ISSN 2307-8960 (online)

World Journal of *Clinical Cases*

World J Clin Cases 2021 December 6; 9(34): 10392-10745

Published by Baishideng Publishing Group Inc

World Journal of Clinical Cases

Contents Thrice Monthly Volume 9 Number 34 December 6, 2021

OPINION REVIEW

10392 Regulating monocyte infiltration and differentiation: Providing new therapies for colorectal cancer patients with COVID-19

Bai L, Yang W, Qian L, Cui JW

REVIEW

10400 Role of circular RNAs in gastrointestinal tumors and drug resistance

Xi SJ, Cai WQ, Wang QQ, Peng XC

MINIREVIEWS

10418 Liver injury associated with acute pancreatitis: The current status of clinical evaluation and involved mechanisms

Liu W, Du JJ, Li ZH, Zhang XY, Zuo HD

10430 Association between celiac disease and vitiligo: A review of the literature

Zhang JZ, Abudoureyimu D, Wang M, Yu SR, Kang XJ

10438 Role of immune escape in different digestive tumours

Du XZ, Wen B, Liu L, Wei YT, Zhao K

ORIGINAL ARTICLE

Basic Study

10451 Magnolol protects against acute gastrointestinal injury in sepsis by down-regulating regulated on activation, normal T-cell expressed and secreted

Mao SH, Feng DD, Wang X, Zhi YH, Lei S, Xing X, Jiang RL, Wu JN

Case Control Study

10464 Effect of Nephritis Rehabilitation Tablets combined with tacrolimus in treatment of idiopathic membranous nephropathy

Lv W, Wang MR, Zhang CZ, Sun XX, Yan ZZ, Hu XM, Wang TT

Retrospective Cohort Study

10472 Lamb's tripe extract and vitamin B_{12} capsule plus celecoxib reverses intestinal metaplasia and atrophy: A retrospective cohort study

Wu SR, Liu J, Zhang LF, Wang N, Zhang LY, Wu Q, Liu JY, Shi YQ

10484 Clinical features and survival of patients with multiple primary malignancies

Wang XK, Zhou MH

World Journal of Clinical Cases

Thrice Monthly Volume 9 Number 34 December 6, 2021

Contents

Retrospective Study

10494 Thoracoscopic segmentectomy and lobectomy assisted by three-dimensional computed-tomography bronchography and angiography for the treatment of primary lung cancer

Wu YJ, Shi QT, Zhang Y, Wang YL

10507 Endoscopic ultrasound fine needle aspiration *vs* fine needle biopsy in solid lesions: A multi-center analysis

Moura DTH, McCarty TR, Jirapinyo P, Ribeiro IB, Farias GFA, Madruga-Neto AC, Ryou M, Thompson CC

10518 Resection of bilateral occipital lobe lesions during a single operation as a treatment for bilateral occipital lobe epilepsy

Lyu YE, Xu XF, Dai S, Feng M, Shen SP, Zhang GZ, Ju HY, Wang Y, Dong XB, Xu B

10530 Improving rehabilitation and quality of life after percutaneous transhepatic cholangiography drainage with a rapid rehabilitation model

Xia LL, Su T, Li Y, Mao JF, Zhang QH, Liu YY

10540 Combined lumbar muscle block and perioperative comprehensive patient-controlled intravenous analgesia with butorphanol in gynecological endoscopic surgery

Zhu RY, Xiang SQ, Chen DR

10549 Teicoplanin combined with conventional vancomycin therapy for the treatment of pulmonary methicillin-resistant *Staphylococcus aureus* and *Staphylococcus epidermidis* infections

Wu W, Liu M, Geng JJ, Wang M

10557 Application of narrative nursing in the families of children with biliary atresia: A retrospective study

Zhang LH, Meng HY, Wang R, Zhang YC, Sun J

Observational Study

10566 Comparative study for predictability of type 1 gastric variceal rebleeding after endoscopic variceal ligation: High-frequency intraluminal ultrasound study

Kim JH, Choe WH, Lee SY, Kwon SY, Sung IK, Park HS

10576 Effects of WeChat platform-based health management on health and self-management effectiveness of patients with severe chronic heart failure

Wang ZR, Zhou JW, Liu XP, Cai GJ, Zhang QH, Mao JF

10585 Early cardiopulmonary resuscitation on serum levels of myeloperoxidase, soluble ST2, and hypersensitive C-reactive protein in acute myocardial infarction patients

Hou M, Ren YP, Wang R, Lu LX

Prospective Study

10595 Remimazolam benzenesulfonate anesthesia effectiveness in cardiac surgery patients under general anesthesia

Tang F, Yi JM, Gong HY, Lu ZY, Chen J, Fang B, Chen C, Liu ZY

World Journal of Clinical Cases

Thrice Monthly Volume 9 Number 34 December 6, 2021

Contents

Randomized Clinical Trial

10604 Effects of lower body positive pressure treadmill on functional improvement in knee osteoarthritis: A randomized clinical trial study

Chen HX, Zhan YX, Ou HN, You YY, Li WY, Jiang SS, Zheng MF, Zhang LZ, Chen K, Chen QX

SYSTEMATIC REVIEWS

10616 Effects of hypoxia on bone metabolism and anemia in patients with chronic kidney disease

Kan C, Lu X, Zhang R

META-ANALYSIS

10626 Intracuff alkalinized lidocaine to prevent postoperative airway complications: A meta-analysis

Chen ZX, Shi Z, Wang B, Zhang Y

CASE REPORT

10638 Rarely fast progressive memory loss diagnosed as Creutzfeldt-Jakob disease: A case report

Xu YW, Wang JQ, Zhang W, Xu SC, Li YX

10645 Diagnosis, fetal risk and treatment of pemphigoid gestationis in pregnancy: A case report

Jiao HN, Ruan YP, Liu Y, Pan M, Zhong HP

10652 Histology transformation-mediated pathological atypism in small-cell lung cancer within the presence of chemotherapy: A case report

