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PVP 治疗新鲜期 OVCF 伴随和不伴随椎体内裂隙征疗效比较 *

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摘要 目的:对经皮椎体成形术(percutaneous vertebroplasty, PVP)治疗新鲜期(急性期和亚急性期)骨质疏松性椎体压缩性骨折(osteoporotic vertebral compression fracture, OVCF)伴随和不伴随椎体内裂隙征疗效进行比较。**方法:**以行 PVP 术治疗 OVCF 的患者为研究对象,其中研究组 A 为 OVCF 伴随椎体内裂隙征(intravertebral cleft, IVC)患者,研究组 B 为 OVCF 不伴随 IVC 患者,以手术时间、所使用的骨水泥量,手术前、术后 2 d、术后 6 个月患者 VAS 评分、骨折椎体前缘高度及 Cobb 角为指标,考察 PVP 的治疗效果。**结果:**与研究组 A 比较,研究组 B 急性期和亚急性期患者手术时间均无显著差异($P>0.05$),研究组 B 骨水泥量显著降低($P<0.05$)。两组急性期和亚急性期患者手术前、术后 2 d 和 6 个月的 VAS 评分均无显著差异($P>0.05$);同组急性期和亚急性期患者手术前后 VAS 评分无显著差异($P>0.05$);与手术前相比,两组患者术后 2 d 和 6 个月的 VAS 评分显著降低($P<0.05$)。两组急性期和亚急性期患者骨折椎体前缘高度无显著差异($P>0.05$);与同组急性期比较,术前亚急性期患者骨折椎体前缘高度显著降低($P<0.05$);与手术前比较,术后 2 d 和术后 6 个月骨折椎体前缘高度均显著增加($P<0.05$),术后 A 组急性期和亚急性期患者椎体前缘高度较术后 B 组显著增加($P<0.05$)。术前 B 组急性期和亚急性期患者 Cobb 角较 A 组无显著差异($P>0.05$),与同组急性期比较,术前亚急性期患者 Cobb 角显著升高($P<0.05$);与手术前比较,两组术后 2 d 和术后 6 个月的 Cobb 角均显著降低($P<0.05$),术后 A 组急性期和亚急性期患者 Cobb 度显著低于术后 B 组($P<0.05$)。**结论:**PVP 治疗新鲜期 OVCF 伴随和不伴随椎体内裂隙征均有较好的疗效。

关键词: OVCF; PVP; 椎体内裂隙征; 新鲜期; 疗效

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Comparison of Effect of PVP on OVCF in Fresh Stage with or without Intravertebral Cleft*

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ABSTRACT Objective: To compare the efficacy of OVCF (osteoporotic vertebral compression fracture) with or without intravertebral cleft in the fresh phase of PVP(percutaneous vertebroplasty) treatment (acute phase and subacute phase). **Methods:** Patients with OVCF treated with PVP were taken as the research subjects. Among them, study group A was OVCF patients with IVC (intravertebral cleft, IVC), and study group B was OVCF patients without IVC. The operation time, bone cement volume, VAS score, anterior edge height of fractured vertebra and Cobb angle were used as indicators to evaluate the therapeutic effect of PVP. **Results:** There was no significant difference in the operation time in the acute and non-acute phases between study group A and study group B ($P>0.05$), and the amount of bone cement in study group B was significantly reduced ($P<0.05$). There was no significant difference in the VAS scores before operation, 2 d after operation, and 6 months after operation between the two groups of patients in the acute and subacute phases ($P>0.05$). There was no significant difference in the VAS scores before and after surgery of the patients in the acute and non-acute phases of the same group ($P>0.05$); compared with before surgery, the VAS scores of the two groups of patients were significantly lower 2 d and 6 months after surgery ($P<0.05$). There was no significant difference in the height of the front edge of the fractured vertebral body between the two groups of patients in the acute and subacute phases ($P>0.05$), compared with the acute phase of the same group, the height of the front edge of the fractured vertebral body in the subacute phase before surgery was significantly reduced ($P<0.05$). Compared with before operation, the height of the anterior edge of the fractured vertebral body increased significantly at 2 days and 6 months after the operation ($P<0.05$). The height of the anterior edge of the vertebral body in the acute and subacute phases of group A

