

脊髓内复发性室管膜瘤术后并发脊髓疝： 附 1 例报道并文献复习

韩 武 戚 继 李 勃 翰 谢 炯 章 炜 郭 腾 显

【摘要】 目的 探讨脊髓内复发性肿瘤术后并发脊髓疝的预防及治疗方法。方法 回顾性分析 1 例脊髓内复发性室管膜瘤术后并发脊髓疝的临床资料,并结合相关文献进行分析。结果 54 岁女性,胸 8 节段脊髓内室管膜瘤(WHO 分级 II 级)全切除术后 9 年复发,再次手术全切除肿瘤,术后 2 d 突发神经功能恶化,复查胸椎 CT 示脊髓疝,急诊行椎管减压+硬脊膜成形术,术后神经功能改善,但遗留大小便功能障碍。术后 3 个月随访,恢复到术前状态,但遗留左下肢不自主颤抖,需要拐杖辅助行走。结论 脊髓内复发性肿瘤再次切除术后出现神经功能障碍,结合影像学表现,应考虑到脊髓疝的可能,充分的减压、松解及硬脊膜成形术是一种有效的治疗方法。

【关键词】 脊髓内复发性室管膜瘤;显微手术;脊髓疝;椎管减压术;硬脊膜成形术

【文章编号】 1009-153X(2024)02-0088-04 **【文献标志码】** A **【中国图书资料分类号】** R 739.42; R 651.1*1

Spinal cord hernia after surgery for recurrent intramedullary ependymoma: a case report and literature review

HAN Wu, QI Ji, LI Bo-han, XIE Jiong, ZHANG Wei, GUO Teng-xian. Department of Neurosurgery, Beijing Fengtai Hospital, Beijing 100071, China

【Abstract】 Objective To investigate the prevention and treatment of spinal cord hernia after surgery for recurrent intramedullary tumors. **Methods** The clinical data of a patient with recurrent intramedullary ependymoma complicated with spinal cord hernia after surgery were retrospectively analyzed, and the relevant literatures were reviewed. **Results** A 54-year-old female presented to the hospital with left lower limb numbness and weakness for 10 days, who underwent total resection for a intramedullary ependymoma at thoracic 8 segment (WHO grade II) 9 years ago. Contrast-enhanced T₁-weighted MR images showed irregular small nodular moderate enhancement signals in the thoracic 8 spinal cord segment, suggesting tumor recurrence. The tumor was totally removed again. The neurological function suddenly deteriorated 2 days after the reoperation, and the thoracic CT showed spinal cord hernia. The emergency spinal canal decompression and dural plasty were performed, and the neurological function improved after the decompression, with residual urinary and fecal dysfunction. At the follow-up 3 months after reoperation, the patient returned to the preoperative state, but left involuntary trembling of the left lower limb, requiring crutches to assist walking. **Conclusions** The spinal cord hernia should be considered when patients have neurological dysfunction after resection of recurrent intramedullary tumors. Adequate decompression and dural plasty are effective treatments.

【Key words】 Recurrent intramedullary ependymoma; Microsurgery; Spinal cord hernia; Spinal decompression; Spinal plasty

脊髓疝(spinal cord herniation, SCH)是一种罕见的疾病,可分为特发性、创伤性和医源性三类^[1]。其发病机制尚不明确。医源性 SCH 具有明确的手术史,可以发生在脊柱各段,根据脊髓受累节段不同,其临床表现各异。本文回顾性分析 1 例脊髓内复发性室管膜瘤术后并发 SCH 的临床资料,并结合文献进行分析、总结此类病例的临床特点及防治方法,为临床提供参考。

1 病例资料

54 岁女性,因脊髓内室管膜瘤术后 9 年伴左下肢麻木、无力 10 d 入院。9 年前,无明显诱因出现双下肢疼痛伴麻木、无力,胸椎 MRI 检查示胸 8 椎体水平脊髓内占位,行后正中入路脊髓内病变切除术,全切除病变,术后病理结果为室管膜瘤(WHO 分级 II 级),术后临床症状缓解出院。10 d 前,出现左下肢麻木、无力,复查 MRI 示胸 8 节段脊髓内占位(图 1A~C),考虑肿瘤复发。入院体格检查:肋弓下缘以下左侧躯干及左下肢浅感觉、本体感觉及精细触觉减退,左侧上腹部腹壁反射减弱,肛门反射正常,左下肢肌力 IV 级,肌张力正常,膝腱反射正常,巴氏征