Ju Q, Wu YT, Zhang Y, Yang WH, Zhao CL, Zhang J

10659 Reversible congestive heart failure associated with hypocalcemia: A case report

Wang C, Dou LW, Wang TB, Guo Y

10666 Excimer laser coronary atherectomy for a severe calcified coronary ostium lesion: A case report

Hou FJ, Ma XT, Zhou YJ, Guan J

10671 Comprehensive management of malocclusion in maxillary fibrous dysplasia: A case report

Kaur H, Mohanty S, Kochhar GK, Iqbal S, Verma A, Bhasin R, Kochhar AS

10681 Intravascular papillary endothelial hyperplasia as a rare cause of cervicothoracic spinal cord compression: A case report

Gu HL, Zheng XQ, Zhan SQ, Chang YB

10689 Proximal true lumen collapse in a chronic type B aortic dissection patient: A case report

Zhang L, Guan WK, Wu HP, Li X, Lv KP, Zeng CL, Song HH, Ye QL

10696 Tigecycline sclerotherapy for recurrent pseudotumor in aseptic lymphocyte-dominant vasculitis-associated lesion after metal-on-metal total hip arthroplasty: A case report

Lin IH, Tsai CH

World Journal of Clinical Cases

Thrice Monthly Volume 9 Number 34 December 6, 2021

Contents

10702 Acute myocardial infarction induced by eosinophilic granulomatosis with polyangiitis: A case report

Jiang XD, Guo S, Zhang WM

10708 Aggressive natural killer cell leukemia with skin manifestation associated with hemophagocytic lymphohistiocytosis: A case report

Peng XH, Zhang LS, Li LJ, Guo XJ, Liu Y

10715 Chronic lymphocytic leukemia/small lymphocytic lymphoma complicated with skin Langerhans cell sarcoma: A case report

Li SY, Wang Y, Wang LH

10723 Severe mediastinitis and pericarditis after endobronchial ultrasound-guided transbronchial needle aspiration: A case report

Koh JS, Kim YJ, Kang DH, Lee JE, Lee SI

10728 Obturator hernia - a rare etiology of lateral thigh pain: A case report

Kim JY, Chang MC

10733 Tracheal tube misplacement in the thoracic cavity: A case report

Li KX, Luo YT, Zhou L, Huang JP, Liang P

10738 Peri-implant keratinized gingiva augmentation using xenogeneic collagen matrix and platelet-rich fibrin: A case report

Han CY, Wang DZ, Bai JF, Zhao LL, Song WZ

World Journal of Clinical Cases

Thrice Monthly Volume 9 Number 34 December 6, 2021

Contents

ABOUT COVER

Editorial Board Member of *World Journal of Clinical Cases*, Gagan Mathur, MBBS, MD, Associate Professor, Director, Staff Physician, Department of Pathology, Saint Luke's Health System, Kansas City, MO 64112, United States. gmathur@saint-lukes.org

AIMS AND SCOPE

The primary aim of *World Journal of Clinical Cases* (*WJCC*, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING

The *WJCC* is now indexed in Science Citation Index Expanded (also known as SciSearch®), Journal Citation Reports/Science Edition, Scopus, PubMed, and PubMed Central. The 2021 Edition of Journal Citation Reports® cites the 2020 impact factor (IF) for *WJCC* as 1.337; IF without journal self cites: 1.301; 5-year IF: 1.742; Journal Citation Indicator: 0.33; Ranking: 119 among 169 journals in medicine, general and internal; and Quartile category: Q3. The *WJCC*'s CiteScore for 2020 is 0.8 and Scopus CiteScore rank 2020: General Medicine is 493/793.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: *Yan-Xia Xing*; **Production Department Director:** *Yu-Jie Ma*; **Editorial Office Director:** *Jin-Lei Wang*.

NAME OF JOURNAL
World Journal of Clinical Cases

ISSN
ISSN 2307-8960 (online)

LAUNCH DATE
April 16, 2013

FREQUENCY
Thrice Monthly

EDITORS-IN-CHIEF
Dennis A Bloomfield, Sandro Vento, Bao-Gan Peng

EDITORIAL BOARD MEMBERS
https://www.wjgnet.com/2307-8960/editorialboard.htm

PUBLICATION DATE
December 6, 2021

INSTRUCTIONS TO AUTHORS
https://www.wjgnet.com/bpg/gerinfo/204

GUIDELINES FOR ETHICS DOCUMENTS
https://www.wjgnet.com/bpg/GerInfo/287

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH
https://www.wjgnet.com/bpg/gerinfo/240

PUBLICATION ETHICS
https://www.wjgnet.com/bpg/GerInfo/288

PUBLICATION MISCONDUCT
https://www.wjgnet.com/bpg/gerinfo/208

ARTICLE PROCESSING CHARGE
https://www.wjgnet.com/bpg/gerinfo/242

STEPS FOR SUBMITTING MANUSCRIPTS
https://www.wjgnet.com/bpg/GerInfo/239

ONLINE SUBMISSION
https://www.f6publishing.com

E-mail: bpgoffice@wjgnet.com https://www.wjgnet.com

World Journal of Clinical Cases

Submit a Manuscript: https://www.f6publishing.com

World J Clin Cases 2021 December 6; 9(34): 10681-10688

DOI: 10.12998/wjcc.v9.i34.10681

ISSN 2307-8960 (online)

CASE REPORT

Intravascular papillary endothelial hyperplasia as a rare cause of cervicothoracic spinal cord compression: A case report

Hong-Lin Gu, Xiao-Qing Zheng, Shi-Qiang Zhan, Yun-Bing Chang

ORCID number: Hong-Lin Gu 0000-0001-7535-3503; Xiao-Qing Zheng 0000-0003-2882-1356; Shi-Qiang Zhan 0000-0002-8924-2027; Yun-Bing Chang 0000-0003-3581-623X.

Author contributions: All authors of this manuscript have actively participated in the data acquisition, and they all have read and approved the final version of the manuscript; Gu HL and Zheng XQ collected the clinical data and drafted the main manuscript text; Zhan SQ and Chang YB performed the surgery and revised the paper.

Informed consent statement: Informed written consent was obtained from the patient for publication of this report and any accompanying images.