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increased significantly compared with group B ($P<0.05$). There was no significant difference in the Cobb angle between the acute and subacute patients in group B before the operation ($P>0.05$). Compared with the same group in the acute phase, the Cobb angle of the patients in the subacute phase before the operation was significantly increased ($P<0.05$); and before the operation, the Cobb angles of the two groups were significantly reduced 2 days after the operation and 6 months after the operation ($P<0.05$). The Cobb degree of the acute and subacute patients in group A was significantly lower than that in group B after operation ($P<0.05$). **Conclusion:** PVP has a good effect on fresh OVCF with and without IVC.

Key words: OVCF; PVP; Intravertebral Cleft; Fresh period; Curative effect

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前言

骨质疏松性椎体压缩骨折(Osteoporotic vertebral compression fracture, OVCF)其主要临床表现为腰背痛、脊柱活动受限、椎管狭窄、脊柱后凸畸形以及肺活量减少等,随着我国人口老龄化程度的加深,骨质疏松性骨折的发病率也随之不断上升^[1-3]。目前主要采用保守和手术治疗,保守治疗主要包括镇痛、肌肉松弛、卧床休息等物理治疗,虽然会在几个月内愈合,但是治疗时间长,且易产生肌肉萎缩、深静脉血栓、褥疮等并发症^[4,5]。而手术治疗能快速缓解患者疼痛、尽早的恢复日常活动能力,为 OVCF 的首选方案^[6-8]。

经皮椎体成形术(Percutaneous vertebroplasty, PVP)通过将聚甲基丙烯酸甲酯经皮注射到受损椎体内,能快速的缓解疼痛,恢复椎体高度,为骨折椎体提供生物力学稳定性,已广泛应用^[9-11]。椎体内裂隙征(Intravertebral cleft, IVC)是 OVCF 常见的病理征象,在 OVCF 中的发生率为 12.1%~53.4%^[12-14]。IVC 多发生于受损椎体的前三分之一部位,极易发生缺血性坏死,使

骨折难以愈合。伴随 IVC 的 OVCF 表现为椎体的持续不稳定,而椎体不稳是引起患者疼痛和功能障碍的重要因素^[15,16]。

本研究以手术时间、所使用的骨水泥量,手术前、术后 2 d、术后 6 个月患者手术前、术后 2 d、术后 6 个月患者 VAS 评分、骨折椎体前缘高度及 Cobb 角为指标,对 PVP 治疗新鲜期 OVCF 伴随和不伴随椎体内裂隙征疗效进行比较,具体如下。

1 对象与方法

1.1 基本资料

以 2017 年 1 月~2019 年 6 月于我院行 PVP 术治疗 OVCF 的患者为研究对象,根据术前影像学资料分为研究组 A 和研究组 B。其中研究组 A 为 OVCF 伴随 IVC 患者 28 例,急性期(<2 w)19 例,亚急性期(2~6 w)9 例;研究组 B 为 OVCF 不伴随 IVC 患者 34 例,急性期(<2 w)22 例,亚急性期(2~6 w)12 例。一般资料见表 1 所示,两组患者基本信息如病程、性别构成比、年龄、骨密度 T 值等经分析无统计学意义($P>0.05$),具有可比性。

表 1 基本资料比较
Table 1 Comparison of basic data

Groups	Course of disease (days)		Average age (years)	Gender		Bone density T value
	Acute/subacute	Course of disease (days)		Male	Female	
Study group A (n=28)	19/9	12.34±19.07	75.3±7.8	6	22	-3.272±0.41
Study group B (n=34)	22/12	13.48±20.12	76.1±6.6	8	26	-3.318±0.62

1.2 纳入与排除标准

纳入标准:(1)根据患者临床表现、体征以及影像学检查确诊为 OVCF^[17];(2)患者可准确判定受伤时间,且经 MRI 确认为新鲜骨折;(3)患者无明确的高能量外伤史;(4)患者及家属知情同意,且有完整的临床和随访资料。