(-)。完善术前检查后,行正中入路脊髓内病变切除术。术中见胸8椎体水平椎管内蛛网膜粘连,予以充分松解,肿瘤位于髓内,呈紫红色,质地软,血供中等,边界尚清,最终在镜下全切除肿瘤。术中对脊髓保护良好,肿瘤切除后见脊髓稍肿胀,但脊髓搏动尚良好。硬脊膜复位,未缝合,切缘内侧置入纤维蛋白硬膜补片,切缘外侧表面贴敷明胶海绵。胸8椎板未还纳,放置引流管。术后静脉滴注20%甘露醇(250 ml,1次/8 h)及甲泼尼龙注射液(80 mg,1次/12 h),以改善微循环及预防脊髓水肿。术后1 d,症状基本同术前。术后2 d,突发双下肢强直,肌张力极度增高,Ashworth分级4级,肌力0级,双侧肋缘以下浅感觉及深感觉均消失,腹壁反射及肛门反射消失,双侧腱反射亢进,巴氏征(+).急诊行胸椎CT检查示胸8椎体水平脊髓由椎板骨窗疝出并嵌顿(图1D),立即行椎管减压术,术中见胸8椎体水平人工硬膜膨隆,无明显搏动,触之张力高,揭开人工硬膜见脊髓肿胀,由硬脊膜切口处膨出并嵌顿于椎板骨窗处,将原椎板骨窗两侧骨质咬除扩大,并将胸7和胸9椎板切除,骨窗同胸8椎板骨窗大小,剪开胸7和胸9水平硬脊膜,见其下蛛网膜粘连,予以充分松解后见大量脑脊液流出,并将疝出的脊髓复位,脊髓逐渐恢复搏动,采用不可吸收人工硬膜进行硬膜囊扩大成形术。放置硬膜外引流管,分层缝合各层组织。术后静脉滴注20%甘露醇250 ml(1次/8 h,持续6 d;1次/12 h,持续6 d;1次/d,持续3 d)及甲泼尼龙注射液(500 mg,1次/d,持续3 d;80 mg,1次/12 h,持续3 d;40 mg,1次/12 h,持续9 d)。椎管减压术后5 d,复查胸椎CT示胸8节段脊髓复位(图1E);复查胸椎增强MRI示肿瘤全切除,脊髓复位良好(图1F~H)。术后10 d拔除引流管,术后15 d出院。出院时,排便需开塞露辅助;排尿因试拔除尿管后出现尿潴留及失禁,遂携带尿管出院。术后3个月,视频电话随访,临床表现较SCH发病时明显改善,可拄拐杖行走,但遗留左下肢不自主颤抖。

2 讨论

2.1 发病率 Cobb等^[2]在1973年首次报道术后医源性SCH。在此后的近50年中,仅有20余例术后医源性SCH被陆续报道^[1-16]。根据一项大宗病例分析,脊柱脊髓术后发生SCH的概率为0.093%,伴有硬脊膜切开术后发生SCH的概率为0.01%^[1]。由于SCH的发生率极低且相关报道很少,因此术后SCH的许多方面仍是不甚清晰的。

2.2 发病机制 有学者认为术中硬脊膜的隐匿性损伤或术中硬脊膜切开及缝合不充分所致的硬脊膜薄弱是医源性SCH的主要原因^[1,3,4]。另外,部分学者认为脊髓与硬脊膜薄弱或缺损处的炎性粘连拴系、脑脊液的搏动和流体力学因素的改变也促进了术后SCH的发生和发展^[3,4,8]。Kaliya-Perumal等^[5]认为术后咳嗽、便秘、尿潴留等可导致腹内压或胸腔内压增高的因素,会使中心静脉压增加,导致经颈静脉系统的引流减少;随后颅内压增加并传导至整个脑脊液流动系统,进而促进脊髓疝出。本文病例脊髓内肿瘤切除术后采用人工硬膜内置修补,未水密缝合,术后2 d突发SCH,我们考虑其发生机制为脊髓内肿瘤术后脊髓局部水肿逐渐加重,致局部蛛网膜下腔受压粘连,脑脊液循环障碍,这样局部水肿和脑脊液搏动冲击共同作用促进了脊髓由硬脊膜切开处疝出。

