

临床论著

# 手术治疗严重胸腰椎爆裂骨折

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**摘要** 本文报告手术治疗 41 例严重胸腰椎爆裂骨折,其中侧前方减压 11 例,全椎板减压 30 例;不全截瘫好转率为 73%,完全截瘫好转率 15.4%。作者认为:1. 爆裂骨折主要是脊柱中柱损伤,对于椎体骨碎块压迫椎管占 1/3 以上,椎管矢径小于 10mm 应行椎管减压内固定。2. 内固定方式应根据椎体损伤情况及范围,尽量选择损伤节段少,复位固定好的固定物。3. 不全截瘫组手术治疗好转率明显高于完全截瘫组。

**关键词** 胸腰椎 爆裂性骨折 手术治疗

严重的胸腰椎爆裂骨折是指外伤时椎体在屈曲和轴向应力共同作用下,垂直的暴力使受损椎体呈爆炸样裂开与上位椎间盘挤压入椎管,多伴有脊髓或马尾损伤,随着 CT、MRI 及脊柱三柱理论在临床的广泛应用,对胸腰椎爆裂骨折及对脊髓,马尾神经损伤有了进一步的认识,治疗方法也进一步完善。作者自 1991 年 10 月至 1995 年 10 月手术治疗严重胸腰椎爆裂骨折 41 例,现报告如下:

### 临床资料

本组共 41 例,男性 30 例,女性 11 例;年龄 15 岁~56 岁,平均 30.7 岁。致伤原因:高处坠伤 31 例,压砸伤 6 例,车祸 4 例。损伤单一椎体 38 例(胸<sub>11</sub>2 例,胸<sub>12</sub>8 例,腰<sub>1</sub>12 例,腰<sub>2</sub>8 例,腰<sub>3</sub>5 例,腰<sub>4</sub>3 例),损伤二个椎体 3 例(胸<sub>12</sub>腰<sub>2</sub>2 例,腰<sub>1</sub>腰<sub>2</sub>1 例)。按 Frankel<sup>[1]</sup>标准分级:完全性四肢瘫痪为 A 级 13 例;仅有感觉没有随意运动为 B 级 7 例;非功能性运动存在的不完全瘫为 C 级 14 例;功能性运动存在但只有局限性的运动功能属不全瘫为 D 级 5 例;感觉存在,运动基本正常,可能有异常反射为 E 级 2 例。所有病例都经 CT 扫描,其中骨碎块占椎管横断面 1/3 占 11 例,1/3~2/3 占 18 例,2/3 以上占 12 例。手术距受伤时间最短 6 小时,最长 21 天,平均 5.5 天。

### 麻醉与手术方法

采用气管插管全麻 30 例,硬膜外麻醉 11 例。所有病例采用俯卧位,其中后路人路全椎板减压 30 例,侧前方减压 11 例,切除突入椎管内椎间盘,并用“锤入法”或“潜挖法”切除压迫脊髓或马尾神经的椎体碎块,采用适当后路固定,其中 Dick 钉固定 17 例,双哈氏棒固定 8 例,鲁氏棒固定 10 例,鲁哈氏棒固定 6 例。并行椎体横突、关节突植骨 15 例,占全组病例的 36.6%。

### 治疗结果

本组 41 例,经 4 个月至 4 年 4 个月随访,平均 2 年,全组病例术后拍片,其中 10 例术后行 CT 复查。

1. 手术方式:本组病例腰<sub>1</sub>以上椎体损伤均采用侧

前方入路减压。41 例中 44 个椎体爆裂,压迫脊髓的突出椎间盘 31 个。35 例减压充分,2 例不全截瘫患者术后 CT 扫描发现椎管内仍有残余骨碎块压迫脊髓,再次手术切除骨碎块。

2. 脊柱固定方式:41 例中 Dick 钉固定 17 例,双哈氏棒固定 8 例,鲁氏棒固定 10 例,鲁哈氏棒固定 6 例,其中横突及关节突植骨 15 例。39 例中近期较稳定。Dick 钉固定有 1 例误入椎间隙,术后 2 个月再次手术调整椎弓根钉位置。鲁氏棒固定有 2 例术后半年拍片发现钢丝折断,哈氏棒固定有 1 例脱勾,术后 1 年取出。