排除标准:(1)骨折引起脊髓或神经受压者;(2)影像学资料不全者;(3)伴有脊柱结核、脊柱肿瘤等疾病患者;(4)合并其它严重内科疾病者。

1.3 研究方法

所有患者于手术前均进行相关检查以排除禁忌症,建立心电图、指脉氧监测,静脉通道。手术患者取俯卧位,于肩、髋部垫软垫使腹部悬空,保持胸腰过伸,同时予以手法正骨复位,有利于椎体高度恢复,避免腹部压迫。根据术前的影像学检查确认最佳穿刺部位。术区常规消毒铺巾,以 2%盐酸利多卡因在进针

点进行局麻,G 形臂 X 线机辅助透视定位,用专用器械穿刺,适当调整穿刺方向及深度,使穿刺针通过伤椎一侧椎弓根至椎体前 1/3 处,逐渐注入拉丝期骨水泥,确认有无骨水泥渗漏情况,骨水泥凝固后,逐渐旋转拔出穿刺针,包扎固定。术后 24 h 可佩戴腰围,腰围佩带时间为 2 个月。

1.4 观察指标

(1)术中相关指标:记录所有患者手术时间、所使用的骨水泥量等;(2)VAS 评分:采用视觉模拟评分法(VAS)法^[18]评价手术前、术后 2 d、术后 6 个月的患者疼痛程度,采用一标尺,刻度 0~10,无痛记为 0,轻度疼痛记为 1~3,中度疼痛记为 4~6,重度疼痛记为 7~9,疼痛剧烈难忍记为 10;(3)骨折椎体前缘高度及 Cobb 角:分别于术后 2 d、术后 6 个月进行腰椎正侧位 X 线片检查,测量骨折椎体前缘高度,计算椎体高度恢复情况;测量手术前后 Cobb 角。

1.5 数据处理

应用 SPSS 19.0, 计量资料以 $\bar{x} \pm s$ 表示, 使用 t 检验, 计数资料采用率(%)表示, 用 χ^2 检验, $P < 0.05$ 有统计学意义。

2 结果

2.1 术中相关指标比较

对两组的术中指标进行比较, 结果见表 2。与研究组 A 比较, 研究组 B 急性期和非急性期患者手术时间均无显著差异 ($P > 0.05$), 研究组 B 骨水泥量显著低于研究组 A ($P < 0.05$); 与同组急性期比较, 亚急性期手术时间和骨水泥量均无显著差异 ($P > 0.05$)。

表 2 术中相关指标比较 (例, %)

Table 2 Comparison of intraoperative related index (n, %)

Index	Study Group A		Study Group B	
	Acute phase(n=19)	Subacute phase(n=9)	Acute phase(n=22)	Subacute phase(n=12)
Operation time(min)	43.22±7.15	43.57±7.03	44.17±6.93	44.21±6.98
Bone cement(mL)	5.75±0.59	5.59±0.67	4.79±0.54*	4.65±0.42*

Note: * compared with study group A in the same period, $P < 0.05$.

2.2 VAS 评分比较

对手术前后两组的 VAS 评分进行比较, 结果见表 3 所示。与研究组 A 比较, 两组急性期和亚急性期患者手术前、术后 2 d 和术后 6 个月的 VAS 评分均无显著差异 ($P > 0.05$); 同组急

性和亚急性期患者手术前后 VAS 评分无显著差异 ($P > 0.05$); 与手术前相比, 两组患者术后 2 d 和术后 6 个月的 VAS 评分显著降低 ($P < 0.05$)。

表 3 手术前后两组 VAS 评分比较

Table 3 Comparison of VAS scores between two groups before and after operation

Index	Study Group A		Study Group B	
	Acute phase(n=19)	Subacute phase(n=9)	Acute phase(n=22)	Subacute phase(n=12)
Preoperative	8.15±1.34	8.25±1.52	8.31±1.28	8.27±1.45
2 d after operation	2.42±0.63 [#]	2.54±0.71 [#]	2.34±0.58 [#]	2.41±0.74 [#]
6 months after operation	1.22±0.57 [#]	1.27±0.39 [#]	1.31±0.48 [#]	1.26±0.51 [#]

Note: [#] compared with preoperative in the same period, $P < 0.05$.

