度,用直径 4.7 mm、长 1.5 mm 的可吸收界面螺钉将人工韧带固定在 2 个锁骨通道内。平锁骨切除韧带末端,缝合斜方肌和三角肌边缘,放置引流条,关闭切口[图 1(1)]。

2.2.2 缝线骨锚组 麻醉方法及患者体位同 LARS 人工韧带组。垫高患肩,自喙突沿锁骨前外侧至肩锁关节切 1 个约 4 cm 长的弧形切口,显露骨折断端和喙突,清理血肿及机化的组织,在喙突基底部内侧拧入 2 枚带缝线的锚钉,在骨折近端喙锁韧带止点处上方,用直径 2 mm 的钻头钻 2 个孔,将缝线骨锚尾端的缝线穿过骨孔,复位锁骨后将尾线收紧、打结,缝合三角肌边缘,放置引流条,关闭切口[图 1(2)]。

2.3 术后处理 术后患肢悬吊 4 周,第 5 周开始进行肩关节被动屈伸及外展锻炼,第 7 周开始肩关节主动锻炼。

2.4 统计学方法 采用 SPSS13.0 统计软件处理数据,2 组患者年龄、受伤至手术时间的比较采用 t 检验;2 组患者性别、骨折分类的比较采用 χ^2 检验;2 组间疗效的比较采用秩和检验;检验水准 $\alpha=0.05$ 。

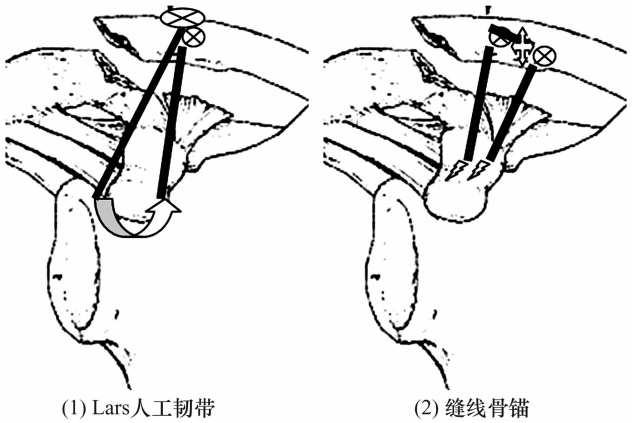


图 1 2 种方法重建喙锁韧带示意图

3 结果

2 组患者均获随访,随访时间 6~16 个月,中位数 11 个月;骨折均愈合;参照 JOA 肩关节疾患治疗成绩判定标准^[1]评定疗效,90~100 分为优,80~89 分为良,70~79 分为可,≤69 分为差。LARS 人工韧带组疗效优于缝线骨锚组,差异具有统计学意义($Z=7.323,P=0.034$),见表 2。LARS 人工韧带组 1 例 NeerⅡ型骨折患者,术后 3 周因跌倒致骨折远端向上移位,患肢上举时疼痛,行锁骨远端切除术后,肩关节功能恢复,疼痛消失。缝线骨锚组 2 例合并骨质疏松症的 NeerⅡ型骨折患者,术后 2 个月出现锚钉松动拔出,骨折端移位,改用锁骨钩钢板固定,4 个月后骨折愈合。典型病例 X 线片见图 2、图 3。