Conflict-of-interest statement: The authors declare that they have no conflict of interest.

CARE Checklist (2016) statement: The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

Supported by Guangdong Medical Science and Technology Research Fund Project, No. A2021454.

Country/Territory of origin: China

Hong-Lin Gu, Xiao-Qing Zheng, Shi-Qiang Zhan, Yun-Bing Chang, Department of Spine Surgery, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, Guangzhou 510080, Guangdong Province, China

Corresponding author: Yunbing Chang, MD, Chief Doctor, Department of Spine Surgery, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, No. 106 Zhongshan Road II, Guangzhou 510080, Guangdong Province, China. sygkspine@163.com

Abstract

BACKGROUND

Intravascular papillary endothelial hyperplasia (IPEH) is a rare benign reactive vascular lesion that grows into an expansile compressing mass. It most commonly involves the skin and subcutaneous tissue. Spinal involvement is rare, with only 11 reported cases in the literature. We report, to our knowledge, the first case of IPEH in the cervicothoracic spinal canal and present a literature review.

CASE SUMMARY

A 27-year-old man presented with acute-onset neck pain, numbness, and weakness in his extremities. Magnetic resonance imaging showed an epidural mass in the cervicothoracic (C6-T1) spinal canal and vertebral hemangioma (VH) involving the C7 vertebral body. C6-T1 Laminectomy and radical excision of the mass were performed. Histopathological examinations revealed papillary proliferation of vascular endothelial cells with thrombus formation, and an IPEH diagnosis was made. By his 6-mo follow-up appointment, his symptoms were relieved without recurrence. The possible pathogenesis, clinical and imaging features, differential diagnosis, and management of IPEH were reviewed.

CONCLUSION

We report, to our knowledge, the first case of IPEH in the cervicothoracic spinal canal, treated *via* complete resection, and showing a favorable outcome. We found a causal relationship between spinal IPEH and VH; this partly explains the mechanism of IPEH.

Key Words: Intravascular papillary endothelial hyperplasia; Cervicothoracic; Spinal cord compression; Thrombosis; Hemangioma; Case report

Specialty type: Neurosciences

Provenance and peer review: Unsolicited article; Externally peer reviewed.

Peer-review report's scientific quality classification
Grade A (Excellent): 0
Grade B (Very good): B
Grade C (Good): C, C
Grade D (Fair): D
Grade E (Poor): 0

Received: April 20, 2021
Peer-review started: April 20, 2021
First decision: June 23, 2021
Revised: June 28, 2021
Accepted: September 14, 2021
Article in press: September 14, 2021
Published online: December 6, 2021

P-Reviewer: Cucuzza ME, Khanna V, Kung WM
S-Editor: Gong ZM
L-Editor: Filipodia
P-Editor: Wang LYT

Core Tip: Intravascular papillary endothelial hyperplasia (IPEH) is a rare benign reactive vascular lesion that grows into an expansile compressing mass. Spine involvement is rare, with only 11 case reports on its occurrence. We reported the first case of IPEH in the cervicothoracic spinal canal, which was treated *via* complete resection and had a good prognosis. We also found a causal relationship between spinal IPEH and vertebral hemangioma, and this partly explained the mechanism of IPEH.

Citation: Gu HL, Zheng XQ, Zhan SQ, Chang YB. Intravascular papillary endothelial hyperplasia as a rare cause of cervicothoracic spinal cord compression: A case report. *World J Clin Cases* 2021; 9(34): 10681-10688
URL: https://www.wjgnet.com/2307-8960/full/v9/i34/10681.htm
DOI: https://dx.doi.org/10.12998/wjcc.v9.i34.10681

INTRODUCTION

Intravascular papillary endothelial hyperplasia (IPEH) was first reported in 1923 by Pierre Masson in a case of an infected hemorrhoidal vein. Initial reports referred to the lesion as a "Masson tumor" or hemangioendotheliome vegetant intravasculaire[1]. In 1975, Clearkin and Enzinger described the lesion as an unusual and exaggerated thrombus reorganization, rather than a true tumor, and the condition was renamed IPEH[2]. IPEHs typically occur in the skin and subcutaneous tissues of the head and neck or limbs[3]; it rarely occurs in the spine. To our knowledge, only 11 cases of IPEH of the spine have been reported. We report the first case of IPEH of the cervicothoracic spinal canal and present a literature review.

CASE PRESENTATION

Chief complaints

A 27-year-old man presented to the Department of Spine Surgery of our hospital with complaints of neck pain, limb numbness, and weakness.

History of present illness

His symptoms started suddenly, 4 d prior to hospital presentation.

History of past illness

The patient had no trauma history. A similar episode of transient limb numbness and weakness occurred 6 years earlier.

Personal and family history

He denied any personal or family history of other diseases.

Physical examination

Physical examination revealed tenderness of the paraspinal muscle of the C6-T1 spinous process, muted sensory responsiveness to touch along the T1 dermatome, and grade IV muscle strength in the four limbs.

Laboratory examinations

The results of all blood analyses — including coagulation markers, inflammatory indicators, and tumor markers — were within normal limits.

Imaging examinations

Spinal radiography and computed tomography demonstrated no obvious bone destruction. Enhanced cervical magnetic resonance imaging (MRI) showed a homogenously enhanced epidural mass in the C6-T1 spinal canal. The mass compressed the spinal cord and extended into the left C7-T1 foramen. It appeared hypointense on T1-weighted images (T1WIs) and hyperintense on T2WI. Moreover, a 0.5 cm × 0.5 cm × 0.6 cm-sized heterogeneously enhanced hyperintense mass was

found in the C7 vertebral body on T2WI, which was suggestive of a benign vertebral hemangioma (VH) (Figure 1).

DIFFERENTIAL DIAGNOSIS

The mass was possibly an epidural schwannoma; however, we needed to exclude a nonneurogenic tumor diagnosis. The patient required surgical spinal cord decompression for symptom relief. The final diagnosis was confirmed histopathologically.

FINAL DIAGNOSIS

The final diagnosis was cervicothoracic spinal IPEH.