2.3 临床表现 SCH的临床表现根据脊髓疝出的节段、疝出的方位(腹侧或背侧)及程度,呈现出多样性,但缺乏特异性,主要包括躯干感觉障碍、肢体感觉及运动障碍、膀胱及直肠功能障碍^[1-16]。SCH引起神经功能缺陷的原因为^[15]:缺血和压迫;疝处脊髓拴系;脊髓牵引和扭曲。原发病术后至SCH的时间间隔长短不一,最长可达18年^[16],最短者为麻醉苏醒后即刻出现^[15]。本文病例术后2 d突发下肢感觉及运动丧失,肌张力增高、腱反射亢进、病理征阳性,我们考虑为脊髓水肿联合SCH导致皮质脊髓束、脊髓丘脑束及薄楔束受累引起。所以,对于有脊柱脊髓手术史的病人,出现神经功能恶化,要考虑SCH的可能性,需尽早行影像学检查加以鉴别。

2.4 防治手段 为了预防这种罕见的并发症,有学者提出在原发病手术阶段充分的硬膜缝合(完全封闭缺损)是必要的^[1-5]。另外,也有学者认为脊柱脊髓手术后放置腰大池引流管可促进硬膜的愈合,从而减少SCH^[4,7]。但部分病例报道中描述即使原发病术中进行了硬膜的水密缝合,术后仍发生了SCH^[1,7,11]。因此,我们认为未来仍需大宗病例的统计学数据证实上述观点。本文病例由于肿瘤切除术后发现脊髓水肿,故采用纤维蛋白硬膜补片内置贴敷修补,且椎板未还纳,以达到椎管减压效果,但术后2 d却发生了SCH。我们认为,如果术中采用不可吸收人工硬膜进行硬膜囊扩大成形术,可能既能达到减压效果,又可降低SCH的风险。在治疗方面,有学者强调对脊髓良好的减压松解的重要性,这是手术治疗的基础^[1,2,4-9,11-14,16]。对于背侧SCH,大多数学者采用直接缝合或补片缝合修补^[1,2,5,8,11,12,14,16],个别学者在此基

