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经皮椎体后凸成形术联合唑来膦酸治疗绝经期妇女骨质疏松性椎体压缩性骨折*

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摘要 目的:探讨经皮椎体后凸成形术联合唑来膦酸(密固达)治疗绝经期妇女骨质疏松性椎体压缩性骨折的临床疗效。**方法:**回顾我科收治的 120 例绝经期妇女骨质疏松性椎体压缩性骨折,经 X 片、CT、MRI 证实存在脊柱椎体压缩性骨折,经双能 X 线吸收测定法推测骨质疏松的程度。其中 96 例新鲜骨折均行经皮椎体后凸成形术(双侧)手术。术后第三天给予密固达 5 mg(100 mL)静滴。对 96 例患者术前、术后 1 周、末次随访术前 VAS 评分、功能障碍指数(ODI)、JOA 评分进行比较。**结果:**94 例患者得以随访,随访时间为术后 3 月~36 月,平均 24 月。16 例出现不同程度的骨水泥渗漏,渗漏部位为椎体前缘或椎间隙。术后一周,末次随访的 VAS、JOA 评分和 ODI 与术前比较,差异有统计学意义(P 值均小于 0.00)。末次随访与术后一周比较无统计学意义(P 值分别为 0.18、0.49、0.50)。**结论:**PKP 联合唑来膦酸治疗绝经期妇女骨质疏松性椎体压缩性骨折具有安全、有效、持久等优势。

关键词:经皮椎体后凸成形术;椎体压缩性骨折;唑来膦酸;绝经期;骨质疏松;临床疗效

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Analysis of Postmenopausal Women with Osteoporotic Vertebral Compression Fractures Treated by Percutaneous Kyphoplasty Combined Zoledronic Acid*

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ABSTRACT Objective: To explore postmenopausal women with osteoporotic vertebral compression fractures Treated by Percutaneous kyphoplasty Combined Zoledronic Acid. **Methods:** Review of 120 cases who were postmenopausal women with osteoporotic vertebral compression fractures confirmed by X-rays, CT, MRI and speculated the degree of osteoporosis by DEXA (dual energy X-ray absorptiometry) were admitted in our departments. All of cases underwent PKP(bilateral) surgery were fresh fractures. Aclasta is given to 5mg (100 mL) infusion after postoperative three days. On 96 patients before surgery, after surgery one week before the end of follow-up surgery VAS score, functional disability index (ODI), JOA score were compared. **Results:** All of patients were followed up 3 to 36 months, an average of 24 months. 16 cases of varying degrees of bone cement let out, seepage or parts of the vertebral disc space. Compared postoperative week, the last follow-up with surgery by VAS, JOA score and ODI, the difference was statistically significant (P values were less than 0.00), whereas, the first two had no statistically significant (P values were 0.18, 0.49, 0.50). **Conclusion:** Postmenopausal women with osteoporotic vertebral compression fractures treated by percutaneous kyphoplasty combined Zoledronic Acid has some advantages, such as safe, effective lasting and so on.

Key words: Percutaneous kyphoplasty; Vertebral compression fractures; Zoledronic Acid; Postmenopausal; Osteoporotic; Clinical efficacy

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前言

骨质疏松是绝经期妇女常见的疾患之一^[1-4]。随着老龄化的进程,骨质疏松的程度已进一步加重,有时轻微外伤或无明显外伤时均可发生椎体骨折导致患者胸(腰)背部疼痛难忍,甚至

卧床不起,严重影响患者的生存质量。而经皮椎体后凸成形术(Percutaneous Kyphoplasty, PKP)因其球囊扩张复位,骨水泥灌溉充填椎体和骨水泥干固过程的热效具有微创、迅速镇痛、恢复椎体高度、患者能早起下床等优点,深受广大患者和脊柱外科医生的欢迎^[5-8]。但 PKP 技术只是针对骨折的病椎,无法解决

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全身骨质疏松的问题,而唑来膦酸(密固达)主要是针对绝经期妇女骨质疏松症全身治疗用药^[9-11]。因此我科自2010年1月~2013年12月对绝经期妇女脊柱骨折的患者行PKP手术,术后联合应用唑来膦酸,取得良好疗效。现报道如下:

1 材料与方法

1.1 一般情况

2008年1月~2012年12月我科收治的120例绝经期妇女脊柱骨折的病例中,其中96例符合纳入研究标准。患者年龄55~91岁,平均65.5岁,患椎波及T8~L5,单个椎体骨折36例,双椎体骨折(间断或连续)40例,三椎体骨折(间断或连续)20例