TREATMENT

The patient underwent C6-T1 Laminectomy, left C7-T1 foramen decompression, and radical excision of the epidural mass. A C6-T1 posterior instrumented fusion was performed to stabilize the facetectomy at the spinal level, proximal to the cervicothoracic junction. We observed a dark red, nodular, highly vascularized 3 cm × 1.5 cm × 1 cm mass compressing the spinal cord and left C7 nerve root dorsally. The mass was subsequently excised (Figure 2), and an intraoperative frozen section revealed a diagnosis of benign neoplasm originating from blood vessels. Histopathological examination revealed papillary proliferation of vascular endothelial cells with thrombus formation, consistent with IPEH (Figure 3).

OUTCOME AND FOLLOW-UP

After the surgery, the patient showed gradual neurologic improvement. At his 6-mo follow-up, he was symptom-free, with no spinal cord compression or recurrence on MRI (Figure 4). The clinical timeline of the patient is depicted in Figure 5.

DISCUSSION

IPEH is a rare benign reactive vascular lesion that expands to form a compressing mass. There is no age predilection for IPEH, and its incidence is higher in women than in men[4], with a female-to-male ratio of 4:1 for intracranial lesions[5]. Although spinal presentations are rare, they occur more commonly in men[6]. IPEHs are commonly located in the skin and subcutaneous tissues of the head and neck or limbs[3] but have also been reported in the oral mucosa, lip, thyroid, maxillary sinus, parotid, lung, superior vena cava, adrenal gland, renal vein, forearm, foot, and intracranially[7-11]. There are 11 reported cases of spinal IPEH, including ten cases involving men and one case involving a woman, with patient age ranging from 16 years to 58 years (see Table 1 for details)[6,12-21]. Among these cases, in one case, the mass was located in the vertebral body and in the remaining ten cases, the mass was located in the spinal canal. Only one case of an intradural mass and nine cases of an epidural mass have been reported. The most common site of involvement was the thoracic spinal canal (n = 7). Of the three remaining cases, two cases involved the lumbar spine and one case involved the thoracolumbar junction. The mass in one case was multifocal, involving the cervical, thoracic, and lumbar vertebral bodies. The present report is the first report of cervicothoracic spinal IPEH.

The pathogenesis of IPEH remains controversial. Some authors believe that IPEH is an excessive reaction to a normal thrombus reorganization process[2,22-24]. Others proposed that IPEH is a benign proliferation of endothelial cells with secondary thrombosis and fibrin deposition[25]. Few authors believe that there is a causal relationship between VH and spinal IPEH. Mozhdehipanah *et al*[17] reported a case of IPEH in the T4-T6 spinal canal. Two adjacent vertebral bodies (T4 and T5) demonstrated VH. The author speculated that bleeding within the spinal canal

Table 1 Summary of reported cases of spinal intravascular papillary endothelial hyperplasia

No.	Ref.	Year	Age (yr)	Sex	Primary location	Clinical features	RadiologicalFeatures	Treatment	Size (cm)
1	Ali *et al*[13]	1994	42	M	T8 posterior epidural mass	Paraplegia for 2 wk duration	MRI non-specific T1/T2 signal changes	Radical excision	1.5
2	Porter *et al* [14]	1995	16	M	T6 posterior epidural mass	Midthoracic radicular back pain with hesitancy for 1-wk duration	CT myelography: extradural thecal compression posteriorly with abnormal lamina	T6 laminectomy with T5-T6 right partial facetectomy	4 × 2 × 1
3	Taricco *et al* [15]	1999	17	M	T12-L1 posterior epidural mass	Pain, numbness, paresis of left lower limb with bladder dysfunction for 1 mo	Contrast-enhanced CT of spine: hyperdense lesion; MRI: T1-iso, T2-hyperintense with homogeneous contrast enhancement	T12-L1 laminectomy with radical excision of mass	Not mentioned
4	Petry *et al* [12]	2009	47	M	Multifocal lesions of the spine	Diffuse low back pain	MRI T1-iso, T2-hyperintense with homogeneous contrast enhancement	No surgery	Not mentioned
5	Lanotte *et al* [16]	2010	33	M	T6-T7 paraverte-bral mass extending epidural space	Back pain, hesitancy with paraparesis for 2 wk	MRI T1 hypo- T2 hyperintense mass	T6 laminectomy and excision of intracanal mass	4.5 × 2.5 × 2.5
6	Mozhdehi-panah *et al* [17]	2013	58	M	T4-6 posterior epidural mass	Spastic paraparesis and sensory deficit for 1 mo	MRI T2 hyperintense mass	Laminectomy and radical excision of mass	3×1
7	Bhalla *et al* [21]	2013	51	F	L1 centered on spinous process and involving pedicles	Back pain with paraparesis	MRI L1 centered on spinous process and involving pedicles causing cauda equina compression	Preoperative embolization, incomplete excision and Radiotherapy	4.6×4.3×5.5
8	Singla *et al* [18]	2016	40	M	T12-L1 dumbbell-shaped mass	Back pain and numbness of the right lower trunk for 2 yr	MRI dumbbell-shaped mass mimicking schwannoma	Radical excision	Not mentioned
9	Behera *et al* [19]	2017	32	M	T4-5 posterior epidural mass	Paraplegia for 4 mo	MRI T1 hypo- T2 hyperintense mass	Radical excision	5 × 3 × 2
10	Tanaka *et al* [20]	2018	40	M	L2-3 intradural mass	Low back pain and leg pain beginning approximately 5 yr ago and 1 mo ago	Isointense on T1 and hypointense with partial areas of high signal intensity on T2 without contrast enhancement	L2-3 laminectomy and durotomy with radical excision of mass	2.5 × 1.5 × 1
11	Oktar *et al* [6]	2019	37	M	T4-5 dumbbell-shaped mass	Dermatomal tingling burning pain with paresis of right lower limb for 1 mo	MRI dumbbell-shaped mass mimicking schwannoma	Radical excision	5 × 2 × 3
12	Present case	2020	27	M	C6-T1 posterior epidural mass	Neck pain and numbness and weakness of the extremities	MRI: T1-hypo-, T2-hyperintense with homogeneous contrast enhancement	C6-T1 laminectomy with C7-T1 left partial facetectomy and radical excision of the mass	3 × 1.5 × 1

MRI: Magnetic resonance imaging; CT: Computed tomography.

subsequently formed an organized thrombus, transformed into Masson's hemangioma and manifested symptoms[17]. According to Petry *et al*[12], IPEH of the vertebral body develops from underlying thrombosis of the basivertebral venous plexus or a preexisting VH. In the present case, spinal cord compression was most severe at the C7 Level. Additionally, a hemangioma was found in the C7 vertebral body, suggesting a possible relationship between spinal IPEH and VH. Therefore, the mechanism behind IPEH could be an excessive reaction to the normal thrombus reorganization process. However, it is difficult to make conclusions based on the few cases. Future, well-powered studies on the relationship between VH and IPEH in the spinal canal are needed.

