

胸椎间盘钙化脱出致截瘫 1 例及文献复习

李天佐¹, 王泽昊¹, 张羽¹, 杨森¹, 王炳武²

(1. 潍坊医学院临床医学院, 山东 潍坊 261041; 2. 潍坊医学院第一附属医院, 山东 潍坊 261041)

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Paraplegia caused by calcified prolapse of thoracic intervertebral disc: a case report and literature review LI Tian-zuo, WANG Ze-hao, ZHANG Yu, YANG Sen, and WANG Bing-wu*. *The First Affiliated Hospital of Weifang Medical College, Weifang 261041, Shandong, China

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患者,男,64岁,因“背部疼痛不适 20 d,加重伴双下肢感觉丧失、运动消失 36 h”于 2021 年 4 月入院。患者 20 d 前无明显原因及诱因出现背部疼痛不适,劳累后加重,休息可缓解,无行走不稳,无夜间痛及静息痛,曾行保守治疗,以上症状间断反复出现并进行性加重,36 h 前上述症状突然加剧,伴双下肢感觉丧失不能活动,不能自行大小便,略腹胀,无其他不适。平车推入,被动卧位。查体:双上肢正常,躯体皮肤自肋弓平面以远针刺觉减退,自脐平面以远、马鞍区及双下肢针刺觉消失。双下肢肌张力低,肌肉无萎缩,肌力 0 级。双侧 Lasague sign、Bragard sign、双侧腹壁反射、肛周反射、提睾反射、膝腱反射、跟腱反射、髌阵挛、踝阵挛、病理征均阴性,双下肢血运良好。入院后实验室检查:白细胞计数 $16.72 \times 10^9/L$,淋巴细胞百分比 6.9%,单核细胞百分比 5.2%,中性粒细胞百分比 87.9%,淋巴细胞绝对值 $1.16 \times 10^9/L$,单核细胞绝对值 $0.87 \times 10^9/L$,中性粒细胞绝对值 $14.69 \times 10^9/L$,C-反应蛋白 9.4 mg/L,余生化检验未见明显异常。胸椎正位 X 线片示 T_{9,10} 椎间隙内见高密度影(图 1a)。胸椎 CT 示各椎体、附件未见明显骨质破坏及骨折征象,T_{9,10} 椎间隙及椎管腔内见结节样高密度影,椎间盘钙化并脱出,硬膜囊显著受压(图 1b)。胸椎 MRI 示 T_{9,10} 椎间盘信号减低并向后方脱出,相应水平椎管明显狭窄,黄韧带未见明显肥厚,硬膜囊显著受压(图 1c)。根据患者相关辅助检查,初步诊断为胸椎间盘钙化脱出,入院后 24 h 内在气管插管全麻下急行后入路胸椎管减压+椎管内占位切除+内固定术,术中切除 T₉ 椎板,切除 T_{8,9}、

T_{9,10} 椎板间黄韧带,切除 T₉ 右侧下关节突,T₁₀ 右侧上关节突,显露椎管内占位组织及硬脊膜囊,探查见 T_{9,10} 水平硬膜严重受压,未见波动,表面明显充血,色泽灰暗。术中取出大量灰白色牙膏状质韧物质,术后送病理检查示(胸椎管内硬膜外占位)髓核组织、水肿变性的纤维软骨伴钙盐沉积,少许软骨细胞,软骨细胞无明显异型性(图 1d)。术后第 3 天复查胸椎侧位 X 线片可见钙化的椎间盘已清除,胸椎管狭窄已解除(图 1e)。在术后 3 个月随访期间,患者双下肢感觉及功能无任何实质性改变。

讨论

椎间盘钙化(intervertebral disc calcification, IDC)在成人中是一种罕见的椎间盘病理性改变,被认为是椎间盘退变的原因之一,有时可伴有后纵韧带及黄韧带的钙化^[1-2]。大多数胸椎间盘突出都无临床症状,但当钙化的椎间盘突出伴脱出时则可导致严重的神经根或脊髓压迫^[3]。

以往的研究表明,IDC 多数发生在颈椎,胸椎及腰椎较为少见^[4],其在成人中的发病率分别占胸椎和腰椎 X 线片的 5%和 6%^[5-6]。Chanchairujira 等^[7]研究表明 IDC 的患病率与年龄呈正相关。Kati 等^[8]研究表明 IDC 在地中海贫血患者的发病率明显高于正常成人。国内外尚无研究直接表明椎间盘钙化本身会造成相应的临床症状,只有当钙化的椎间盘突出或者出现炎症反应时,才可能出现相应的临床症状。