3. 术后神经功能恢复情况:按 Frankel 标准评定,术前术后变化如表所示:

分 类	病 例	术 后					
		A	B	C	D	E	
术 前	A	13	11	1	1		
	B	7		3	3	1	
	C	14			3	9	2
	D	5				1	4
	E	2					2

其中有二例术前为 E 级,CT 扫描见椎管被骨碎块压迫达 1/3 以上,仍予以椎管减压 Dick 钉固定。

### 讨 论

1. 损伤机制:严重椎体爆裂骨折是在屈曲位,屈曲和轴心应力的共同作用下,垂直的暴力使上位椎间盘挤压入椎体,使受损椎体呈爆炸样裂开,椎体后壁皮质骨折,骨碎片与椎间盘组织可突入椎管伴有脊髓或马尾损伤。主要是脊柱中柱损伤,多伴有前柱及后柱损伤<sup>[2]</sup>。本组 41 例中高处屈曲位坠伤 31 例,压砸伤 6 例,车祸 4 例。

2. 临床及影像学表现:爆裂骨折有明显外伤史,腰部疼痛剧烈,肿胀,瘀血明显,局部压痛伴有后凸畸

形, 并有神经损伤症状如双下肢感觉, 运动障碍。X 线特点: 侧位伤椎前高, 后高均丢失。椎体矢径加大; 生理前凸消失, 产生不同程度的后凸畸形。椎体后高的丢失区别于单纯压缩性骨折, 反映出椎体后壁的损伤, 伤椎骨块进入椎管。正位可见伤椎高度减低, 两侧椎弓根距离增宽。CT 或 MRI 可以了解脊髓受伤及椎体崩裂、椎管狭窄情况。诊断主要依靠临床症状、体征、X 线、CT 三者结合。

3、治疗方法: 目前对椎体爆裂骨折治疗方法尚有争议。主张非手术者认为, 目前尚无明显证据证明手术利大于弊, 认为体位复位或卧床是最适宜的治疗。主张手术者认为爆裂骨折 50%—70% 伴有神经系统改变, 表现为全瘫或不全瘫, 并有明确手术指征。椎管减压和脊柱内固定, 可以重建脊柱的稳定性, 解除骨片、椎间盘组织对脊髓、马尾神经压迫, 防止脊髓或马尾神经发生不可逆改变。通过手术减压内固定可以缩短卧床时间, 减少并发症, 争取早期康复。Denis 发现: 无神经症状的爆裂骨折如进行保守治疗, 17% 病人最终会出现神经症状, 他主张对不稳定的骨折, 应进行预防性减压防止出现外伤性椎管狭窄。作者认为严重爆裂性骨折骨碎块占椎管容积 1/3 以上、椎管矢径小于 10mm 都应进行椎管减压、脊柱内固定。椎管减压应充分, 术前应明确损伤椎体, 必要时术前或术中拍片定位。对于腰<sub>1</sub> 以上椎体严重爆裂骨折, 由于其位于脊髓部分, 后路全椎板减压易加重脊髓损伤, 故采用侧前方减压, 用“潜挖法”切除突入椎管的椎间盘及骨碎块。对于腰<sub>1</sub> 以下平面的椎体爆裂骨折, 骨碎块主要压迫马尾神经, 可采用后路病椎全椎板切除, 牵开马尾神经, 切除压迫马尾的椎间盘及骨碎块, 对于难以摘除的骨碎块, 采用“锤入法”, 用“L”或“T”形骨凿将骨碎块锤入复位, 恢复椎管有效容积, 解除脊髓、马尾神经压迫。椎管减压均应在直视下进行, 防止损伤或加重脊

髓、马尾损伤。

4、固定方法选择: 椎管减压后采用何种固定方法, 各种观点不同。作者认为固定方式选择应根据损伤椎体情况、范围, 尽量选择固定节段少且固定牢固复位好的固定物。哈氏撑开棒<sup>[3]</sup>及鲁氏棒虽然固定牢固, 但需固定病椎上、下各二节椎体, 损伤大, 影响脊柱活动, 且有脱钩、断棒、断钢丝危险。Dick<sup>[4,5]</sup>钉固定节段少只需固定伤椎上、下各一节椎体, 牢固、损伤少, 操作简便, 但由于椎弓根截面小, Dick 钉固定时应防止破出椎弓根误入椎间隙或椎管、神经根管, 损伤神经。

