

可塑纸板有限外固定治疗老年性肱骨近端粉碎性骨折

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【摘要】 目的:探讨可塑纸板有限外固定治疗老年性肱骨近端粉碎性骨折的临床疗效。方法:自 2015 年 6 月至 2017 年 12 月收治 32 例老年性肱骨近端粉碎性骨折患者,经手法整复后可塑纸板有限外固定,其中男 13 例,女 19 例;年龄 55~85(68.22±8.36)岁;左侧 18 例,右侧 14 例。所有患者定期复查肩关节 X 线片并指导其进行适当功能锻炼,术后 3 个月采用 Constant-Murley 肩关节评分进行临床疗效评价。结果:32 例患者获得随访,时间 3~12 (4.97±2.39)个月。所有患者在医师指导下行功能锻炼,9 例患者结合局部中药湿热敷进行局部理疗促进肩关节功能恢复。术后 31 例达到骨性愈合,愈合时间 5~12(7.44±1.72)周,1 例未愈合因骨折断端粉碎明显且分离移位大,肱骨头血供不足出现肱骨头坏死吸收。术后 3 个月 Constant-Murley 肩关节评分为 87.56±6.93;其中优 15,良 14,可 2 例,差 1 例。结论:采用可塑纸板有限外固定保守治疗老年性肱骨近端粉碎性骨折,保证了骨折断端的生物力学稳定,有利于患者进行早期功能锻炼,促进肩关节功能的早期恢复,缩短了康复时间,创伤小,患者易于接受。

【关键词】 骨折固定术; 肱骨; 骨折,粉碎性; 老年人

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Limited external fixation of plastic cardboard for the treatment of senile comminuted humeral fracture TAO Shuai, CHEN Feng-hua, WANG Kai, GONG Hua-hui, SHEN Shao-yong, JI Wan-bo, LIU Jin-tao, and JIANG Hong*. *Department of Orthopaedics, Suzhou Hospital of TCM Affiliated Nanjing University of Chinese Medicine, Suzhou 215009, Jiangsu, China

ABSTRACT Objective:To explore clinical efficacy of limited external fixation with plastic paperboard in treating senile proximal comminuted humeral fracture. **Methods:**From June 2015 to December 2017, 32 senile patients with proximal comminuted fracture of humerus were treated with plasticized cardboard after manual external fixation. Among them, including 13 males and 19 females aged from 55 to 85 years old with an average of (68.22±8.36) years old; 18 patients on the left side and 14 patients on the right side; all patients were regularly review shoulder X-rays and performed appropriate functional exercises. Constant-Murley shoulder joint scoring was used to evaluate clinical effects. **Results:**Thirty-two patients were followed up for 3 to 12 months with an average of (4.97±2.39) months. All patients were underwent functional exercise under guidance of physicians. Nine patients were treated with topical Chinese herbal moist heat compresses to promote shoulder function recovery. Thirty-one patients were obtained fracture healing, the time ranged from 5 to 12 weeks with an average of (7.44±1.72)weeks. One patient was not healed due to comminuted fracture of fracture end and the separation was large, the blood supply to humeral head was insufficient for necrosis absorption. Postoperative Constant-Murley shoulder score at 3 months was 87.56±6.93; 15 patients got excellent results, 14 good, 2 fair and 1 poor. **Conclusion:**Limited external fixation with plastic paperboard for the treatment of senile proximal comminuted humeral fracture could ensure biomechanical stability of fracture, promote early recovery of shoulder joint function and shorten recovery time.