目前,关于成人椎间盘钙化的发病机制尚不明确。通常认为羟基磷灰石为钙化椎间盘的主要成分。Lioté 等^[9]研究表明,碱性磷酸酶可通过水解磷酸盐形成磷酸离子,它们与钙离子结合产生羟基磷灰石。Ho 等^[10]研究发现,羟基磷灰石的形成可能与细胞外无机焦磷酸浓度有关。一些研究发现在钙化的椎间

通讯作者:王炳武 E-mail:bwspine@126.com

Corresponding author: WANG Bing-wu E-mail:bwspine@126.com

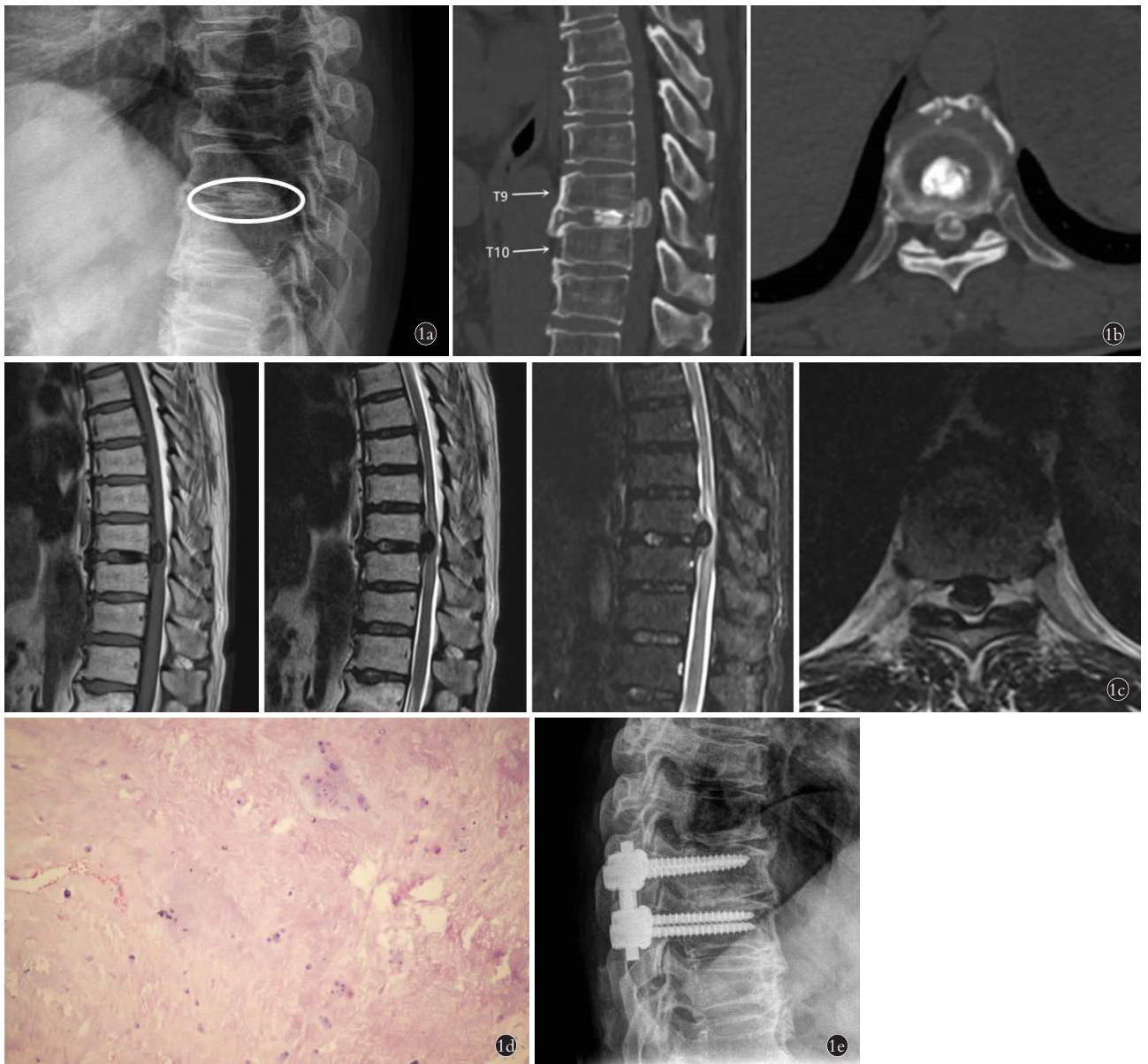


图 1 患者,男,64 岁,胸椎间盘钙化脱出致截瘫 **1a.** 术前胸椎侧位 X 线片示 T_{9,10} 椎间隙内高密度影 **1b.** 术前胸椎 CT 示 T_{9,10} 椎间隙及椎管内结节样高密度影,相应水平椎管狭窄 **1c.** 术前 MRI 矢状面及水平面示 T_{9,10} 椎间盘水平后方球状异常信号,T1WI、T2WI 呈低信号,抑脂序列呈边缘低信号,中心高信号 **1d.** 术后病理示水肿变性的纤维软骨,软骨细胞无明显异型性 **1e.** 术后 3 d 胸椎侧位 X 线片示钙化的椎间盘已清除,椎管狭窄解除,无脊髓压迫,内固定在位,未见松动

Fig.1 A 64-year-old male patient with paraplegia caused by calcified prolapse of thorac intervertebral disc **1a.** Preoperative lateral X-ray film of thoracic vertebra showed high-density shadow in intervertebral space of T_{9,10} **1b.** Preoperative thoracic CT showed nodular high-density shadow in the intervertebral space and spinal canal cavity of T_{9,10},and corresponding horizontal spinal canal stenosis **1c.** Preoperative MRI on sagittal plane and horizontal plane showed spherical abnormal signals behind level of T_{9,10} intervertebral discs. T1WI and T2WI showed low signals,lipid suppression sequence showed marginal low signals and central high signals **1d.** Postoperative pathology showed edema and degeneration of fibrocartilage,and there was no obvious atypia of chondrocytes **1e.