1.2 纳入标准

绝经期妇女,X片和MRI证实脊柱有一处或多处椎体新鲜椎体压缩性骨折,经双能X线吸收测定法(Dual Energy X-ray Absorptiometry,DXA)治疗的 $T\leq -2.5$,血钙正常,肌酐清除率 $>35\text{ mL/min}$ 。

1.3 手术方法

患者俯卧,全麻或局麻下C-臂透视进行伤椎侧位相定位。标记伤椎的两侧椎弓根(猫眼),经左右椎弓根的外上缘10点至14点或9点至15点进行双侧穿刺。穿刺成功后,进行双侧球囊扩张,调拌骨水泥,根据充填情况,每侧各推注2.0~2.5 mL,透视正侧位相无误后,反复旋转T形套管,待骨水泥较固化时(开始搅拌后的15 min)拔出套管针。

1.4 术后处理

术后24~48小时卧床休息。术后常规应用抗生素三天。术后继续口服钙剂(1000~1500 mg/d),加服非甾体类消炎镇痛药3天(西乐葆200 mg/d),第四天病情稳定后,同患者及家属进行特殊治疗知情谈话并签字,滴注唑来膦酸(5 mg/100 mL)一支,滴注时间不少于15 min,滴注前后各补生理盐水250 mL~500 mL,观察患者用药后的反应及测量体温。

1.5 评分方法

视觉模拟评分法^[12](Visual Analogue Scale/Score, VAS),患者自我评估术后腰痛的状况。0分为无痛;3分以下有轻微疼痛,能忍受;4~6分为患者疼痛并影响睡眠,尚能忍受;7~10分患者有渐强烈的疼痛,难忍,食欲跟睡眠均受影响。

Oswestry功能障碍指数问卷表^[13](Oswestry Disability Index, ODI),Oswestry功能障碍指数问卷表是由10个问题组成,包括疼痛的强度、生活自理、提物、步行、坐位、站立、干扰睡眠、性生活、社会生活、旅游等10个方面的情况,每个问题6个选项,每个问题的最高得分为5分,选择第一个选项得分为0分,依次选择最后一个选项得分为5分,假如有10个问题都做了问答,记分方法是:实际得分/50(最高可能得分) $\times 100\%$,假如有一个问题没有回答,则记分方法是:实际得分/45(最高可能得分) $\times 100\%$,如越高表明功能障碍越严重。

日本骨科协会评估治疗分数^[14](Japanese Orthopaedic Association Scores,JOA),根据JOA下腰痛评价表来评估术后下腰痛,此表根据患者的主观症状、腰痛、感觉障碍、运动障碍、步行能力、下肢痛及麻木、日常生活动作、体征、直腿抬高、膀胱功能等(具体分值参考JOA下腰痛评分表),总分分前分后分,JOA总评分最高为29分,最低0分,分数越低表明功能障碍越明显。

1.6 统计学分析

应用SPSS19.0统计软件,对数据进行统计,以均数标准差形式记录于表格,后对三组数据进行单因素方差分析, $P<0.05$ 为差异有统计学意义。

2 结果

2.1 一般结果

94例患者得以随访,随访时间12月~36月,平均26.5月,94例患者用了唑来膦酸无任何反应的44例,50例有不同程度的发热、头痛、四肢关节痛、无力症状,持续时间一般为用药48小时内。所有随访的伤椎均行双侧PKP手术,10例患者除压缩性骨折外,存在脊柱不稳症,辅以经皮椎弓根微创系统内固定术;16例患者出现不同程度的骨水泥渗漏,渗漏的部分为椎体前缘和椎间隙;未发生感染、栓塞和神经压迫症状,术后一年内有3例邻近椎体骨折。患者术后一周,末次随访的VAS、ODI和JOA评分与术前比较有统计学意义,术后一周与末次随访的三个指标比较无统计学意义(附典型病例一例)。

表1 不同时间、不同系统评分的比较

Table1 Comparing different times, different scoring system

Time	VAS	ODI	JOA
Preoperative	7.3 $\pm$ 1.4	40.7 $\pm$ 9.9	9.3 $\pm$ 1.5
A week after operation	1.3 $\pm$ 0.6	4.4 $\pm$ 2.1	27.4 $\pm$ 3.3
Survival time	1.2 $\pm$ 0.4	4.2 $\pm$ 1.9	27.1 $\pm$ 2.8
P-value	0.00 ^a	0.00	0.00
	0.00 ^b	0.00	0.00
	0.18 ^c	0.49	0.50

Note: 0.00a preoperative compared with surgery after a week, 0.00b the last follow-up compared with preoperative, 0.18c after a week compared with the last follow-up.