KEYWORDS Fracture fixation; Humerus; Fractures, comminuted; Aged

随着我国人口老龄化进程加快,肱骨近端骨折的发病率呈逐年上升趋势,与其特殊的解剖结构密切相关,此处是松质骨与密质骨汇集处,骨皮质单薄,松质骨多于密质骨,局部肌肉覆盖少,抵抗能力差,容易发生骨折。尤其是老年性肱骨近端粉碎性骨

折这一特殊群体,其骨折原因与骨质疏松相关程度高,治疗上比较棘手,手术治疗风险大且术后功能恢复欠佳^[1-4],这为保守治疗创造了机遇。自 2015 年 6 月至 2017 年 12 月采用可塑纸板有限外固定治疗老年性肱骨近端粉碎性骨折 32 例,疗效满意,现报告如下。

1 临床资料

纳入标准:年龄≥55 岁;影像学检查(X 线片、

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CT)示骨折端 Neer^[5]分型属于 3、4 部分骨折或合并脱位者;受伤 2 d 内完成手法复位;纳入对象同意目前的治疗方案,坚持完成随访。排除标准:骨折早期放弃保守治疗,改行手术治疗者;患有严重的内科疾病,影响疾病治疗及随访进程者;对疼痛耐受性差,不能配合检查治疗,未积极行功能锻炼者。本组 32 例,其中男 13 例,女 19 例,年龄 55~85 (68.22±8.36)岁;左侧 18 例,右侧 14 例。

2 治疗方法

32 例患者受伤后就诊时根据影像学资料(X 线片、CT)首先行骨折断端的手法复位,复位后立即行可塑纸板有限外固定,笔者观察到复位后复查 X 线即使骨折断端对位不甚理想也无须及时重新手法复位,可根据患者断端移位情况指导患者早期功能锻炼,通过患肢自身重力的代偿来纠正部分难以复位满意的骨折,最终达到功能复位,具体操作方法如下。

2.1 手法复位

体位:患者取坐位或半卧位,将上臂自然垂于身体两侧,全身处于完全放松状态,昂首挺胸,健侧手叉于腰间,有节奏的进行深呼吸运动。依据患者肱骨近端骨折成角移位情况可分为内收型和外展型两种,分别采用不同的手法进行复位。对于合并肩关节脱位或肱骨头翻转的患者,通常先对骨折进行手法整复,然后将肱骨头推送至关节内。

2.2 可塑纸板固定

纸板规格:马粪纸板 3 块,2 块呈“菜刀”状,分别置于肩前、肩后,前至腋窝前,后至腋窝后,上达肩峰,下至上臂中下 1/3 处;另一块侧方纸板上达颈部外侧,下至上臂中下 1/3 处,与肩前后 2 块纸板保持水平,3 块纸板上、下端分别剪开 3 条 3~5 cm 的纵行裂口,浸水后泡软根据患者肩部情况以利于塑形贴服。

固定方法:两助手辅助下进行对抗牵引,患侧肩关节及双侧腋下分别用绵纸均匀铺垫,并保持局部平整消除死角,以免造成医源性压疮。然后将 2 块“菜刀”状纸板用水浸湿后分别放置于肩关节的前后侧,刀柄位于肩峰端,刀把止于患肢上臂中下 1/3 处,绷带环绕,均布加压包扎。颈肩外侧则以超肩关节侧方纸板贴服固定,3 块纸夹板相互放置间距以边缘相接触为宜,不可重叠或间距过大。然后于上臂处从下往上进行包扎,环绕至骨折近端时嘱患者挺胸抬头穿过健侧腋下,再绕回至患侧上臂、肩部及腋下,缠绕 1 圈。再重复穿过健侧腋下,呈单“8”字形缠绕包扎,边包扎边保持局部平整,共来回缠绕 8 次,最后用三角巾将患肢按照外展型骨折上臂内收贴胸位固定、内收型骨折上臂外展位固定悬吊胸前。