** Three days after operation,lateral X-ray film of thoracic spine showed that the calcified intervertebral disc had been removed,the spinal canal stenosis was relieved,there was no spinal cord compression,the internal fixation was in place,and there was no loosening

盘中存在大量 X 型胶原和骨桥蛋白(osteopontin, OPN),二者通过调节碱性磷酸酶间接导致椎间盘钙化^[11-13]。创伤、感染、某些代谢性疾病所产生的炎症因子可通过刺激细胞外无机焦磷酸促进椎间盘钙化^[14]。维生素 D、钙剂、双膦酸盐、Wnt 信号蛋白激活

剂,以及甲状旁腺激素类似物等抗骨质疏松药物均有可能导致椎间盘钙化^[15]。椎间盘软骨终板骨髓接触通道数量减少使椎间盘营养供应减少加快椎间盘退变,从而改变其性质并导致钙盐沉积^[16-17]。上述理论所描述的椎间盘钙化均为长期过程,该患者起病

急,病程短,既往无外伤感染等病史,且椎间盘、椎管内部分均有异常密度或信号影,考虑为原位椎间盘钙化,而非慢性长期形成的钙化。

该患者 MRI 可见椎管内突出物在 T1、T2 序列上呈低信号,抑脂序列上可见突出物边缘呈低信号,中心为高信号,考虑为炎性水肿,这与患者白细胞计数、中性粒细胞百分比、C-反应蛋白等炎症指标升高以及术后病理中水肿变性的纤维软骨伴钙盐沉积相一致。该患者 CT 可见椎间盘后半部与突入椎管内部分呈高密度影,其前半部与正常椎间盘密度相近,且未见椎体骨质破坏,考虑为椎间盘钙化。钙化椎间盘的 CT 值高,与周围骨组织接近或相等。

儿童椎间盘钙化多为自限性疾病,采用保守治疗多数可自行吸收^[18]。成人椎间盘钙化可导致急性椎间盘炎,引起背痛等症状,通过短期服用非甾体类消炎药和肌肉松弛剂缓解症状^[19]。在受到外力或过度活动时,钙化的椎间盘因与上下软骨终板及周围组织的粘附性减低更容易脱出,引起神经系统症状,严重时可导致截瘫,因此一旦影像学检查发现巨大椎间盘钙化,建议尽早手术^[20]。如已经脱出致截瘫,应尽快行减压手术避免脊髓缺血损伤。术中应注意保护脊髓硬膜,避免减压过程中因过度牵拉脊髓造成医源性二次损伤,在保护脊髓的前提下用髓核钳将钙化椎间盘尽可能多的清理,做到减压彻底,避免复发。术中可行椎间植骨,避免椎间隙高度丢失。

综上所述,成人椎间盘钙化是一种特殊的椎间盘病变,其发生机制目前尚不明确,有待于进一步研究。笔者通过此例患者的诊断及治疗认为胸椎间盘钙化所致的早期症状可通过非甾体类消炎药等药物控制,一旦发现巨大椎间盘钙化应尽早手术,预防其脱出导致神经根或脊髓压迫。

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