5、术后神经恢复: 本组 41 例中完全截瘫 13 例, 术中证实有 11 例为脊髓或马尾横断, 预后差, 对于椎间盘, 骨碎块压迫脊髓马尾的非器质性损伤, 采用椎管减压和固定后神经功能有一定恢复, 好转率为 15.4%。不完全截瘫有一部分神经是因受压而非器质性损伤, 解除压迫后神经功能有一定恢复, 好转率为 73%。明显高于完全截瘫。

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## Abstract of Original Articles

**Surgical treatment of the severe thoraco-lumbar burst fracture** *Chen Fen-yong, Song Jian-rong, Lin Jia-jun, et al Union Hospital of Fujian Medical College (350001)*

The authors reported 51 cases of severe thoracolumbar burst fracture treated with surgery. According to Frankel grades, there were 13 cases of grade A, 7 cases of grade B, 14 cases of grade C, 5 cases of grade D and 2 cases of grade 3 in 11 cases, and total laminectomy decompression was done in 30 cases. The recovery rate was 73% in the incomplete paraplegia and 15.4% in complete paraplegia. It was concluded 1. Burst fractures mainly injure the middle column of the spinal cord, and spinal canal decompression as well as internal fixation should be done, if the fragments of vertebra had compressed about 1/3 of the spinal canal and the sagittal diameter of the later was less than 10 mm; 2. Internal fixation should be selected according to the condition and range of the injured vertebra, It is reasonable to choose the internal fixation procedure which can cause less injury of the spinal segment and get good results in reduction and fixation; 3. The recovery rate of the incomplete paraplegia group was significantly higher than that of the complete paraplegia group when surgical treatment was applied.

**Key words** Thoracolumbar vertebrae Burst fracture Surgical treatment

(Original article on page 3)

**The following-up analysis on the patients with artificial hip prosthesis** *Zhai Ming-yu, Zhao Yu-gui, Wang Chun-ping, et al. Zhengzhou Hospital of Orthopaedics, Henan Province (450052)*

108 cases (112 hips), applied with artificial prosthesis have been followed up after operation, for the average years of 6.8. It was discovered that 37 cases of complication (about 33%) were produced due to the unproper operation; 46 cases of post-operational complication (41.1%); and the satisfactory therapeutic effective rate being about 74.1%.

The frequently encountered reasons and treatments of the various kinds of complications were put into stress

to be analysed and discussed in this paper.

**KEY WORDS** Artificial prosthesis Disease of the hip region

(Original article on page 5)

**Study of the effect of intermittent compressive pressure to the osteoblasts in vitro.** *Li Ke-xin, Shang Tian-yu, Dong Fu-hui, et al. Institute of Orthopaedics & Traumatology, Chinese Academy of TCM (100700)*

The experiment imitated the physiological changes of the cellular external circumstances, existed during skeletal functional movement, and supplied a intermittent compressive pressure (0.098 MPa, 15 minutes pressure, 15 minutes relax, 2 cycles/one hour, 8 hours/day) to the osteoblasts of experimental groups in vitro. It was discovered that the numbers of osteoblasts and the reaction of alkaline phosphatase in the experimental group were markedly elevated than that of the control groups. The results indicate that the intermittent compressive pressure is able to improve the proliferation and differentiation of the osteoblasts.

**KEY WORDS** Intermittent compressive pressure Osteoblast in vitro

(Original article on page 7)

**Experimental research on the restoration of bone defect with the complex of heterogenous deproteinized bone and the bone morphogenetic protein.** *Bai Meng-hai, Ge Bao-feng, Wang Yong, et al. Institute of Orthopaedics & Traumatology, Lanzhou General Hospital of the Military Region (730050)*

The failure of the implantation of the heterogenous deproteinized bone is always due to the intensive immune rejection. A new method for treating heterogenous bone was described in this paper. The bone of calf was deproteinized, i. e. extracted the main antigens and combined with bovine bone morphogenetic protein (BMMP) and then produced a kind of heterogenous deproteinized bone, not only without antigenicity, but also advantageous to the bone formation. Implanting this kinds of bone complex into the artificial defect (2cm) of the radius of Newzeland rabbit, the observation on the recovery with immunological, radioactive, and histological