

World Journal of *Clinical Cases*

World J Clin Cases 2022 January 7; 10(1): 1-396



MINIREVIEWS

- 1 Omicron variant (B.1.1.529) of SARS-CoV-2: Mutation, infectivity, transmission, and vaccine resistance
Ren SY, Wang WB, Gao RD, Zhou AM
- 12 Hepatitis B virus reactivation in rheumatoid arthritis
Wu YL, Ke J, Zhang BY, Zhao D
- 23 Paradoxical role of interleukin-33/suppressor of tumorigenicity 2 in colorectal carcinogenesis: Progress and therapeutic potential
Huang F, Chen WY, Ma J, He XL, Wang JW

ORIGINAL ARTICLE**Case Control Study**

- 35 Changes in rheumatoid arthritis under ultrasound before and after sinomenine injection
Huang YM, Zhuang Y, Tan ZM
- 43 Benefits of multidisciplinary collaborative care team-based nursing services in treating pressure injury wounds in cerebral infarction patients
Gu YH, Wang X, Sun SS

Retrospective Study

- 51 Outcomes and complications of open, laparoscopic, and hybrid giant ventral hernia repair
Yang S, Wang MG, Nie YS, Zhao XF, Liu J
- 62 Surgical resection of intradural extramedullary tumors in the atlantoaxial spine *via* a posterior approach
Meng DH, Wang JQ, Yang KX, Chen WY, Pan C, Jiang H
- 71 Vancomycin lavage for the incidence of acute surgical site infection following primary total hip arthroplasty and total knee arthroplasty
Duan MY, Zhang HZ
- 79 Distribution of transient receptor potential vanilloid-1 channels in gastrointestinal tract of patients with morbid obesity
Atas U, Erin N, Tazegul G, Elpek GO, Yildirim B
- 91 Value of neutrophil-lymphocyte ratio in evaluating response to percutaneous catheter drainage in patients with acute pancreatitis
Gupta P, Das GC, Bansal A, Samanta J, Mandavdhare HS, Sharma V, Naseem S, Gupta V, Yadav TD, Dutta U, Varma N, Sandhu MS, Kochhar R

- 104 Influence of overweight and obesity on the mortality of hospitalized patients with community-acquired pneumonia
Wang N, Liu BW, Ma CM, Yan Y, Su QW, Yin FZ
- 117 Minimally invasive open reduction of greater tuberosity fractures by a modified suture bridge procedure
Kong LP, Yang JJ, Wang F, Liu FX, Yang YL
- 128 Increased levels of lactate dehydrogenase and hypertension are associated with severe illness of COVID-19
Jin ZM, Shi JC, Zheng M, Chen QL, Zhou YY, Cheng F, Cai J, Jiang XG
- 136 Age, alcohol, sex, and metabolic factors as risk factors for colonic diverticulosis
Yan Y, Wu JS, Pan S
- 143 Evaluation of right-to-left shunt on contrast-enhanced transcranial Doppler in patent foramen ovale-related cryptogenic stroke: Research based on imaging
Xiao L, Yan YH, Ding YF, Liu M, Kong LJ, Hu CH, Hui PJ
- 155 Characterization of focal hypermetabolic thyroid incidentaloma: An analysis with F-18 fluorodeoxyglucose positron emission tomography/computed tomography parameters
Lee H, Chung YS, Lee JH, Lee KY, Hwang KH
- Clinical Trials Study**
- 166 Low-dose intralesional injection of 5-fluorouracil and triamcinolone reduces tissue resident memory T cells in chronic eczema
Wu Y, Wang GJ, He HQ, Qin HH, Shen WT, Yu Y, Zhang X, Zhou ML, Fei JB
- Observational Study**
- 177 Alterations in blink and masseter reflex latencies in older adults with neurocognitive disorder and/or diabetes mellitus
Bricio-Barrios JA, Ríos-Bracamontes E, Ríos-Silva M, Huerta M, Serrano-Moreno W, Barrios-Navarro JE, Ortiz GG, Huerta-Trujillo M, Guzmán-Esquivel J, Trujillo X
- 189 Predicting adolescent perfectionism: The role of socio-demographic traits, personal relationships, and media
Livazović G, Kuzmanović K
- 205 Novel m.4268T>C mutation in the mitochondrial tRNA^{Leu} gene is associated with hearing loss in two Chinese families
Zhao LJ, Zhang ZL, Fu Y
- 217 Superior mesenteric venous thrombosis: Endovascular management and outcomes
Alnahhal K, Toskich BB, Nussbaum S, Li Z, Erben Y, Hakaim AG, Farres H
- Randomized Controlled Trial**
- 227 Zinc carnosine-based modified bismuth quadruple therapy vs standard triple therapy for *Helicobacter pylori* eradication: A randomized controlled study
Ibrahim N, El Said H, Choukair A