2.2 典型病例随访结果

患者,女,73岁,诊断:1、腰3椎体压缩性骨折;2、骨质疏松症;3、冠心病。在我院行经皮椎弓根钉棒微创系统内固定术+腰3椎体PKP成形术。以下图组分别为患者术前腰椎X线、CT、MRI、术中X线和术后6月随访的X线。术前选择合适的病例(椎体后壁必须完整,以免骨水泥渗入椎管),根据MRI判断椎体骨折的新鲜程度,结合患者的临床症状,决定是否手术(本病例MRI显示,椎体为新鲜骨折,伴腰部疼痛,手术适应症明显)。术中透视,寻找“猫眼”(椎弓根投影处)处进针,边透视边扩张球囊,待椎体高度恢复后,停止扩张。根据患者骨质疏松的程度、患椎及临近椎体生物力学状况及患者自身意愿,选取合适钉棒系统固定。

3 讨论

3.1 PKP技术在绝经期妇女骨质疏松性椎体压缩性骨折的应用探讨

本世纪初,我国引进并开展PKP技术以来,因其手术微创、镇痛效果好,患者能在很短的时间恢复体力广受医患的欢迎。随着该项技术的发展和推广,各地陆续有报道发生骨髓渗漏^[15-18],损伤椎前血管和压迫脊髓和神经根、肺栓塞等并发症。通过本组的病例操作,我们认为只要把握好以下几点操作要领可减少或避免并发症的发生。

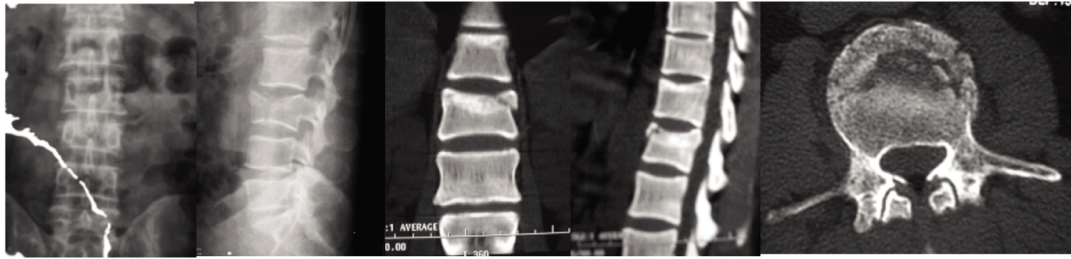
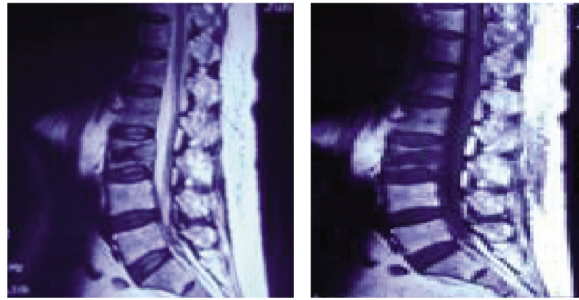


图1 术前腰椎X片:腰3椎体压缩性骨折 术前腰椎CT:腰3骨折椎体后壁完整

Fig. 1 Preoperative lumbar spine X-ray: the three lumbar vertebral compression fractures preoperative lumbar CT: lumbar vertebral posterior wall of three full



T₁W (T₁ 加权像 T₁-weighted imaging) T₂W (T₂ 加权像 T₂-weighted imaging)