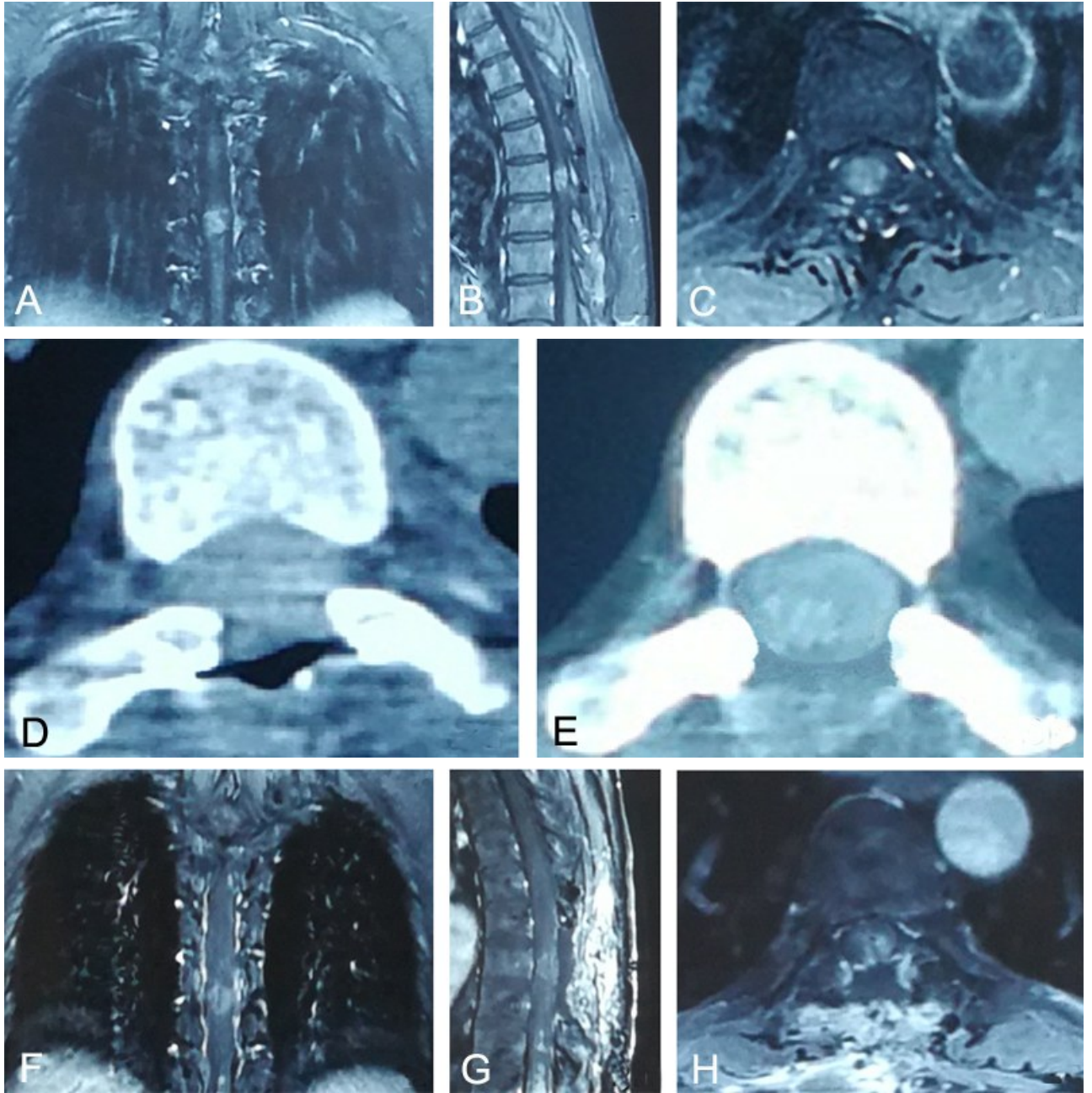


图1 胸8节段脊髓内复发性室管膜瘤术后并发脊髓疝的影像学表现

A~C. 胸8节段脊髓内室管膜瘤术后9年复查胸椎MRI增强显示胸8节段脊髓内可见不规则小结节样中等强化影,考虑肿瘤复发;D. 再次肿瘤切除术后2 d突发发神经功能恶化,复查胸椎CT显示胸8节段脊髓由椎板骨窗突出并嵌顿;E. 椎管减压术后5 d复查胸椎CT显示胸8节段脊髓复位;F~H. 椎管减压术后5 d复查MRI增强显示胸8节段脊髓内可见纵行裂隙手术痕迹,术区周围轻度强化影,脊髓疝出已复位

Figure 1 Imaging findings of a patient with recurrent ependymoma in the thoracic 8 spinal cord segment associated with subsequent spinal cord herniation after surgery

A~C: Contrast-enhanced T₁-weighted MR images 9 years after surgery for an ependymoma in the thoracic 8 spinal cord segment showed irregular small nodular moderate enhancement signals in the thoracic 8 spinal cord segment, suggesting tumor recurrence. D: Sudden deterioration of neurological function occurred 2 days after resection of the recurrent tumor and axial CT images of the thoracic spine showed that the thoracic 8 spinal cord herniating through the pedicle window and being impinged. E: Axial CT images of the thoracic spine 5 days after decompression of the spinal cord showed reduction of the thoracic 8 spinal cord. F~H: Contrast-enhanced T₁-weighted MR images 5 days after decompression of the spinal cord showed irregular longitudinal incision marks in the thoracic 8 spinal cord segment, mild enhancement signals around the operative field, and reduction of the herniated spinal cord, indicating that the spinal cord herniation has been reduced.

基础上还增加了纤维蛋白补片的或自体组织的贴敷以及蛋白胶的使用^[5,16],均取得了令人满意的效果。对于腹侧SCH,由于直接缝合困难,多采用人工硬膜补片内置贴敷,合并硬膜缺损外侧纤维蛋白补片、自体移植物贴敷及蛋白胶的使用^[4,6,7,9,13],也取得了满意效果。另外,Min等^[15]采用后路椎板切除减压术治疗颈部腹侧SCH,病人临床表现及影像学表现明显改善。除此之外,有学者采用物理疗法和甲泼尼龙冲击疗法治疗颈部腹侧SCH,效果一般^[3,10]。本文病例脊髓水肿严重,在减压松解并复位脊髓的基础上,为预防相对性椎管狭窄,故采用椎板切除及扩大硬膜成形术,取得满意的疗效。