Preoperative diagnosis of spinal IPEH is challenging because of its non-specific MRI features and the need to differentiate IPEH from arteriovenous malformations, schwannomas, or neurofibromas *via* imaging technology. Reported cases of spinal

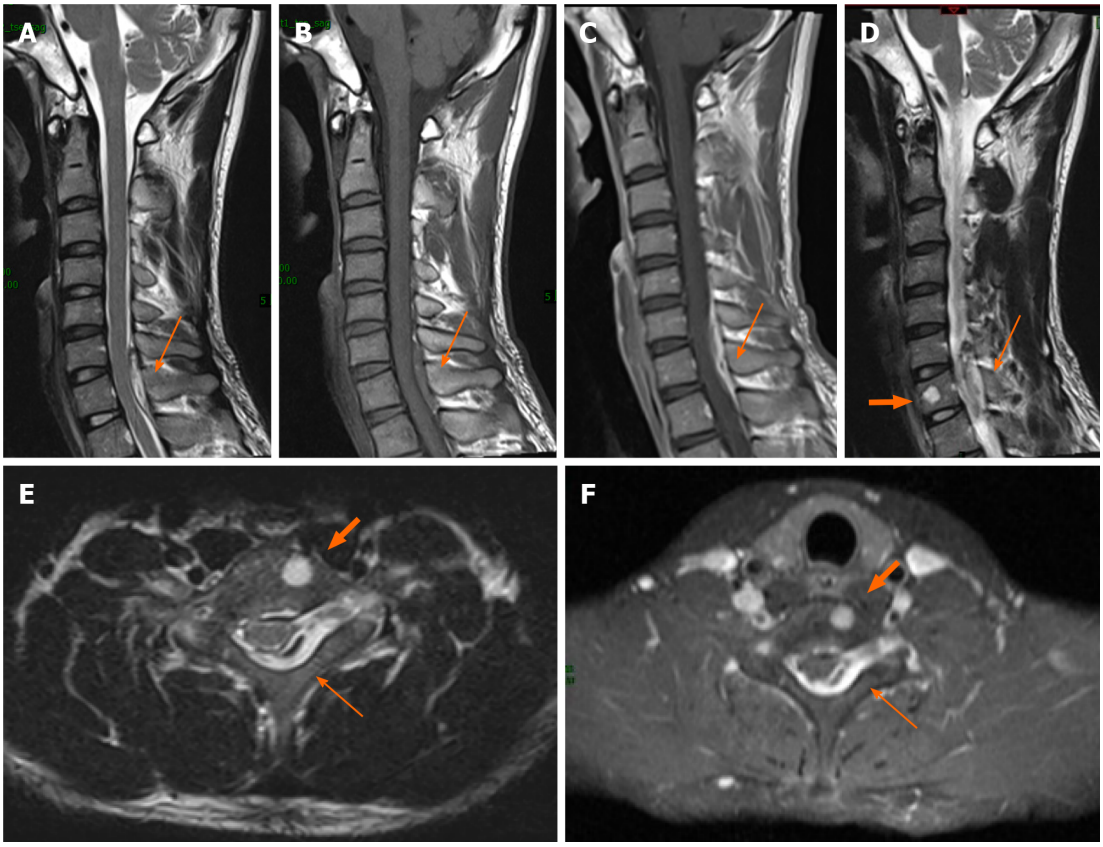

Figure 1 Preoperative magnetic resonance imaging. A and D: Sagittal T2-weighted imaging (T2WI); B: Sagittal T1-weighted imaging (T1WI); C: Sagittal T1WI of the spine with contrast; E: Axial T2WI; F: Axial T1WI with contrast. A posterior spinal epidural mass located from C6 to T1 (thin arrow) appeared high signal intensity on T2WI sagittal and axial images, and low signal intensity on T1WI images. A gadolinium-enhanced scan reveals inhomogeneous enhancement. And a 0.5 cm × 0.5 cm × 0.6 cm-sized round tumor (thick arrow) can be seen on the left side of the C7 vertebral body; high signal intensity is observed on T2WI and homogeneous enhancement is detected on T1WI after contrast agent administration.