2.3 功能锻炼

包扎完成后,既保证了骨折断端的稳定,又可使患肩在可塑纸板外固定的情况下保持肩关节微动。1 周后复查,在可耐受的情况下,指导患者开始行功能锻炼,嘱患者取站立位,患肢在以身体侧为中心行前后甩动,如钟表样般,甩动幅度一般控制在以患肢为中心±30°之内,利用上肢自重的惯性,摆动幅度可逐渐加大;第 2~3 周甩动幅度开始增至以患肢为中心±90°之间;结合患者功能情况及复查 X 线片结果指导患者 4 周后加做肩关节水平位左右甩动,若复查 X 线片见骨折断端分离移位明显,可嘱患者适当增加患肢重量进行甩肩锻炼(可手握约 1 kg 重物);定期摄 X 线片复查,根据肱骨近端骨折愈合良好程度适时去除纸板外固定,同时指导患者进行适当的功能锻炼,如患肢爬墙、甩肩及各方向环旋等主动功能锻炼。局部肌肉僵硬者,必要时可结合我院特色外治法中药湿热敷进行局部松解治疗。

3 结果

3.1 疗效评价标准

采用肩关节功能 Constant-Murley^[6]评分标准,分别从疼痛(15 分)、关节功能(40 分)、日常社会活动(20 分)、肌力(25 分)4 个方面进行评价,总分≥90 分为优,80~89 分为良,70~79 分为可,<70 分为差。

3.2 疗效评价结果

32 例患者均获得随访,时间 3~12 (4.97±2.39)个月。所有患者在医师指导下行功能锻炼,9 例患者结合局部中药湿热敷进行局部理疗促进肩关节功能恢复。32 例患者中,31 例达到骨性愈合,愈合时间为 5~12 (7.44±1.72)周;1 例未愈合患者因骨折断端粉碎明显且骨折断端分离移位大,肱骨头血供不足出现肱骨头坏死吸收。

32 例患者治疗后 3 个月肩关节功能 Constant-Murley 评分为 87.56±6.93;其中优 15,良 14,可 2 例,差 1 例。结果见表 1。典型病例见图 1-2。

4 讨论

4.1 目前治疗方式的适应证及局限性

老年肱骨近端粉碎性骨折患者具有骨折端碎骨块多、局部骨质疏松、疼痛耐受性差特点,临床治疗比较棘手,既需要兼顾骨折端局部的稳定固定,尽可能保证患肢早期功能锻炼,促进肩关节功能恢复,又要让患者易于配合接受。目前临床主要的治疗方式^[7]如切开复位钢板内固定、髓内钉内固定、人工肱骨头置换等均难以达到这样的目的。切开复位锁定钢板内固定保证了骨折端的坚强内固定,但内侧骨皮质粉碎不稳定易并发肱骨头内翻塌陷、螺钉切出等风险导致手术失败。髓内钉内固定术后虽有利于

