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骨水泥强化椎弓根内固定治疗骨质疏松性脊柱骨折的效果*

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摘要 目的:探讨内固定与植骨融合术治疗骨质疏松性椎体骨折的临床疗效。**方法:**回顾性分析我院 2011 年 7 月至 2012 年 7 月收治的 80 例骨质疏松性椎体骨折患者的临床资料。根据固定方式,将 37 例采用 PMMA 骨水泥强化椎弓根内固定的患者作为研究组,其余 43 例单纯应用椎弓根内固定的患者作为对照组。收集两组患者的手术时间、术中出血量、术后疼痛程度、愈合时间等临床资料。评价患者手术前后侧位 X 线片椎体高度和内固定效果。术后随访 24 个月。**结果:**两组患者的手术时间、术中出血量、住院时间及骨折愈合时间等无显著性差异($P>0.05$);研究组患者术后疼痛程度、椎体高度、内固定物松动及断裂情况等显著优于对照组,差异具有统计学意义($P<0.01$)。**结论:**骨水泥强化椎弓根螺钉治疗骨质疏松性椎体骨折具有良好的临床效果,值得推广应用。

关键词:骨质疏松;椎体骨折;骨水泥;内固定

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Clinical Practice of Polymethylmethacrylate-augmented Transpedicular Screw in the Treatment of Osteoporotic Vertebral Fractures*

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ABSTRACT Objective: To investigate the clinical efficacy of fixation and bone grafting of osteoporotic vertebral fractures. **Methods:** A retrospective analysis of clinical data in our hospital from July 2011 to July 2012 was performed in 80 cases of osteoporotic vertebral fractures. According to the fixed way, the 37 cases of patients treated with PMMA bone cement augmentation combined with pedicle screw fixation was admitted as the research group, and the remaining 43 cases of patients with a fixed simple application of pedicle was considered as the control group. Clinical data of all these patients including the operative time, blood loss, postoperative pain, healing time was collected. The vertebral height before and after surgery was measured by lateral X-ray radiography, and the fixed effect was evaluated. The patients were followed up for 24 months. **Results:** There was no significant difference ($P>0.05$) between the two groups in the operative time, blood loss, hospital stay or fracture healing time. In comparison of the postoperative pain, vertebral height, implant loosening and breaking between the two groups, the research group was superior to the control group, and the difference was statistically significant ($P<0.01$). **Conclusion:** Bone cement augmentation with pedicle screw fixation has good clinical effects on the osteoporotic vertebral fractures, and it is worthy of wide application in clinic.

Key words: Osteoporosis; Vertebral fractures; Polymethylmethacrylate; Internal fixation

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前言

骨质疏松症是以人体内骨量减少,骨的微观结构退化为特征的,骨的脆性增加而发生骨折的一种全身性骨骼疾病,多发于老年人群。由于老年人的机体功能逐渐衰退,骨代谢功能也随之减退,因此骨生成量减少,而骨破坏增加,发生骨质疏松性骨折的几率也逐渐升高。骨质疏松易发生胸椎、腰椎等压缩性骨折^[1]。临床通常采取椎弓根螺钉内固定治疗骨质疏松性胸腰椎骨折,但该方法易产生切割现象,导致固定物松动,且术后椎

体高度易丢失,手术效果并不理想^[2]。因此,如何增强椎弓根钉内固定的稳定性对治疗效果至关重要。近年来,聚甲基丙烯酸甲酯(PMMA)骨水泥被广泛应用于临床脊柱外科的椎弓根螺钉固定术中,以改善螺钉的稳定性^[3]。本研究对 37 例骨质疏松性脊柱骨折患者采用椎弓根螺钉加骨水泥强化治疗,临床效果较理想,现报告如下。