表 2 2 组患者术后疗效评定结果

组别	例数	优	良	可
LARS 人工韧带组	20	11	9	0
缝线骨锚组	22	9	7	6

4 讨论

Neer 将锁骨远端骨折分为 3 型^[2]:NeerⅠ型,喙锁韧带完整,为韧带间骨折;NeerⅡ型,喙锁韧带断

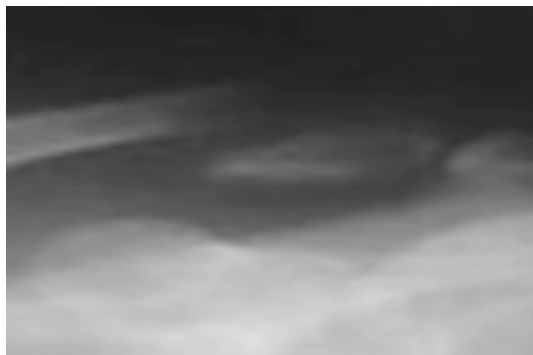


(1)术前X线片

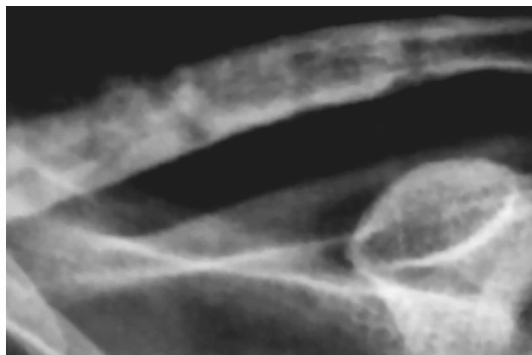


(2)术后3个月X线片

图2 患者,女,36岁,右锁骨远端不稳定性骨折(Neer II型),缝线骨锚固定重建喙锁韧带



(1)术前X线片



(2)术后3个月X线片

图3 患者,女,65岁,左锁骨远端不稳定性骨折(Neer III型)合并骨质疏松症,LARS人工韧带重建喙锁韧带

裂,骨折近端向上移位;Neer III型,骨折累及肩锁关节的关节面。后2型均为不稳定性骨折。喙锁韧带较短,断裂后无法进行直接缝合,对于喙锁韧带断裂的锁骨远端骨折,治疗的关键在于选择合适的方法使骨折复位后能牢固固定,重建肩锁间的生理稳定。

手术治疗锁骨远端不稳定性骨折,方法有克氏针交叉固定、喙锁螺钉固定及锁骨钩钢板固定^[3-5]等。但这些方法都只强调了肩锁关节的解剖复位,而忽略了肩锁关节的生物力学稳定。喙锁韧带断裂可使肩锁关节处存在强大的剪切力,克氏针交叉固定后,易出现松动、滑出或断裂,导致固定失败;且针尾刺激皮下组织可引起疼痛。喙锁螺钉固定为双皮质固定,固定后锁骨、喙锁韧带及喙突形成1个刚性整体,肩锁关节丧失正常的微动,在长期的应力作用下,可出现螺钉拔出和断裂。锁骨钩钢板内固定,由于钢板钩插入肩峰下,冈上肌腱在肩峰下方滑动时可与锁骨钩钢板钩部发生碰撞,术后出现患肩活动时疼痛、肩关节功能受限等并发症,且可致创伤性关节炎。只进行肩锁关节的固定而不进行喙锁韧带的重建,喙锁韧带瘢痕愈合,强度较低,难以维持骨折端的解剖复位,取出内固定后易出现再骨折。因此重建喙锁韧带、维持喙锁间隙功能的手术方式是治疗锁骨远端不稳定性骨

折的理想方法。

LARS人工韧带和缝线骨锚重建喙锁韧带治疗锁骨远端不稳定性骨折,均可维持锁骨的解剖复位,且不损伤肩锁关节的软骨面,降低了肩锁关节创伤性关节炎发生的几率。Harris等^[6]发现缝线骨锚重建后的喙锁韧带的强度与正常韧带相近,但其刚度小于正常喙锁韧带的30%。Motamedi等^[7]发现聚合编织线与正常喙锁韧带的强度和刚度相近。本研究结果表明,治疗锁骨远端不稳定性骨折,LARS人工韧带重建喙锁韧带的疗效优于缝线骨锚,可能与人工韧带经喙突固定较缝线骨锚在喙突基底部固定更牢固,及LARS人工韧带具有很强的韧性及抗疲劳性,对骨折端的把持力也较缝线骨锚更大等因素有关。但LARS人工韧带费用较高,在患者经济条件允许的情况下,采用LARS人工韧带重建喙锁韧带,是治疗锁骨远端不稳定性骨折的一种理想方法。

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4 在局部组织积聚可诱导异位骨化的发生,这类似于局部输注 BMP-4 促进骨融合的机制^[15]。目前常见的预防异位骨化形成的措施有物理治疗和药物治疗,如通过局部放疗阻止前体细胞向成骨细胞转化^[16]和通过羟乙二磷酸阻断成骨作用^[17]等。因此,笔者考虑适度控制脑外伤患者伤后的血清 BMP-4 含量可能会降低其异位骨化的发生率。

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