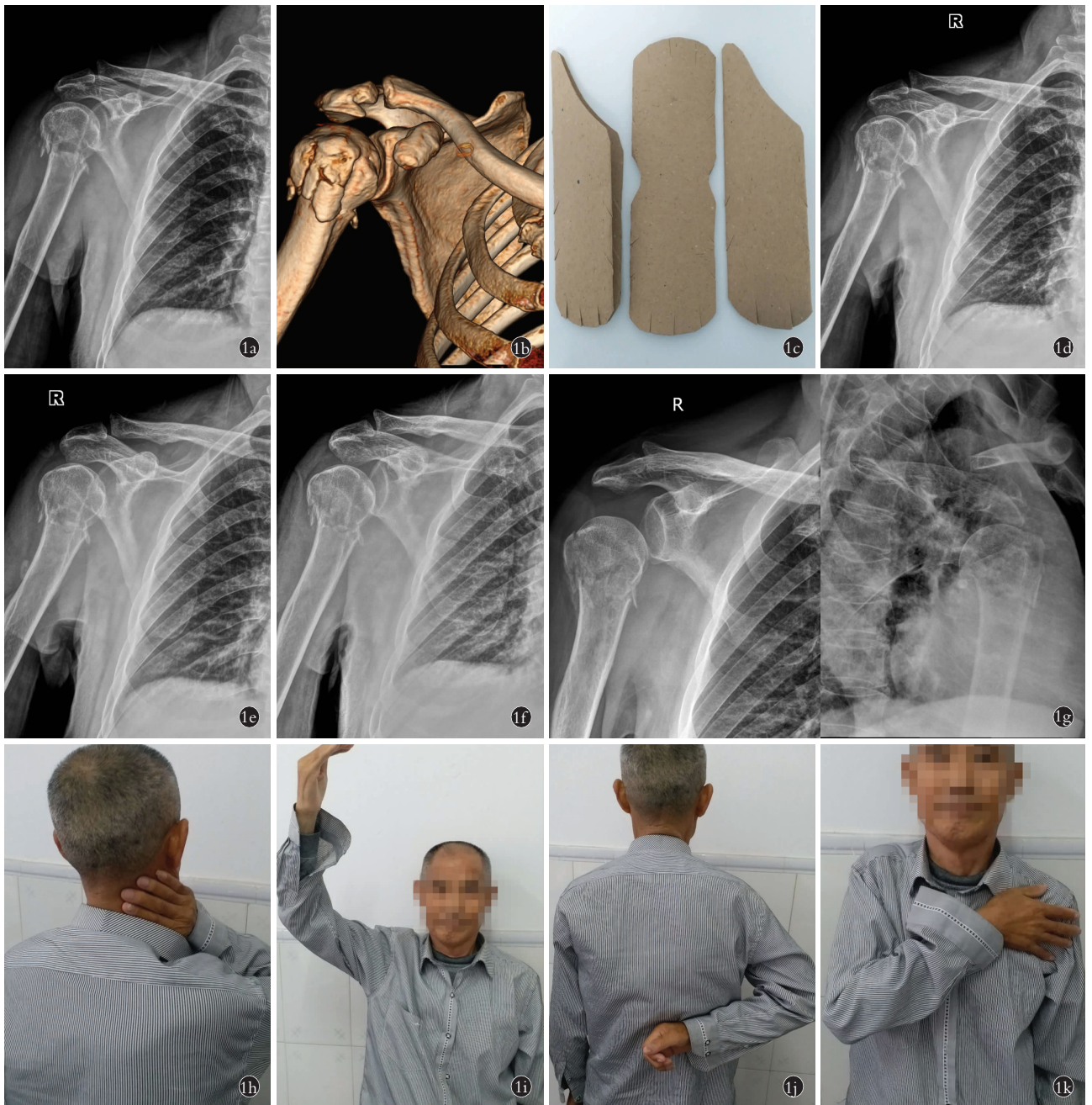


图 1 患者,男,69 岁,外伤致右肱骨近端粉碎性骨折(3 部分骨折) **1a.** 治疗前右肩关节正位 X 线片示骨折断端粉碎,远近端分离移位 **1b.** 治疗前右肩关节 CT 三维重建示骨折断端多片碎骨块,大结节部分分离,远近端稍有分离移位 **1c.** 患者体形偏瘦,肩部肌肉单薄,根据其外部特征剪裁的可塑纸板宽度可稍窄 **1d.** 手法复位 1 d 后右肩关节正位 X 线片示远近端局部分离移位 **1e.** 手法复位后 1 周右肩关节正位 X 线片示骨折端有嵌插,断端稳定且位置较前改善 **1f.** 手法复位后 2 周右肩关节正位 X 线片示骨折远近端及大结节碎骨块稳定,位置尚可 **1g.** 手法复位后 4 周右肩关节正侧位 X 线片示骨折断端位置满意,局部骨痂生长 **1h, 1i, 1j, 1k.** 手法复位后 12 周外观患肢手可触及后颈部,患肢手可至背部 T₁₂ 椎体处及健侧肩部