1 资料与方法

1.1 临床资料

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选取我院 2011 年 7 月至 2012 年 7 月收治的 80 例骨质疏松性椎体骨折患者的临床资料。根据手术方式,将采用 PMMA 骨水泥强化椎弓根内固定的患者作为研究组,其余单纯应用椎弓根内固定的患者作为对照组。研究组 37 例患者,其中男 12 例,女 15 例;年龄 60-73 岁,平均(67.08 ± 1.61)岁;胸椎体骨折 13 例,腰椎体骨折 14 例;Denis 分型:A 型 10 例,B 型 11 例,C 型 8 例,D 型 8 例。对照组 43 例患者,其中男 19 例,女 14 例;年龄 60-75 岁,平均(66.45 ± 1.33)岁;胸椎体骨折 26 例,腰椎体骨折 17 例;Denis 分型:A 型 6 例,B 型 19 例,C 型 13 例,D 型 5 例。两组患者的一般资料无显著性差异,具有可比性($P>0.05$)。

1.2 纳入及排除标准

纳入标准:合并骨质疏松;胸腰段脊柱骨折;短节段后路椎弓根钉系统内固定手术者;经椎弓根椎体内植骨者;临床资料完整。排除标准:行前路或前后路联合手术者;同时行椎体后外侧植骨手术者;伴截瘫者。

1.3 手术方法

两组均采用全身麻醉,患者取俯卧位,术前 C 型臂定位骨折椎体,取后正中切口,显露骨折椎体及上下邻近椎体的椎板和关节突,定位椎弓根钉进钉点,开路与正中中线成 5-10 度刺入椎弓根,探查孔道四周壁均呈骨性感,使用 C 型臂术中透视,确定孔道后将 1-3 mL 骨水泥缓慢注入孔道内,注意骨水泥外漏,然后拧入椎弓根钉。根据患者椎体骨折对椎管的影响,椎体

骨折后移占据椎管 1/3 内的可依赖后纵韧带的完整性、紧张度辅助椎管内骨块复位。椎体骨折后移超过 1/3 则需进行椎板减压,安装连接杆进行撑开复位固定,并给予椎板间或横突间植骨融合。

1.4 观察指标

术后随访 24 个月。记录两组患者的手术时间、术中出血量、术后疼痛程度、骨折部位愈合时间及手术前后侧位 X 线片椎体高度和内固定效果。

1.5 统计学分析

采用 SPSS17.0 统计软件进行处理,计量资料以($\bar{x} \pm s$)表示,组间比较采用 t 检验,计数资料用 χ^2 检验,以 $P<0.05$ 为差异有统计学意义。

2 结果

2.1 两组患者手术基本情况比较

研究组患者的手术时间为(133.81 ± 5.45) min,术中出血量为(221.75 ± 4.71) mL,住院时间为(8.67 ± 0.55) d,骨折愈合时间为(6.35 ± 0.29) d;对照组患者的手术时间为(134.52 ± 5.33) min,术中出血量为(225.91 ± 4.42) mL,住院时间为(8.83 ± 0.29) d,骨折愈合时间为(6.29 ± 0.34) d;由表 1 可知,两组患者的手术时间、术中出血量、住院时间及骨折愈合时间等手术基本情况无显著性差异($P>0.05$)。

表 1 两组患者手术基本情况比较($\bar{x} \pm s$)

Table 1 Comparison of the general data of the operation between the two groups($\bar{x} \pm s$)

Group	Case	Operation time	Blood loss	Hospitalization	Fracture Recovery
Study group	37	133.81 ± 5.45	221.75 ± 4.71	8.67 ± 0.55	6.35 ± 0.29
Control group	43	134.52 ± 5.33	225.91 ± 4.42	8.83 ± 0.29	6.29 ± 0.34
t		1.045	1.491	1.580	0.726
P		0.310	0.152	0.615	0.478

2.2 两组患者术后恢复情况比较

研究组患者术后椎体高度评分为(28.38 ± 7.04),内固定物稳定性为(10.44 ± 3.71),术后疼痛程度为(2.50 ± 1.10);对照组患者术后椎体高度评分为(17.63 ± 7.68),内固定物稳定性为

