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下颈椎骨折脱位合并急性脊髓损伤的手术方式选择及疗效对比*

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摘要 目的:分析不同手术方式处理下颈椎骨折脱位合并急性脊髓损伤疗效。**方法:**选取2012年10月-2015年10月本院收治的110例下颈椎骨折脱位合并急性脊髓损伤患者作为研究对象。A组36例实施前路手术,B组44例实施后路手术,C组30例实施前后路联合手术。比较三种手术方式的治疗效果。**结果:**术后12个月,三组患者Cobb角、椎体水平位移距离均较术前显著改善($P<0.05$),C组患者改善程度显著高于A、B组($P<0.05$);C组患者JOA评分优良率显著高于A、B组($P<0.05$);在术后随访过程中,三组患者并发症总发生情况无统计学差异($P>0.05$)。**结论:**前后路联合手术治疗可更好地恢复颈椎解剖结构,促进脊髓神经功能恢复,值得在临床工作中进行推广。

关键词:下颈椎;骨折脱位;脊髓损伤;疗效

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Effect of Different Surgical Approaches on Treatment of Lower Cervical Vertebra Fracture and Dislocation Combined with Acute Spinal Cord Injury*

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ABSTRACT Objective: To analyze the clinical effect of three different surgical approaches on the treatment of lower cervical vertebra fracture and dislocation combined with acute spinal cord injury. **Methods:** 110 patients with lower cervical vertebra fracture and dislocation combined with acute spinal cord injury who were treated in our hospital from October 2012 to October 2015 were selected and randomly divided into three groups. 36 patients in group A were treated with anterior surgery, 44 patients in group B were treated with posterior surgery, and 30 cases in group C were treated with anterior combined posterior operation. Then the clinical effects of different methods were observed and compared. **Results:** After operation, the Cobb angle and the horizontal displacement distance of the three groups significantly improved ($P<0.05$). The improvement of group C was significantly higher than that of group A and group B ($P<0.05$). The JOA score of group C was significantly higher than that of group A and group B ($P<0.05$). The total incidence of complications had no significant difference among the three groups ($P>0.05$). **Conclusion:** Anterior and posterior combined surgical treatment has better effect on the restoring the anatomical structure of cervical spine and promoting the recovery of spinal nerve function, which is worthy of clinical promotion.

Key words: Lower cervical spine; Fracture and dislocation; Spinal cord injury; Effect

Chinese Library Classification(CLC): R683; R651.2 **Document code:** A

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前言

患者发生下颈椎骨折脱位后,颈椎管失去连续性,骨折块脱位突出至椎管内,机械性压迫颈部脊髓,处理较为棘手,采取牵引等保守治疗方式效果较差,伤后致残率较高^[1,2]。需尽快对骨折部位进行切开、减压、复位、固定等治疗,解除脊髓压迫,以改善患者预后。当前临床工作中对于该类患者的手术治疗有多种入路方式,但对不同手术方式的优缺点探讨较少,尚无统一认识^[3,4]。为进一步分析前路、后路以及前后路联合手术三种方式处理下颈椎骨折脱位合并急性脊髓损伤的疗效,对2012年10月-2015年10月本院收治的110例下颈椎骨折脱位合并急

性脊髓损伤患者进行了研究,结果报道如下:

1 资料与方法

1.1 一般资料

选取2012年10月-2015年10月本院收治的110例下颈椎骨折脱位合并急性脊髓损伤患者。纳入标准:①患者术前均已行CT、MRI等影像学检查,结合相关临床表现,下颈椎骨折脱位合并急性脊髓损伤诊断明确并存在手术指征,伤后入院时间不超过3天。②患者年龄18-70周岁,无心、肺、肾、凝血系统障碍等相关手术禁忌症,伤前无严重颈部关节病变,无颈椎手术史、严重外伤史。③患者或其监护人对于本次治疗方案均知