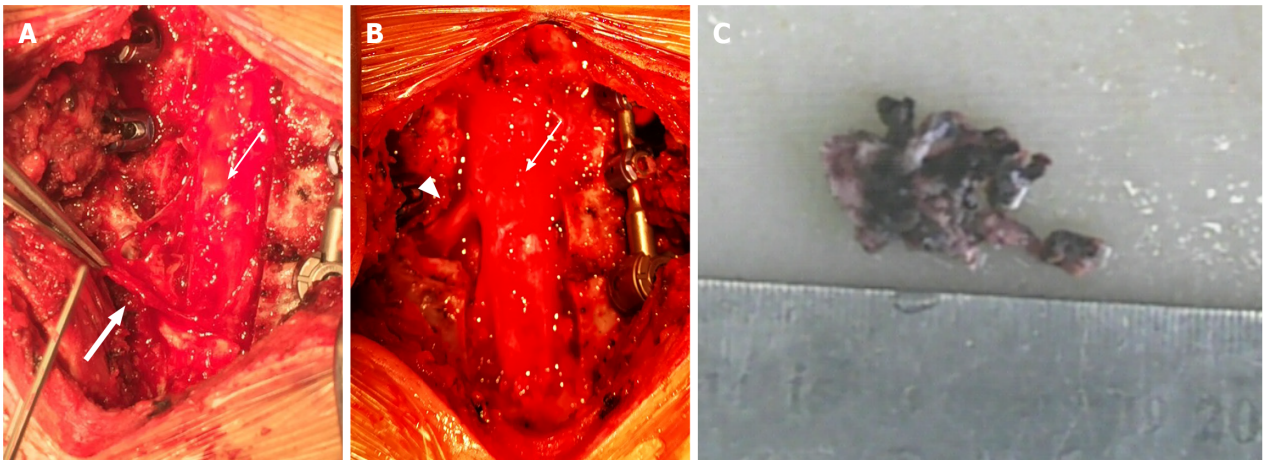

Figure 2 Intraoperative images. A: Operative view of a dark red, nodular, highly vascularized epidural mass (thick arrow) measuring 3 cm × 1.5 cm × 1 cm compressing the left side of the spinal cord (thin arrow) after C6-T1 Laminectomy. B: View of the surgeon after complete resection of the mass and decompression of dura (thin arrow) and left C7 nerve root (triangle). C: Nodular fragment of the lesion.

IPEH mostly exhibited isointensity or low signal intensity on T1WI and high or variable signal intensity on T2WI with contrast enhancement. Three cases presented as dumbbell-shaped masses, mimicking schwannoma[6]. The present patient was preoperatively diagnosed with epidural schwannoma, which typically features papillary proliferation of vascular endothelial cells, localized intravascularly, with normal thrombus formation in the entire papillary tissue[4,23,26]. The pathological findings in our case are consistent with a diagnosis of IPEH. However, IPEH must be

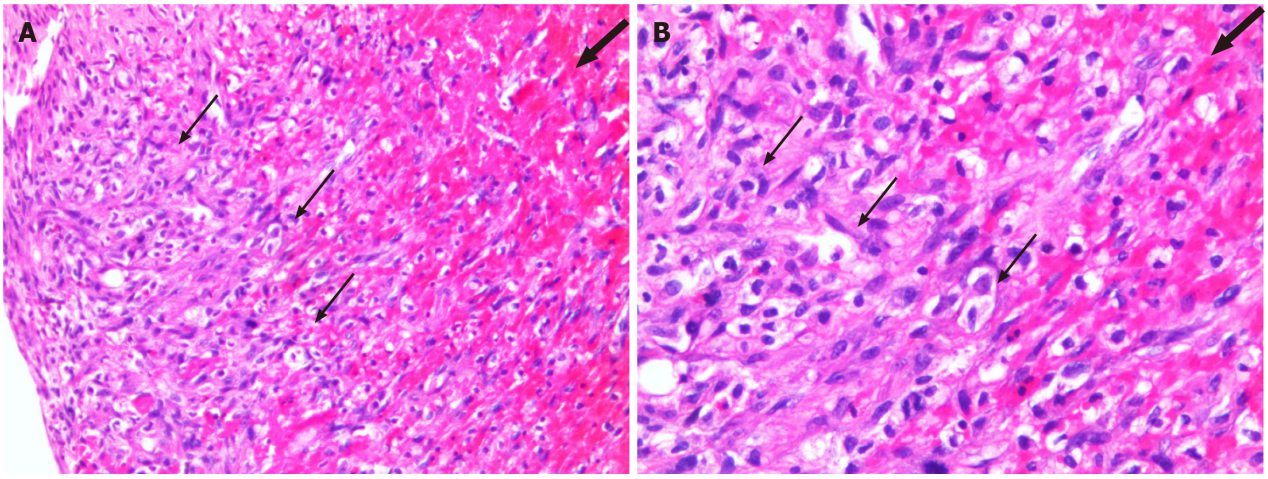

Figure 3 Histological features of the epidural mass. A: Hematoxylin-eosin (HE); × 100; B: HE × 200. Histopathological pictomicrograph shows dilated thin-walled vessels lined by a monolayer of obese endothelial cells (thin arrows). The lumen appears to be filled with organizing thrombi (thick arrow).

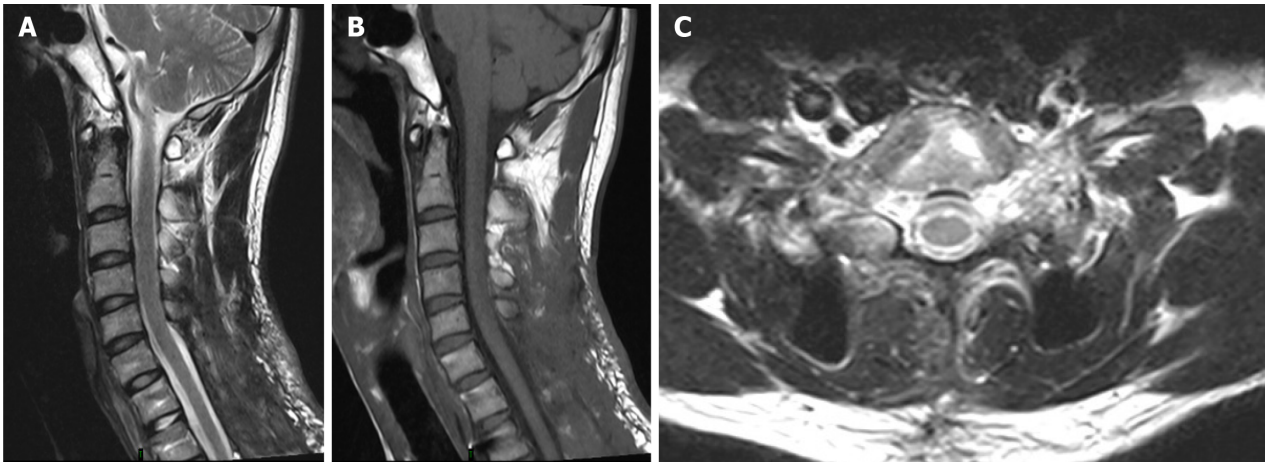

Figure 4 Postoperative magnetic resonance imaging at 6-mo follow-up. A-C: Magnetic resonance imaging showing total relief of the previously noted spinal cord compression and no signs of recurrence.