(8.16 ± 3.55),术后疼痛程度为(4.59 ± 1.44)。研究组患者术后恢复情况明显优于对照组,差异具有统计学意义($P<0.05$)。见表 2。

表 2 两组患者术后恢复情况比较($\bar{x} \pm s$)

Table 2 Comparison of the postoperative recovery of patients between the two groups($\bar{x} \pm s$)

Group	Vertebral height	Stability	Postoperative pain
Study group	28.38 ± 7.04	10.44 ± 3.71	2.50 ± 1.10
Control group	17.63 ± 7.68	8.16 ± 3.55	4.59 ± 1.44
t/ χ^2	0.140	7.33	5.23
P	0.009	0.006	0.000

3 讨论

腰椎骨折是临床常见的骨损伤症状,极易引起脊髓和神经根损伤。手术是腰椎骨折常用的治疗方法,通过对骨折部位进行复位,恢复脊柱的正常序列,重建其稳定性^[5]。

椎弓根螺钉内固定系统以其操作简单、稳定性好等优点逐渐成为临床常用的脊柱骨折治疗方法。据研究表明,经椎弓根内固定对相邻椎体的影响小,且固定效果较理想^[6]。骨质疏松患者的脊柱骨质较差,无法提供牢固的骨支持,植入界面无法承受压力而最终破坏可导致内固定物松动、脱落等发生,影响手

术的效果^[7]。有学者认为,改进内固定物的设计及手术方式可以减少骨质疏松对椎弓根螺钉内固定效果的影响^[10]。还有研究表明,增加螺钉长度可增加椎弓根的把持力^[11]。但该方法对手术操作的精确度要求较高,并且损伤患者椎体前方血管及脏器,具有较高的危险性。另有研究证实,虽然直径较长的椎弓根螺钉具有较高的稳定性,但易导致椎弓根爆裂骨折,不利于患者预后^[12]。因此,提高椎弓根螺钉在骨质疏松椎体内的稳定性是脊柱外科需要解决的重要问题。

PMMA 骨水泥在椎体松质骨中扩散,与骨接触面增加,提高了钉与骨水泥界面的连接强度,从而加强螺钉固定的稳定性。有实验表明,用骨水泥固定后椎弓根螺钉的拔出强度可增加 49 %~62 %^[13],骨水泥强化椎弓根钉能够明显增强脊柱稳定性及固定强度^[14]。相关临床研究证实,骨水泥可以起到稳定螺钉的作用^[15]。本研究中,研究组患者术后恢复情况明显优于对照组,差异具有统计学意义($P<0.05$)。结果说明,骨水泥强化椎弓根螺钉治疗骨质疏松性椎体骨折具有良好的临床效果,有利于患者术后恢复。

但值得注意的是,PMMA 聚合易对脊髓和神经根等周围组织造成损伤。我们建议术前应仔细测量椎弓根角度,术中反复探索椎弓根内壁^[16]。另外,骨水泥界面的异物反应可使骨溶解而导致螺钉松动,而且 PMMA 不具有生物降解性,无法被新生组织取代,其毒性可能导致肺栓塞等并发症。我们建议,在对椎体进行内固定的同时行植骨融合术,待脊柱固定节段融合后可取出骨水泥,以减少术后并发症的发生率^[17-20]。

此外,本研究中每侧椎弓根注入的骨水泥量约为 2-3 mL,可见骨水泥溢至钉道口,这与既往研究提出的骨水泥注入量 1-3 mL 相符^[19]。结果说明,若骨水泥注入量 >4 mL 仍未见溢出应考虑骨水泥渗漏发生并及时采取应对措施。

综上所述,骨水泥强化椎弓根钉内固定对于骨质疏松性椎体骨折具有良好的临床效果,有利于稳定椎弓根螺钉,促进植骨融合率,从而提高患者术后生存质量,值得临床推广应用。

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