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情同意。将患者依据手术入路方式不同分为 A、B、C 组。A 组患者 36 例,男 19 例,女 17 例,年龄 22-54 岁,平均年龄(32.2 ± 2.4)岁,病程 3-52 小时,平均(22.2 ± 1.3)小时,ASIA 分级:A 级 6 例,B 级 10 例,C 级 11 例,D 级 9 例。B 组患者 44 例,男 23 例,女 21 例,年龄 21-67 岁,平均年龄(33.5 ± 2.7)岁,病程 3-58 小时,平均(22.9 ± 1.7)小时,ASIA 分级:A 级 11 例,B 级 12 例,C 级 14 例,D 级 7 例。C 组患者 30 例,男 17 例,女 13 例,年龄 21-62 岁,平均年龄(31.6 ± 2.1)岁,病程 6-61 小时,平均(24.1 ± 1.9)小时,ASIA 分级:A 级 7 例,B 级 9 例,C 级 10 例,

D 级 4 例。三组研究对象各一般资料相比无统计学差异($P > 0.05$)。

1.2 方法

1.2.1 A 组(骨折脱位、脊髓损伤来源于前方) 患者仰卧位,于胸锁乳突肌内侧缘作横切口将椎体暴露,术中 C 臂机透视确定骨折部位及临近椎体,如为单纯脱位,则将病变椎间盘切除后 Caspar 撑开器复位,如为骨折,则进行椎体次全切除术并切除上下椎间盘进行减压,自体髂骨块椎体间填补,锁定钢板固定,逐层关闭切口,留置引流管,颈托外固定。如图 1。

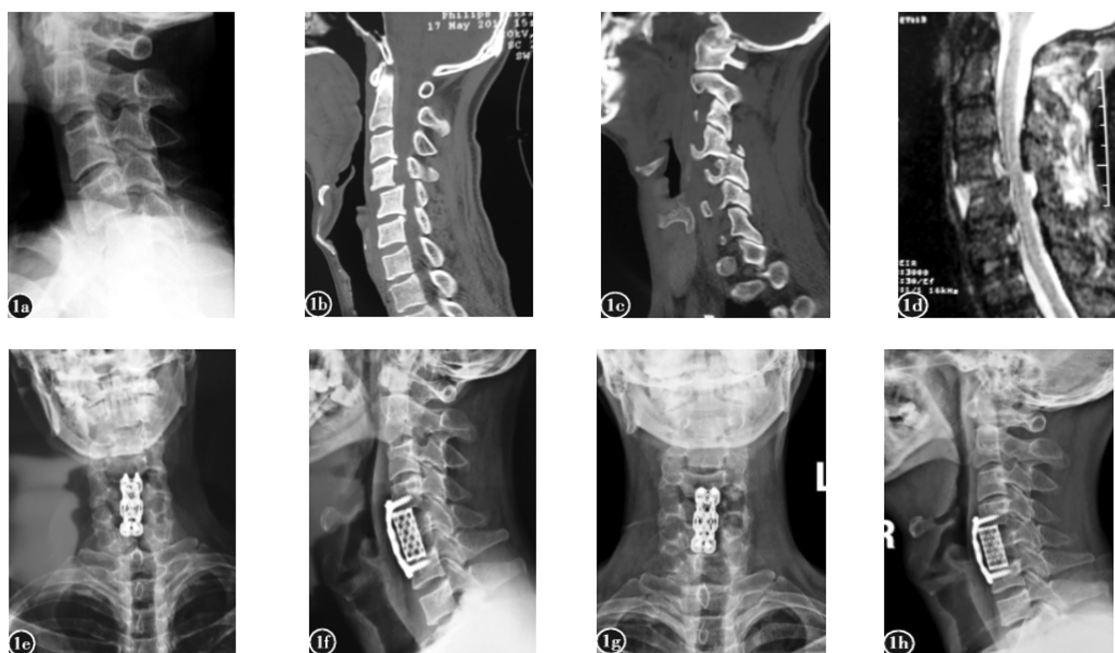


图 1 A 组患者女,29 岁,车祸伤下颈椎骨折

Fig.1 Group A, female, 29 years old, fracture of cervical spine in traffic accident