图2 术前腰椎 MRI

Fig. 2 Preoperative MRI lumbar spine

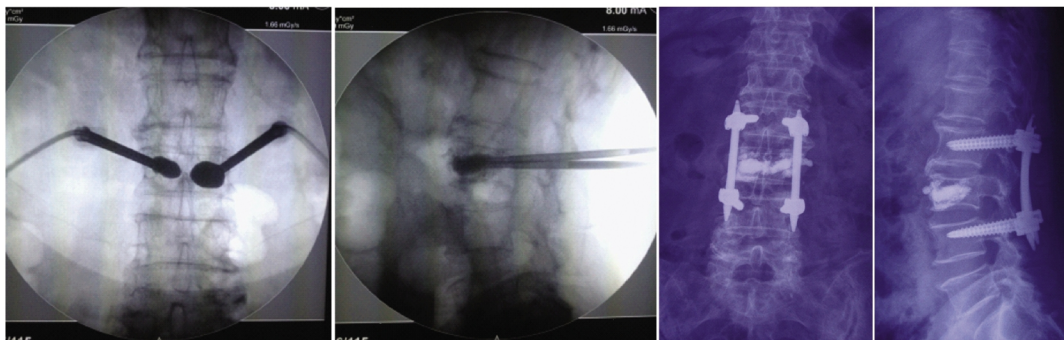


图3 经皮穿刺椎体后凸成形术 (PKP) 术后6月随访X片 (PKP+Sextent)

Fig. 3 Percutaneous kyphoplasty (PKP) after 6 months X-ray (PKP + Sextent)

①重视术前定位 正位相伤椎的椎弓根投影与棘突投影等距,否则需调整床面至水平或检查患者卧床后是否水平位,以免造成穿刺失误。

②严格术中操作 紧贴椎弓根外上缘,掌握好外展角和头倾角进行穿刺,当穿刺深度达5~6 cm时,侧位针尖进入椎体后缘2~3 mm,正位相针尖不超过椎弓根内缘,否则重新穿刺,以免刺入椎管。

③把握推入骨水泥的时间 目前市场上用骨水泥多为第三代骨髓泥,干涸速度较慢,一般需15 min,有学者认为较稀的骨水泥弥散效果好,选择较稀的骨水泥推入,但较稀的骨水泥易发生渗漏是一个不争的事实^[19-21],同时有报道认为术后肺栓塞发生率与骨水泥的稀薄程度有关,本组96例患者我们采用拔丝期推注,一般为搅拌后7~8分钟,推注是缓缓推入,边推边透,一旦发现渗漏,应调整推管(向前或退后)在慢慢推入或停止推注,因此本组未发生肺栓塞并发症。虽有16例发生椎前或椎前的少量渗漏,但由于推注速度缓慢,水泥进入拔丝期,加上前纵韧带的完整性未发生损伤血管的并发症。通过透视可观

察到椎体前、中后的弥散程度,通过调整椎管远端的位置,适当补充骨水泥的推注,一般可达到很好的弥散效果。

3.2 唑来膦酸与 PKP 的联合应用,使骨质疏松症的治疗更加完整、有效

PKP 技术是针对伤椎进行球囊扩张达到椎体复位,推注骨水泥对伤椎充填加固,而骨水泥固化过程中可发热烧灼椎体末梢神经,从而达到恢复椎体高度、稳定椎间结构,迅速镇痛的目的^[22-23]。但骨质疏松症是一种全身性骨量低下、骨强度下降、骨微观结构退化性骨病,要完整、有效地治疗骨质疏松症,需要进行全身治疗,而唑来膦酸正是一种治疗全身骨质疏松症的药物,该药用法为一年静滴一次,连续用三年,患者容易接受,具有良好的依从性;由于该药主要经肾脏代谢,要求肌酐清除率 ≥ 35 mL/min,血钙水平正常(血清总钙 >2.13 mmol/L)。因此本组纳入研究标准的患者均符合此标准。由于该药可发生低热、肌肉骨骼系统疼痛、头痛等类流感症状,本组用药前三天嘱患者开始口服西乐葆胶囊等非甾体类药物,用药当天充分补水。50例患者虽有不同程度的类流感症状,一般24~48h症状

消失;本组治疗期间也给予充分补钙(1000~1500 mg/d)和维生素 D(1000~1200 IU)。有相关报道,PKP 术后邻近椎体骨折或远位椎体骨折时有发生,研究显示再骨折发生率为 2.4~23%^[24-26]。关于再骨折研究有学者认为是:①强化后椎体终板改变了生理内应力,使应力集中;②骨水泥注入量过多,增大了伤椎强度和刚度;③骨水泥渗入椎间隙,降低椎间盘的缓冲作用;④骨质疏松症的一种自然进展,本组 94 例随访对象中有 3 例发生邻近椎体骨折,发生率为 3.19%。我们认为发生率较低与 PKP 术后联合使用唑来膦酸和治疗期间综合补钙和维生素 D 有关。由于该药进入临床应用时间不长,目前主要集中在大型三甲医院,应用病例有限,药物的安全性、有效性有待进一步的临床应用和总结。

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