Fig.1 Male, 69 years old, right proximal comminuted humeral fracture caused by injury (three-part fracture) **1a.** AP X-ray of right shoulder joint before treatment showed comminuted fracture, and separation and displacement between distal and distal end **1b.** CT three-dimensional reconstruction of right shoulder joint before treatment showed multiple fractured bone fragments on the fracture end, and the large nodules were partially separated; the distal end was slightly separated and displaced **1c.** Width of plastic cardboard were cut narrow according to thin body and shoulder muscles of patients **1d.** AP X-ray of right shoulder joint after manual reduction at 1 day showed slightly local separation between distal and distal end **1e.** AP X-ray of right shoulder joint after manual reduction at 1 week showed insertion of fracture, and position of fracture was better than before operation **1f.** AP X-ray of right shoulder joint after manual reduction at 2 weeks showed stable position of fracture and large nodule was good **1g.** AP X-rays of right shoulder joint after manual reduction at 4 weeks showed satisfied position of fracture, growth of local callus **1h, 1i, 1j, 1k.** Appearance at 12 weeks after manual reduction showed the affected limbs could touch posterior neck, could reach T₁₂ vertebral body on the back and also placed on the healthy shoulder

表 1 肱骨近端粉碎性骨折 32 例患者治疗前后 Constant-Murley 评分比较 ($\bar{x}\pm s$, 分)

Tab.1 Comparison of Constant-Murley scores in 32 patients with senile comminuted proximal humeral fracture before and after treatment ($\bar{x}\pm s$, score)

时间	疼痛	功能	日常社会活动	肌力	总分
治疗前	5.31±3.58	1.34±1.00	1.44±0.95	8.91±2.10	17.00±6.14
治疗后 3 个月	13.28±2.73	35.06±2.03	15.00±1.90	24.38±1.68	87.56±6.93
t 值	-12.66	-85.45	-47.80	-33.00	-58.08
P 值	0.000	0.000	0.000	0.000	0.000