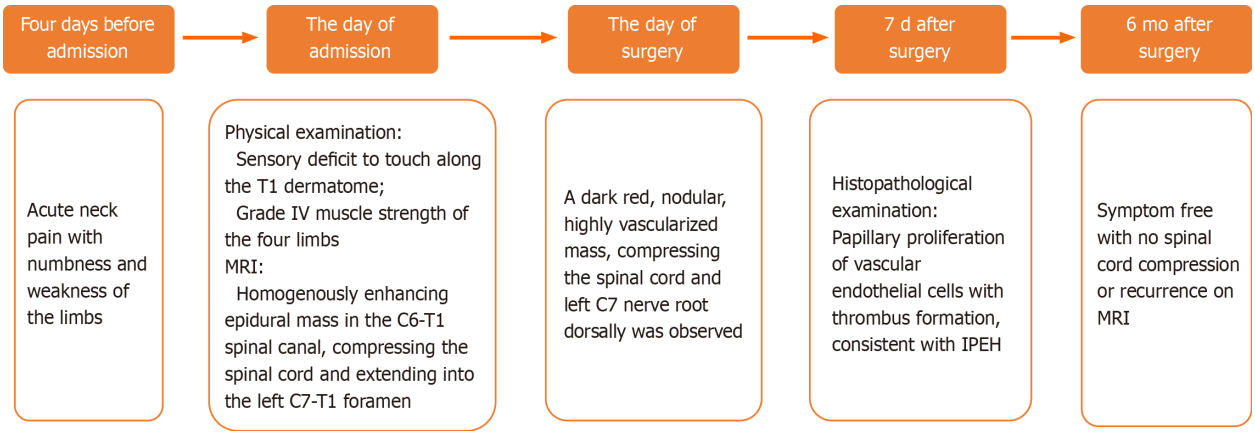

Figure 5 Patient timeline. MRI: Magnetic resonance imaging; IPEH: Intravascular papillary endothelial hyperplasia.

distinguished from other benign and malignant lesions, including cavernous/capillary hemangioma, Kaposi sarcoma, endovascular papillary, and angioendothelioma. Importantly, IPEH should be differentiated from angiosarcoma to avoid unnecessary radiation and surgery[11].

Spinal manifestations of IPEH may be associated with chest or back pain, lower limb numbness, paralysis, and bladder dysfunction caused by spinal cord or cauda equina compression[6]. Treatment is only considered when pain or compression-related symptoms occur, and complete surgical resection is the preferred treatment. Prognosis after complete resection is good, with minimal recurrence. Nine of the 11 patients in the reported cases underwent radical resection, and no recurrence was noted during follow-up. Further, the patient in the present case — who presented with acute-onset numbness and weakness of the limbs owing to spinal cord compression — underwent complete surgical resection. His symptoms were relieved and had not recurred by the 6-mo follow-up visit. Adjuvant radiotherapy can be considered for lesions that cannot be completely removed or that are recurrent. To our knowledge, there is only one reported case of radiotherapy for incompletely resected spinal IPEH. This case showed the potential benefit of radiation following the recurrence of benign IPEH in a patient with epidural disease[21].

CONCLUSION

The main pathological change attributable to IPEH is benign vascular endothelial papillary hyperplasia with thrombosis; however, the mechanism of this relationship remains controversial. Spinal IPEH is rare, occurring more frequently in men, and is localized to the thoracic spine. Importantly, our findings suggest that spinal IPEH is related to VH. There are no prior reports of IPEH in the cervical spinal canal. To our knowledge, this is the first case of IPEH in the cervicothoracic spinal canal which was associated with a favorable outcome after complete resection.

ACKNOWLEDGEMENTS

The authors wish to thank the patient for his contributions to this report.

REFERENCES

1 **Masson P**. Hemangioendotheliome vegetant intravasculaire. *Bull Soc Anat (Paris)* 1923; **93**: 517-532
2 **Clearkin KP**, Enzinger FM. Intravascular papillary endothelial hyperplasia. *Arch Pathol Lab Med* 1976; **100**: 441-444 [PMID: 947306]
3 **Espinosa A**, González J, García-Navas F. Intravascular Papillary Endothelial Hyperplasia at Foot Level: A Case Report and Literature Review. *J Foot Ankle Surg* 2017; **56**: 72-74 [PMID: 27989349 DOI: 10.1053/j.jfas.2016.09.016]
4 **Hashimoto H**, Daimaru Y, Enjoji M. Intravascular papillary endothelial hyperplasia. A clinicopathologic study of 91 cases. *Am J Dermatopathol* 1983; **5**: 539-546 [PMID: 6666836 DOI: 10.1097/00000372-198312000-00004]
5 **Perez Prat G**, Serrano Jimenez M, Cancela Caro P, Cardenas Ruiz-Valdepeñas E, Rivero Garvia M, Marquez Rivas FJ. Staged Management of Intracranial Masson Tumor: An Unexpected Gauntlet: Case Report and Review of the Literature. *World Neurosurg* 2018; **114**: 194-203 [PMID: 29550594 DOI: 10.1016/j.wneu.2018.03.054]
6 **Oktar N**, M Ozer H, Demirtas E. Spinal intravascular papillary endothelial hyperplasia. Case report and review of the literature. *Br J Neurosurg* 2019; 1-3 [PMID: 30964346 DOI: 10.1080/02688697.2019.1597832]
7 **Mahapatra QS**, Sahai K, Malik A, Mani NS. Intravascular papillary endothelial hyperplasia: An unusual histopathological entity. *Indian Dermatol Online J* 2015; **6**: 277-279 [PMID: 26225335 DOI: 10.4103/2229-5178.160269]
8 **Barritt AW**, Merve A, Epaliyanage P, Aram J. Intracranial papillary endothelial hyperplasia (Masson's tumour) following gamma knife radiosurgery for temporal lobe epilepsy. *Pract Neurol* 2017; **17**: 214-217 [PMID: 28232387 DOI: 10.1136/practneurol-2016-001573]
9 **Narwal A**, Sen R, Singh V, Gupta A. Masson's hemangioma: A rare intraoral presentation. *Contemp Clin Dent* 2013; **4**: 397-401 [PMID: 24124316 DOI: 10.4103/0976-237X.118363]
10 **Clifford PD**, Temple HT, Jorda M, Marecos E. Intravascular papillary endothelial hyperplasia (Masson's tumor) presenting as a triceps mass. *Skeletal Radiol* 2004; **33**: 421-425 [PMID: 15205930 DOI: 10.1007/s00256-004-0772-z]
11 **Mardani P**, Askari A, Shahriarirad R, Ranjbar K, Erfani A, Anbardar MH, Moradmand S. Masson's Tumor of the Hand: An Uncommon Histopathological Entity. *Case Rep Pathol* 2020; **2020**: 4348629 [PMID: 32274236 DOI: 10.1155/2020/4348629]