总之,脊柱脊髓术后突发神经功能恶化,应考虑到医源性SCH的可能,需及时行影像学检查加以明确,及时进行减压松解及硬膜成形术至关重要。

【伦理学声明】:本研究方案于2023年5月18日经北京丰台医院伦理委员会审批,批号为P2023010。

【利益冲突声明】:本文不存在任何利益冲突。

【作者贡献声明】:韩武收集病例资料、撰写文章;戚继指导写作并审校;李勃翰负责随访;谢炯、章炜、郭腾整理数据、参与文章写作。

【参考文献】

- [1] NAKASHIMA H, ISHIKAWA Y, KATO F, *et al.* Postoperative iatrogenic spinal cord herniation: three case reports with a literature review [J]. Nagoya J Med Sci, 2020, 82(2): 383-389.
- [2] COBB C III, EHNI G. Herniation of the spinal cord into an iatrogenic meningocele: case report [J]. J Neurosurg, 1973, 39(4): 533-536.
- [3] SINHA S, GEORGE KJ. Spinal cord herniation following multilevel anterior cervical discectomy and fusion: a case report and literature review [J]. Surg Neurol Int, 2020, 11: 327.
- [4] FINNERAN MM, SCHAIBLE K. Ventral herniation of the cervical cord after single-level corpectomy: a case report [J]. World Neurosurg, 2020, 136: 12-16.
- [5] KALIYA-PERUMAL AK, TAN M, NOLAN CP, *et al.* Post-surgical thoracic spinal cord herniation following an unrepaired dural defect: a rare complication [J]. Br J Neurosurg, 2023, 37(4): 791-794.
- [6] GURYILDIRIMM, KOCAKM, DUASG. Teaching neuroimages: spinal cord herniation after cervical corpectomy [J]. Neurology, 2019, 93(18): e1744.
- [7] GUPPY KH, SILVERTHORN JW. Spinal cord herniation after cervical corpectomy with cerebrospinal fluid leak: case report and review of the literature [J]. World Neurosurg, 2017, 100: 711.e7-711.e12.
- [8] HELLER RS, HWANG SW, RIESENBURGER RI. Dorsal cervical spinal cord herniation precipitated by kyphosis deformity correction for spinal cord tethering [J]. World Neurosurg, 2017, 100: 709.e1-709.e4.
- [9] HYUN SJ, KIM HK, KIM KJ, *et al.* Posterior trans-dural repair of iatrogenic spinal cord herniation after resection of ossification of posterior longitudinal ligament [J]. Asian Spine J, 2016, 10(2): 355-359.
- [10] KIZILAY Z, YILMAZ A, ISMAILOGLU O, *et al.* Anterior spinal cord herniation after multilevel anterior cervical corpectomy: a case report [J]. Neurol Neurochir Pol, 2016, 50(3): 190-194.
- [11] AIYER SN, SHETTY AP, KANNA R, *et al.* Spinal cord herniation following cervical meningioma excision: a rare clinical entity and review of literature [J]. Eur Spine J, 2016, 25 Suppl 1: 216-219.
- [12] ELWAHAB SMA, O'SULLIVAN MJ. Spinal cord herniation after resection of cervical spinal neurofibroma with a unique presentation [J]. Spine J, 2015, 15(4): e1-3.
- [13] KAWSAR KA, BHATIA R, CASEY AC. Spinal cord herniation as a complication of en bloc, multilevel, anterior thoracic vertebrectomy for a giant cell tumor: success of posterior cord reduction and dural repair: case report [J]. J Neurosurg Spine, 2014, 21(6): 909-912.
- [14] MORIYAMA T, TACHIBANA T, MARUO K, *et al.* Postoperative spinal cord herniation with pseudomeningocele in the cervical spine: a case report [J]. Spine J, 2013, 13(10): 43-45.
- [15] MIN JH, JUNG BJ, JANG JS, *et al.* Spinal cord herniation after multilevel anterior cervical corpectomy and fusion for ossification of the posterior longitudinal ligament of the cervical spine: a case report [J]. J Neurosurg Spine, 2009, 10(3): 240-243.
- [16] BURREN KP, CONLEY FK. Progressive neurological dysfunction secondary to postoperative cervical pseudomeningocele in a C-4 quadriplegic: case report [J]. J Neurosurg, 1978, 48(2): 289-291.

(2022-02-14收稿, 2022-04-08修回)