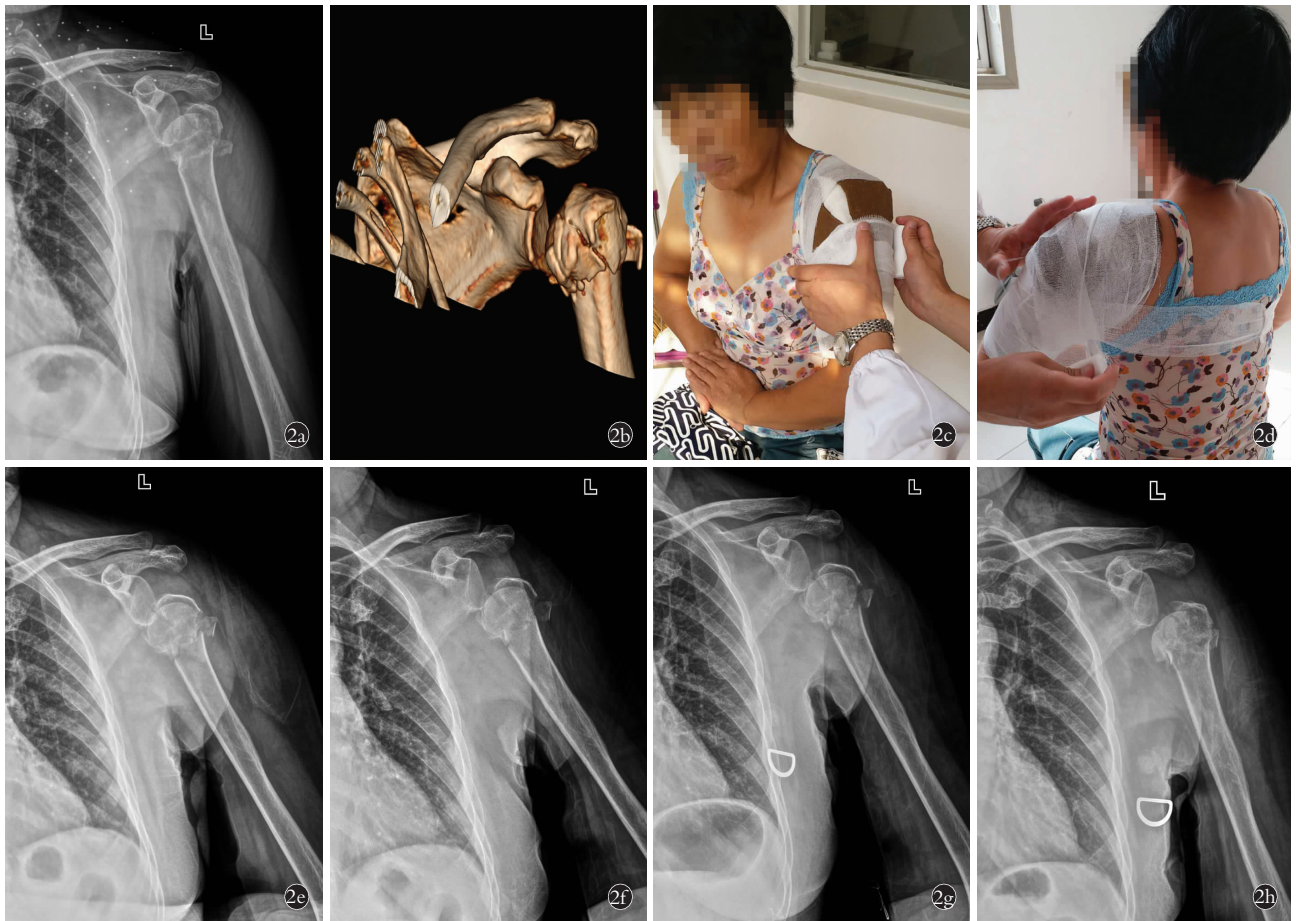


图 2 患者,女,65 岁,外伤致左肱骨近端粉碎性骨折(4 部分骨折) 2a. 治疗前左肩关节正位 X 线片示骨折断端粉碎明显,大结节分离移位 2b. 治疗前左肩关节三维重建 CT 示骨折断端粉碎呈多个碎骨块,大小结节移位 2c,2d. 患者体形偏丰满,左肩部肌肉丰厚,根据其外观形态裁剪可塑纸板,浸湿服帖后呈“8”字回旋包扎 2e. 手法复位 1 d 后左肩关节正位 X 线片示骨折断端位置较治疗前稍纠正,大小结节移位较前好转,左肩关节呈半脱位 2f. 手法复位后 1 周左肩关节正位 X 线片示骨折远端稍有嵌插,力线尚可,左肩关节仍呈半脱位 2g. 手法复位后 2 周左肩关节正位 X 线片示骨折远端间隙稍增宽,断端少量骨质吸收,位置及患肢力线尚可,左肩关节半脱位 2h. 手法复位后 3 周左肩关节正位 X 线片示骨折断端稍模糊,断端稳定,位置尚可,左肩关节半脱位

Fig.2 Female, 65 years old, left proximal comminuted humeral fracture caused by injury (four-part fracture) 2a. AP X-ray of left shoulder joint before treatment showed obvious comminuted fracture, and separation of greater tuberosity 2b. CT three-dimensional reconstruction of left shoulder joint before treatment showed multiple fractured bone fragments on the fracture end, and greater and lesser tuberosity were partially displaced 2c, 2d. Width of plastic cardboard were cut narrow according to fully body and shoulder muscles of patients, cyclotron bandaged like as “8” after immersion wetting 2e. AP X-ray of left shoulder joint after manual reduction at 1 day showed position of fracture, displacement of greater and lesser tuberosity were improved, left shoulder joint expressed half-dislocation 2f. AP X-ray of left shoulder joint after manual reduction at 1 week showed insertion of fracture, and line of force was moderate, and left shoulder joint was half-dislocation 2g. AP X-ray of left shoulder joint after manual reduction at 2 weeks showed interval between near and far fracture turned broadening, bone absorbing, line of force was moderate, and left shoulder joint was half-dislocation 2h. AP X-ray of left shoulder joint after manual reduction at 3 weeks showed fracture line was not clear, position was good, and left shoulder joint was half-dislocation