2.3 骨折椎体前缘高度及 Cobb 角比较

对两组患者手术前后骨折椎体前缘高度比较, 结果见表 4 所示。术前两组急性期和亚急性期患者骨折椎体前缘高度无显著差异 ($P > 0.05$); 与同组急性期比较, 术前亚急性期患者骨折椎体前缘高度显著降低 ($P < 0.05$); 与手术前比较, 术后 2 d 和术后 6 个月骨折椎体前缘高度均显著增加 ($P < 0.05$); 术后 A 组急性期和亚急性期患者椎体前缘高度较术后 B 组显著增加

($P < 0.05$)。

对两组患者手术前后 Cobb 角比较, 结果见表 4 所示。术前 B 组急性期和亚急性期患者 Cobb 角较 A 组无显著差异 ($P > 0.05$), 与同组急性期比较, 术前亚急性期患者 Cobb 角显著升高 ($P < 0.05$); 与手术前比较, 两组术后 2 d 和术后 6 个月的 Cobb 角均显著降低 ($P < 0.05$), 术后 A 组急性期和亚急性期患者 Cobb 度显著低于术后 B 组 ($P < 0.05$)。

表 4 手术前后骨折椎体前缘高度及 Cobb 角比较

Table 4 Comparison of anterior edge height and Cobb angle of fractured vertebral body before and after operation

Index		Study Group A		Study Group B	
		Acute phase(n=19)	Subacute phase(n=9)	Acute phase(n=22)	Subacute phase(n=12)
Fracture anterior vertebral body height (mm)	Preoperative	16.78±1.18	15.04±1.58 [#]	16.43±1.24	15.19±1.85 [#]
	2 d after operation	20.51±3.24 ^{&}	19.13±2.45 ^{&}	18.46±2.21 ^{*&}	17.25±2.25 ^{*&}
	6 months after operation	19.75±3.64 ^{&}	18.87±3.85 ^{&}	18.14±2.22 ^{*&}	16.34±2.16 ^{*&}
Cobb corner	Preoperative	16.71±2.21	18.86±3.24 [#]	16.67±2.01	18.63±2.68 [#]
	2 d after operation	11.64±3.42 ^{&}	12.64±2.84 ^{&}	13.89±2.21 ^{*&}	14.25±2.35 ^{*&}
	6 months after operation	12.95±2.14 ^{&}	13.89±2.14 ^{&}	14.56±2.04 ^{*&}	15.04±2.17 ^{*&}

Note: * compared with study group A in the same period, $P < 0.05$; [#] compared with the same group in the acute phase, $P < 0.05$;

& compared with preoperative, $P < 0.05$.

3 讨论

IVC 是 OVCF 的一种影像学特征, 约有 12.1%~53.4% 的 OVCF 患者伴随 IVC, 一般认为骨质疏松是 IVC 产生的基础, 较高的年龄和较低的骨密度患者易伴随 IVC^[19,21], 多发于上、下终板有破裂情况的骨折椎体^[22]。另外, 伴随 IVC 的 OVCF 多见于胸腰段, 该部位活动性强、载荷大、应力集中, 可能与 IVC 的形成相关^[23]。伴随 IVC 的 OVCF 常发生于非新鲜期 OVCF, 相比于不伴随 IVC 患者, 腰背部的疼痛会更严重、持续时间更长, 及更严重的功能障碍。另有研究表明新鲜期 OVCF 也常伴有 IVC 现象, 且伴随 IVC 患者的椎体稳定性更差, 患者会伴随剧烈的腰背部疼痛、严重的伤椎高度丢失等^[24]。本研究对 PVP 治疗新鲜期 OVCF 伴随和不伴随 IVC 手术时间和所用骨水泥量进行比较, 与研究组 A 比较, 研究组 B 急性期和非急性期患者手术时间均无显著差异, 研究组 B 骨水泥量显著低于研究组 A; 与同组急性期比较, 亚急性期手术时间和骨水泥量均无显著差异。与陈继良^[25]的研究类似, 该学者主要是探讨 PVP 治疗 OVCF 伴椎体内裂隙样变的疗效, 结果显示术中注射骨水泥量 3.5~6.25 mL, 平均 4.25 mL。与本研究组 A 相比, 该学者的研究骨水泥量更低, 不同的是, 没有与 OVCF 不伴随 IVC 进行对比。