12 **Petry M**, Brown MA, Hesselink JR, Imbesi SG. Multifocal intravascular papillary endothelial hyperplasia in the retroperitoneum and spine: a case report and review of the literature. *J Magn Reson Imaging* 2009; **29**: 957-961 [PMID: 19306442 DOI: 10.1002/jmri.21724]

13 **Ali SZ**, Farmer PM, Black K, Rosenthal A. Masson's hemangioma of spinal meninges causing cord compression with paraplegia. *Ann Clin Lab Sci* 1994; **24**: 371-375 [PMID: 7944274]

14 **Porter DG**, Martin AJ, Mallucci CL, Makunura CN, Sabin HI. Spinal cord compression due to Masson's vegetant intravascular hemangioendothelioma. Case report. *J Neurosurg* 1995; **82**: 125-127 [PMID: 7815116 DOI: 10.3171/jns.1995.82.1.0125]

15 **Taricco MA**, Vieira JO Jr, Machado AG, Ito FY. Intravascular papillary endothelial hyperplasia causing cauda equina compression: case report. *Neurosurgery* 1999; **45**: 1478-1480 [PMID: 10598718 DOI: 10.1097/00006123-199912000-00044]

16 **Lanotte M**, Molinaro L, Crudo V, Filosso PL, Crasto SG, Roncaroli F, Cassoni P. Spinal cord compression due to an extra-dural intra-vascular papillary endothelial hyperplasia of the thoracic spine. *Acta Neurochir (Wien)* 2010; **152**: 877-880 [PMID: 19763392 DOI: 10.1007/s00701-009-0502-3]

17 **Mozhdehipanah H**, Samiei F, Sayadnasiri M. Masson's hemangioma: A very rare cause of spinal cord compression. *Neurol India* 2013; **61**: 89-90 [PMID: 23466857 DOI: 10.4103/0028-3886.108032]

18 **Singla N**, Kapoor A, Sodhi HB, Bal A, Chatterjee D. Straddling across the neural foramina with a leash of blood vessels: Mason's vegetant intravascular hemangioendothelioma mimicking a schwannoma. *Neurol India* 2016; **64**: 348-349 [PMID: 26954824 DOI: 10.4103/0028-3886.177619]

19 **Behera BR**, Panda RN, Mishra S, Dhir MK. Masson Hemangioma-An Unusual Cause of Thoracic Compressive Myelopathy. *World Neurosurg* 2017; **98**: 876.e9-876.e13 [PMID: 27894942 DOI: 10.1016/j.wneu.2016.11.099]

20 **Tanaka M**, Hiyama A, Sakai D, Katoh H, Sato M, Watanabe M. Intravascular Papillary Endothelial Hyperplasia (Masson's Tumor) Within Cauda Equina. *J Am Acad Orthop Surg Glob Res Rev* 2018; **2**: e087 [PMID: 30656267 DOI: 10.5435/JAAOSGlobal-D-17-00087]

21 **Bhalla N**, Husband DJ, Pillay R, Thorp N. Radiotherapy for a benign cause of cauda equina compression in a known case of breast carcinoma. *BMJ Case Rep* 2013; **2013** [PMID: 23784763 DOI: 10.1136/bcr-2013-009549]

22 **Salyer WR**, Salyer DC. Intravascular angiomatosis: development and distinction from angiosarcoma. *Cancer* 1975; **36**: 995-1001 [PMID: 1237350 DOI: 10.1002/1097-0142(197509)36:3<995::aid-cncr2820360323>3.0.co;2-b]

23 **Akdur NC**, Donmez M, Gozel S, Ustun H, Hucumenoglu S. Intravascular papillary endothelial hyperplasia: histomorphological and immunohistochemical features. *Diagn Pathol* 2013; **8**: 167 [PMID: 24125024 DOI: 10.1186/1746-1596-8-167]

24 **Guledgud MV**, Patil K, Saikrishna D, Madhavan A, Yelamali T. Intravascular papillary endothelial hyperplasia: diagnostic sequence and literature review of an orofacial lesion. *Case Rep Dent* 2014; **2014**: 934593 [PMID: 24891960 DOI: 10.1155/2014/934593]

25 **Kuo T**, Gomez LG. Papillary endothelial proliferation in cystic lymphangiomas. A lymphatic vessel counterpart of Masson's vegetant intravascular hemangioendothelioma. *Arch Pathol Lab Med* 1979; **103**: 306-308 [PMID: 582267]

26 **Díaz-Flores L**, Gutiérrez R, Madrid JF, García-Suárez MP, González-Álvarez MP, Díaz-Flores L Jr, Sáez FJ. Intravascular papillary endothelial hyperplasia (IPEH). Evidence supporting a piecemeal mode of angiogenesis from vein endothelium, with vein wall neovascularization and papillary formation. *Histol Histopathol* 2016; **31**: 1271-1279 [PMID: 27323848 DOI: 10.14670/HH-11-795]

Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-3991568
E-mail: bpgoffice@wjgnet.com
Help Desk: https://www.f6publishing.com/helpdesk
https://www.wjgnet.com