图 2 患者,女,65 岁,外伤致左肱骨近端粉碎性骨折(4 部分骨折) **2i**.手法复位后 5 周左肩关节正位 X 线片示骨折断端模糊,骨量减低,左肩关节在位 **2j**.手法复位后 7 周左肩关节正位 X 线片示骨折断端模糊,局部骨痂生长明显,断端稳定 **2k**.手法复位后 10 周左肩关节正位 X 线片示骨折断端大量骨痂生长,断端稳定,位置尚可,大结节处轻度骨质增生 **2l**.手法复位后 15 周左肩关节正位 X 线片示骨折断端愈合良好,局部骨量减低,大结节处轻度骨质增生,左肩关节在位 **2m,2n,2o,2p**.手法复位后 15 周外观示患肢手可触及后颈部,上举过头顶,患肢手可至背部 T₁₂ 椎体处,触及健侧肩部

Fig.2 Female, 65 years old, left proximal comminuted humeral fracture caused by injury (four-part fracture) **2i**. AP X-ray of left shoulder joint after manual reduction at 5 weeks showed unclear of fracture, reduce of bone mass and left shoulder joint was on position **2j**. AP X-ray of left shoulder joint after manual reduction at 7 weeks showed fracture line still not clear, local growth of callus, position of fracture was stable **2k**. AP X-ray of left shoulder joint after manual reduction at 10 weeks showed large number of callus generated, position was good, and hyperostosis of greater tubercle **2l**. AP X-ray of left shoulder joint after manual reduction at 15 weeks showed fracture healing well, local bone mass was decreased with slightly hyperostosis of greater tubercle, left shoulder joint was on position **2m,2n,2o,2p**. Appearance at 15 weeks after manual reduction showed the affected limbs could touch posterior neck, could reach T₁₂ vertebral body on the back and also placed on the healthy shoulder

患者早期功能锻炼,但对于粉碎明显移位程度大的骨折复位效果欠佳,在主钉插入时可加重骨折断端局部的移位,术后易出现肩关节撞击,功能恢复差。人工肱骨头置换常用于肱骨头吸收坏死、无法复位或存在复位困难的患者,是保守治疗与切开复位内固定治疗失败的补救措施,可在术后早期功能锻炼,但在首选的治疗方案中,老年患者常因手术创伤大、风险高而将其拒之门外。因此,笔者认为每种治疗方式都有其适应证及局限性,同时也存在其风险和并发症。尤其老年患者,为患者选择损伤小、风险低、经济负担小且功能恢复可的治疗方式,是每一位临床医生需要面临的难题。在本研究中,笔者为此类患者

选择保守治疗即手法复位后通过可塑纸板有限外固定,指导积极功能锻炼,尽可能实现功能复位。

4.2 可塑纸板材料的优越性

本研究选用马粪纸板作为外固定材料,根据患者形体及肩部形态的变化“量体裁衣”,达到“私人定制”,符合目前个性化医疗“精准医疗”理念。其具有以下特性:(1)可塑性。马粪纸板能根据患者的不同体型进行设计裁剪,用水浸湿后材料变软,根据肩关节的不同形态进行塑形,适应肢体生理弧度的要求,在超关节固定的同时不妨碍功能锻炼。(2)韧性及弹性。其固定于肢体干燥后,具有骨折端固定所需的硬度,且同时能适应肌肉收缩和舒张时所产生的肢体

内部的压力变化。(3)通透性。纸板由植物纤维制作而成,透气性好,有利于局部散热及皮肤汗液吸收;X线易穿透,在定期复查中无须解除局部外固定,避免骨折断端再移位的风险。(4)便于携带。马粪纸板质量轻,患者在纸板包扎固定的情况下可进行正常的日常活动,且对其肢体练功活动无明显影响。