注:a:术前颈椎侧位 X 片 C4/5 脱位,b,c:术前 CT 示 C4/5、C5/6 脱位,关节突关节骨折,d:术前 MRI 示 C4/5、C5/6 脱位,C4/5 椎间盘损伤,椎外血肿,e,f:前路手术 C5 椎体次全切除,钛网、钢板固定后颈椎正侧位 X 片,g,h:术后 6 个月时颈椎正侧位 X 片,固定良好。

Note: A: preoperative lateral cervical X C4/5 dislocation, B, C: preoperative CT C4/5 and C5/6 dislocation, facet fracture, D: preoperative MRI C4/5 and C5/6 C4/5 dislocation, intervertebral disc injury, vertebral epidural hematoma, e, F, C5: anterior corpectomy, titanium mesh after plate fixation, cervical anteroposterior and lateral X, G, H: 6 months after operation of cervical anteroposterior and lateral X, fixed well.

1.2.2 B 组(骨折脱位、脊髓损伤来源于后方) 患者俯卧位,于后正中切开暴露损伤部位,切除椎板、棘突等结构进行脊髓减压,保持颈椎过伸位,钢板固定脱位椎体上下侧,注意保持螺钉倾斜 30° ,平行于上下关节突关节面,逐层关闭切口,留置引流管,颈托外固定。见图 2。

1.2.3 C 组(脊髓前后受压损伤) 患者俯卧位,先后路手术扩大椎管,脊髓减压,复位滑脱椎体,如有需要可进行植骨融合。再转为仰卧位行前路手术,将脱位椎体间的椎间盘、上下终板等彻底清除,自体髂骨块椎体间填补,锁定钢板固定,逐层关闭切口,留置引流管,颈托外固定。如图 3。

1.3 观察指标

① 三组患者骨折复位情况比较。患者手术前后 X 线摄片,对患者 Cobb 角、椎体水平位移距离进行比较。② 三组患者脊髓神经功能恢复情况比较。采取 JOA 评分系统^[5,6]对患者手术前后脊髓神经功能进行评价。 $\text{JOA 改善率} = (\text{术后评分} - \text{术前评$

分)/((17- 术前评分) $\times 100\%$,差:JOA 改善率 $< 25\%$,可: $25\% \leq \text{JOA 改善率} < 50\%$,良: $50\% \leq \text{JOA 改善率} < 75\%$,优: $75\% \leq \text{JOA 改善率}$ 。优良率 = (优 + 良)/总例数 $\times 100\%$ 。③ 三组患者术后并发症发生情况比较。术后定期随访,12 个月后评估患者恢复情况,记录患者伤口感染、固定松动、脊髓二次损伤、骨折延迟愈合等并发症发生情况并进行比较。

1.4 统计学方法

采用 SPSS19.0 软件对所有数据进行统计学分析。计量资料用($\bar{x} \pm s$)表示,采用 t 检验,计数资料用(n,%)表示,采用卡方检验。设定检验标准为 0.05,当 $P < 0.05$ 时,组间差异有统计学意义。