OVCF 患者常伴有严重的且长期的腰背部疼痛; 骨折后的微动刺激骨膜和骨关节周围的疼痛感受器, 进而产生疼痛; 骨折后有关化学因子的释放刺激神经引起疼痛^[26]。而 PVP 的治疗, 可通过骨水泥固定骨折椎体, 明显的减轻疼痛, 为骨折愈合创造稳定条件, 同时骨水泥的热效应破坏末梢神经, 减轻炎症因子^[27]。多项研究表明, PVP 治疗 OVCF 能快速的缓解患者疼痛, 这与本研究结果一致^[28,29]。本研究对手术前、术后 2 d 和术后 6 个月两组患者的疼痛情况进行比较, 结果显示与研究组 A 比较, 两组急性期和亚急性期患者手术前、术后 2 d 和术后 6 个月的 VAS 评分均无显著差异; 同组急性期和亚急性期患者手术前后 VAS 评分无显著差异, 两组术后 2 d 和术后 6 个月的 VAS 评分显著降低, 与陈继良^[25]的研究类似, 术前 VAS 评分(8.3±0.8)分, 显著高于术后 1 w(2.4±0.7)分和末次随访时(2.1±0.6)分。李继凯^[30]的研究也显示, 经皮椎体成形术治疗伴或不伴真空裂隙征的骨质疏松性椎体骨折, 两组的术后自感疼痛症状均降低。

有学者认为, PVP 治疗不伴随 IVC 的 OVCF, 只能通过骨水泥对伤椎起到固定作用, 而不能有效恢复伤椎高度^[31]。但另有学者研究发现 PVP 治疗伴 IVC 和不伴 IVC, 患者伤椎高度和后凸均有不同程度的恢复^[32]。本研究通过胸腰椎过伸手法按压正骨复位而促进椎体高度的恢复, 我们将术前、术后 2 d 和术后 6 个月两组患者的骨折椎体前缘高度和 Cobb 角进行比较, 结果显示两组急性期和亚急性期患者骨折椎体前缘高度无显著差异; 与同组急性期比较, 术前亚急性期患者骨折椎体前缘高度显著降低, 与术前比较, 术后 2 d 和术后 6 个月骨折椎体前缘高度均显著增加, 术后 A 组急性期和亚急性期患者椎体前缘高度较术后 B 组显著增加。术前 B 组急性期和亚急性期患者 Cobb 角较 A 组无显著差异, 与同组急性期比较, 术前亚急性期患者 Cobb 角显著升高; 与术前比较, 两组术后 2 d 和术后 6 个月的 Cobb 角均显著降低, 术后 A 组急性期和亚

急性期患者 Cobb 度显著低于术后 B 组。与蒋小军^[33]等学者的研究类似, 临床观察比较采用 PVP 治疗伴或不伴裂隙样变骨质疏松性椎体压缩性骨折方面的疗效, 结果显示两组治疗后患椎的高度显著升高, 后凸 Cobb 角显著降低, 且术后伴有裂隙样变椎体压缩性骨折的患椎的高度, 后凸 Cobb 角改善较为显著。

综上所述, PVP 治疗伴随和不伴随 IVC 的 OVCF 均有较好疗效, 能明显降低患者疼痛、恢复骨折椎体前缘高度和 Cobb 角。本研究虽取得了一定的结果, 但是也存在一定的不足, 样本量少, 结果可能存在一定的偏移, 同时没有随访对比两组的并发症的发生情况, 后需研究还需要进一步的深入探究其并发症的情况。

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