4.3 “有限”外固定治疗关键点

因肩关节近端肌肉丰厚,应力集中,为了能更好地满足早期功能锻炼的目的,“有限”二字显得极为重要:(1)绷带包扎的压力均匀于患侧肩部的前、后、外3块可塑纸板上,消除不利于骨折的旋转、成角应力,构成断端的相对稳定状态。(2)体现中医骨折治疗理念的“动静结合”原则,在保证以往对于粉碎性骨折需要良好外固定观念的前提下,可塑纸板包扎固定后形成稳妥的生物力学固定,又可使肩关节成为微动关节,避免了长期静态固定造成的软组织挛缩、肌肉萎缩、肩关节粘连、僵硬等情况,达到“筋骨并重”的目的。在有限外固定这一特定形态下,本研究2例患者均在治疗后1周行早期甩肩功能锻炼,利用患肢自身的重力调整力线平衡,同时根据锻炼后骨折断端的调整情况必要时适当增加患肢重量,促进骨折断端分离、成角、移位等畸形矫正,利于肩关节功能恢复。

4.4 可塑纸板有限外固定保守治疗的竞争优势及临床意义

对于肱骨近端粉碎性骨折(Neers分型3、4部骨折),普遍认为其具有手术指征^[8],理应进行手术治疗。然而通过本研究证实即使是复杂的肱骨近端粉碎性骨折,也无须追求所谓解剖复位,功能复位即可。根据患者体形及肩关节形态的个体化差异自行调整可塑纸板的规格及塑形形态,“量体裁衣”“私人定制”,为此类老年患者保守治疗创造机遇,发挥中医“动静结合,筋骨并重”的优势,手法复位后进行“有限”外固定,取材简单,操作简便,既保证了骨折

断端的生物力学稳定,又有利于患者进行早期功能锻炼,促进肩关节功能的早期恢复,缩短了康复时间,提高了老年性肱骨近端粉碎性骨折的最终疗效,同时也避免了手术给患者带来的经济负担和身心痛苦,易于接受,可作为一种中医特色“精准医疗”方法,在临床中推广使用。

参考文献

- [1] 王蕾. 肱骨近端骨折的治疗理念与思考[J]. 中国骨伤, 2013, 26(1): 1-3.
WANG L. Therapy conception and thinking of proximal humeral fracture[J]. Zhongguo Gu Shang/China J Orthop Trauma, 2013, 26(1): 1-3. Chinese.
- [2] Kim TI, Choi JH, Kim SH, et al. The adequacy of diagnosis and treatment for osteoporosis in patients with proximal humeral fractures[J]. Clin Orthop Surg, 2016, 8(3): 274-279.
- [3] 吴望晟, 刘剑, 朱显科, 等. 肱骨近端骨折的治疗现状[J]. 中国矫形外科杂志, 2017, 25(12): 1117-1120.
WU WS, LIU J, ZHU XK, et al. Current treatment of proximal humeral fracture[J]. Zhongguo Jiao Xing Wai Ke Za Zhi, 2017, 25(12): 1117-1120. Chinese.
- [4] 蒋电明, 苏保. 肱骨近端骨折治疗方法选择与现状[J]. 中国骨伤, 2014, 27(12): 975-979.
JIANG DM, SU B. Present status and choice of treatment for proximal humeral fractures[J]. Zhongguo Gu Shang/China J Orthop Trauma, 2014, 27(12): 975-979. Chinese.
- [5] Neer CS 2nd. Displaced proximal humeral fracture. I. Classification and evaluation[J]. J Bone Joint Surg Am, 1970, 52(6): 1077-1089.
- [6] Constant CR, Murley AH. A clinical method of functional assessment of the shoulder[J]. Clin Orthop Relat Res, 1987, (214): 160-164.
- [7] Sabesan VJ, Lombardo D, Petersen-Fitts G, et al. National trends in proximal humerus fracture treatment patterns[J]. Aging Clin Exp Res, 2017, 29(6): 1277-1283.
- [8] 叶锋, 朱少兵, 王晓, 等. 老年肱骨近端骨折合并肩袖损伤的手术治疗[J]. 中国骨伤, 2015, 28(12): 1111-1113.
YE F, ZHU SB, WANG X, et al. Operative treatment for proximal humeral fracture with rotator cuff tear in elderly patients[J]. Zhongguo Gu Shang/China J Orthop Trauma, 2015, 28(12): 1111-1113. Chinese with abstract in English.

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