2 结果

2.1 三组患者骨折复位情况比较

三组患者术前 Cobb 角、椎体水平位移距离相比无显著差

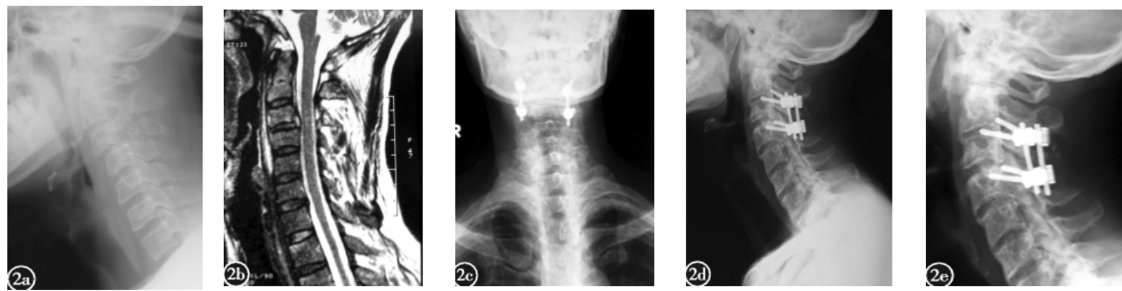


图 2 B 组患者男, 44 岁, 高处坠落伤下颈椎骨折。

Fig.2 Group B, male, 44 years old lower cervical spine fracture injured by falling

注:a:术前颈椎侧位 X 片示 C3/4 骨折脱位, C3 棘突骨折, b:术前 MRI 示 C3/4 骨折脱位, 椎间盘轻度膨出, c、d:后路手术固定后颈椎正侧位 X 片示复位满意, e:术后 9 月颈椎 X 片示固定良好。

Note: A: preoperative X showed C3/4 lateral cervical fracture dislocation, C3 spinous process fracture, B: preoperative MRI showed C3/4 fracture dislocation, intervertebral disc prolapse, mild, C D: posterior fixation after cervical anteroposterior and lateral X showed satisfactory reduction, e: after September X showed good cervical fixation.

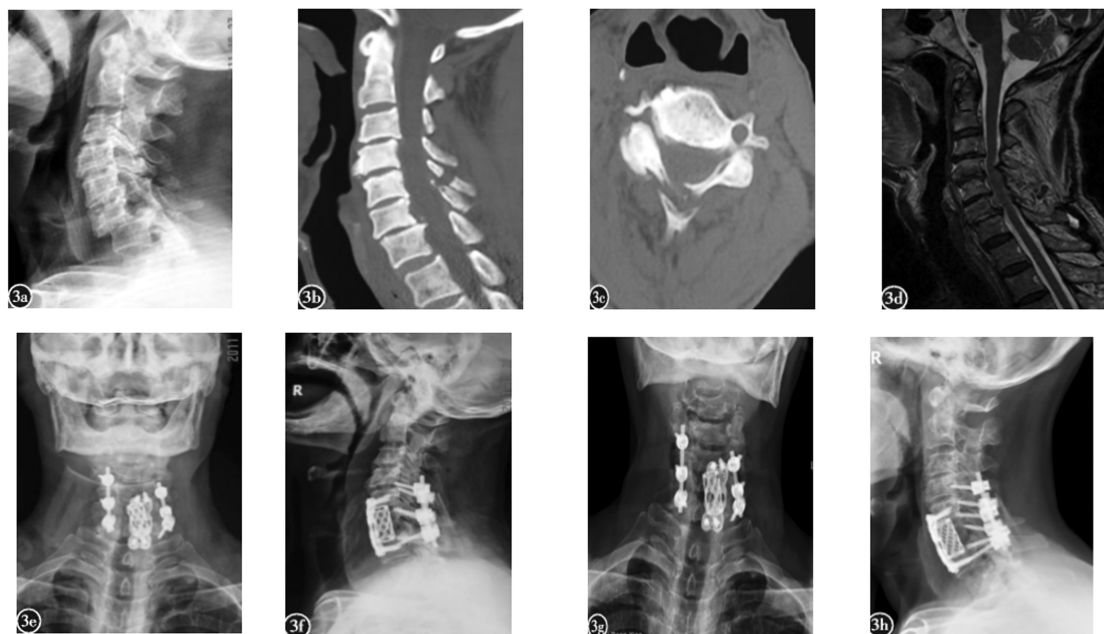


图 3 C 组患者男, 63 岁, 车祸伤下颈椎骨折脱位。

Fig.3 Group C, male, 63 years old, lower cervical fracture dislocation injured by car accident

注:a:术前 X 片示 C6/7 脱位, C5 棘突骨折, b、c:术前 CT 示 C6/7 脱位, 椎间隙高度丢失, C6 椎板骨折, d:术前 MRI 示颈椎退变, C5/6、C6/7 椎间盘突出, C6 向前脱位, e、f:颈前路 C6 椎体次全切除, 钛网、钢板固定, 颈后路 C5-C7 侧块螺钉内固定术后正侧位 X 片, g、h:术后 1 年颈椎正侧位 X 片示固定良好。

Note: A: preoperative X showed C6/7 dislocation, fracture of spinous process of B, C5, C: preoperative CT showed C6/7 dislocation, loss of intervertebral height, vertebral fracture C6, D: preoperative MRI showed cervical degeneration, C5/6, C6/7 disc, C6 e, F: forward dislocation, anterior cervical vertebral body C6 total resection, titanium mesh, steel plate fixation, C5-C7 posterior cervical lateral mass screw fixation postoperative anteroposterior and lateral X, G, H: 1 years after operation of cervical anteroposterior and lateral X showed good fixation.

异($P>0.05$),在术后 12 个月时,三组患者 Cobb 角、椎体水平位移距离均较术前显著改善($P<0.05$),A、B 组两指标改善程度接近($P>0.05$),C 组患者两指标改善程度显著高于 A、B 组($P<0.05$)。见表 1。

2.2 三组患者脊髓神经功能恢复情况比较

术后 12 个月对患者脊髓神经功能恢复情况进行比较,A、B 组患者 JOA 评分优良率无显著差异($P>0.05$),C 组患者 JOA 评分优良率显著高于 A、B 组($P<0.05$)。见表 2。

2.3 三组患者术后并发症发生情况比较

三组患者术后随访中出现伤口感染、固定松动、脊髓二次损伤、骨折延迟愈合等并发症,总并发症发生情况组间相比无显著差异($P>0.05$)。见表 3。所有出现并发症患者均得到有效处理。

3 讨论

前路、后路以及前路联合后路是临床处理下颈椎骨折脱位的主要手术方式。依据现有理论^[7,8],在选择不同的手术方式时,

表 1 三组患者骨折复位情况比较($\bar{x} \pm s$)Table 1 Comparison of fracture reduction among three groups ($\bar{x} \pm s$)

Groups	n	Average Cobb angle (°)		Horizontal displacement distance (mm)	
		Before surgery	12 months after surgery	Before surgery	12 months after surgery
Group A	36	28.5± 2.3	13.7± 1.9 ^a	17.8± 3.5	8.4± 1.6 ^a
Group B	44	28.1± 2.4	14.2± 2.2 ^{ab}	17.2± 2.8	8.1± 2.0 ^{ab}
Group C	30	28.7± 2.7	4.8± 1.6 ^{ac}	18.3± 2.9	4.7± 1.2 ^{ac}

Note: compared with before surgery, ^aP<0.05; compared with group A, ^bP>0.05; compared with group A and B, ^cP<0.05.

表 2 三组患者脊髓神经功能恢复情况比较(n, %)

Table 2 Comparison of spinal nerve function recovery among three groups (n, %)

Groups	n	Excellent	Good	General	Bad	Rate of excellence and good
Group A	36	13(36.1)	13(36.1)	6(16.7)	4(11.1)	26(72.2)
Group B	44	13(29.5)	14(31.8)	10(22.7)	7(15.9)	27(61.4) ^a
Group C	30	13(43.3)	14(46.7)	2(6.7)	1(3.3)	27(90.0) ^b

Note: compared with group A, ^aP>0.05; compared with A and B, ^bP<0.05.

表 3 三组患者术后并发症发生情况比较(n, %)

Table 3 Comparison of postoperative complications among three groups

Groups	n	Wound infection	Loose fixation	Secondary spinal damage	Delayed fracture healing	Others	Incidence of complication
Group A	36	2(5.6)	0(0)	1(2.8)	1(2.8)	1(2.8)	5(13.9)
Group B	44	2(4.5)	1(2.3)	1(2.3)	0(0)	0(0)	4(9.1) ^a
Group C	30	1(3.3)	0(0)	0(0)	1(3.3)	1(3.3)	3(10.0) ^b

Note: compared with group, ^aP>0.05; compared with group A and B, ^bP>0.05.

需依据患者脊髓受压情况、颈椎骨折部位和最大程度恢复颈椎稳定性等方面进行综合考虑,但是实际操作中,部分医务人员选择随意性较大,习惯性单纯选择前路或后路入路进行手术,近年来随着前路联合后路手术治疗的推广^[9,10],使得这一问题更加复杂化。

研究表明^[11,12],当患者发生下颈椎骨折脱位合并急性脊髓损伤时,最大程度恢复颈椎稳定性以及序列曲度,充分减压,恢复椎间高度,对于缓解脊髓损伤,改善患者预后具有重要意义。因此,在进行手术时,应当依据颈椎骨折的具体情况选择不同的手术入路方式,如果患者表现为颈椎前部损伤较重、稳定性降低,骨折块向椎体后缘突出,并且伴有脊髓腹侧椎间盘突出导致脊髓受压,可以通过前路手术进行复位,术中减压彻底,出血少,通过切除椎间盘或次全切除椎体后进行自体髂骨植骨,对于获得颈椎即刻稳定性,恢复颈椎序列曲度和椎间高度,缓解脊髓损伤效果显著^[13,14],并且术中融合相邻节段对颈椎活动度不会产生明显影响,符合生物力学结构,稳定性高,但是无法对患者后方脊髓压迫进行减压,复位关节突交锁时难度较大,强行撑开复位有进一步加重脊髓损伤的风险。当患者出现颈椎后方骨折并且椎板向脊髓背侧内陷或关节突发生骨折脱位并损伤脊髓等情况时,可实施后路手术解锁复位关节突,切除椎板、黄韧带,并进行植骨融合术。通过后路手术入路可有效处理关节突交锁,复位椎体,扩大椎管进行减压,使得椎管恢复有效

容积,并获得可靠的内固定^[15,16]。但是临床经验表明,当患者因严重暴力发生下颈椎骨折脱位时,多数患者出现椎板、椎体同时骨折,椎体发生移位,脊髓背侧、腹侧同时受压,及时恢复颈椎的解剖结构并进行稳定固定,解除脊髓的背侧、腹侧压迫是治疗的关键所在。前路联合后路手术具有减压彻底,复位牢靠,可同时对颈椎前后方进行处理等优点,有学者^[17,18]认为下颈椎骨折脱位患者单纯前路或后路手术提供的即刻稳定性不强,术后易发生植骨不融合、固定松动等现象,而采取前路联合后路手术,减压彻底,固定牢固,复位及时,避免术后脊髓进一步损伤,患者可术后早期进行功能恢复锻炼,利于脊髓神经功能的恢复,效果更好,但是需注意的是前路联合后路手术不是单纯将前路和后路手术叠加,而是合理、有序的进行,避免进一步损伤。现为进一步分析三种入路方式处理下颈椎骨折脱位合并急性脊髓损伤的疗效,对本院 110 例相关患者进行了研究。根据本次研究结果,采取三种手术入路方式均能对下颈椎骨折进行有效复位固定,患者 12 个月后脊髓功能亦得到显著改善,而采取前路联合后路手术治疗效果显著优于单纯前路或后路手术治疗,且三种方式术后并发症发生情况无显著差异,与章波等人^[19,20]的研究结果一致。

综上所述,三种手术方式均可有效处理下颈椎骨折脱位合并急性脊髓损伤,可依据患者具体情况进行选择,而前路联合后路手术治疗可更好地恢复颈椎解剖结构,促进脊髓神经功能

恢复,值得在临床工作中进行推广。

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