CASE REPORT

- 236** Acquired coagulation dysfunction resulting from vitamin K-dependent coagulation factor deficiency associated with rheumatoid arthritis: A case report
Huang YJ, Han L, Li J, Chen C
- 242** Intraoperative thromboelastography-guided transfusion in a patient with factor XI deficiency: A case report
Guo WJ, Chen WY, Yu XR, Shen L, Huang YG
- 249** Positron emission tomography and magnetic resonance imaging combined with computed tomography in tumor volume delineation: A case report
Zhou QP, Zhao YH, Gao L
- 254** Successful response to camrelizumab in metastatic bladder cancer: A case report
Xie C, Yuan X, Chen SH, Liu ZY, Lu DL, Xu F, Chen ZQ, Zhong XM
- 260** HER2 changes to positive after neoadjuvant chemotherapy in breast cancer: A case report and literature review
Wang L, Jiang Q, He MY, Shen P
- 268** Hyper-accuracy three-dimensional reconstruction as a tool for better planning of retroperitoneal liposarcoma resection: A case report
Ye MS, Wu HK, Qin XZ, Luo F, Li Z
- 275** Recurrent postmenopausal bleeding - just endometrial disease or ovarian sex cord-stromal tumor? A case report
Wang J, Yang Q, Zhang NN, Wang DD
- 283** Complex proximal femoral fracture in a young patient followed up for 3 years: A case report
Li ZY, Cheng WD, Qi L, Yu SS, Jing JH
- 289** Bilateral Hypertrophic Olivary Degeneration after Pontine Hemorrhage: A Case Report
Zheng B, Wang J, Huang XQ, Chen Z, Gu GF, Luo XJ
- 296** Clinical characteristics and outcomes of primary intracranial alveolar soft-part sarcoma: A case report
Chen JY, Cen B, Hu F, Qiu Y, Xiao GM, Zhou JG, Zhang FC
- 304** Removal of laparoscopic cerclage stitches *via* laparotomy and rivanol-induced labour: A case report and literature review
Na XN, Cai BS
- 309** Cerebral venous sinus thrombosis in pregnancy: A case report
Zhou B, Huang SS, Huang C, Liu SY
- 316** Eustachian tube teratoma: A case report
Li JY, Sun LX, Hu N, Song GS, Dou WQ, Gong RZ, Li CT

- 323 Protein-losing enteropathy caused by a jejunal ulcer after an internal hernia in Petersen's space: A case report
Yasuda T, Sakurazawa N, Kuge K, Omori J, Arai H, Kakinuma D, Watanabe M, Suzuki H, Iwakiri K, Yoshida H
- 331 Lunate dislocation with avulsed triquetral fracture: A case report
Li LY, Lin CJ, Ko CY
- 338 Clinical manifestations and prenatal diagnosis of Ullrich congenital muscular dystrophy: A case report
Hu J, Chen YH, Fang X, Zhou Y, Chen F
- 345 Diagnosis and guidance of treatment of breast cancer cutaneous metastases by multiple needle biopsy: A case report
Li ZH, Wang F, Zhang P, Xue P, Zhu SJ
- 353 Test of incremental respiratory endurance as home-based, stand-alone therapy in chronic obstructive pulmonary disease: A case report
Dosbaba F, Hartman M, Batalik L, Brat K, Plutinsky M, Hnatiak J, Formiga MF, Cahalin LP
- 361 Diagnostic and surgical challenges of progressive neck and upper back painless masses in Madelung's disease: A case report and review of literature
Yan YJ, Zhou SQ, Li CQ, Ruan Y
- 371 Suspected cerebrovascular air embolism during endoscopic esophageal varices ligation under sedation with fatal outcome: A case report
Zhang CMJ, Wang X
- 381 An atypical primary malignant melanoma arising from the cervical nerve root: A case report and review of literature
Shi YF, Chen YQ, Chen HF, Hu X
- 388 Epidural blood patch for spontaneous intracranial hypotension with subdural hematoma: A case report and review of literature
Choi SH, Lee YY, Kim WJ

ABOUT COVER

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An atypical primary malignant melanoma arising from the cervical nerve root: A case report and review of literature

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Abstract

BACKGROUND

Primary melanomas affecting the central nervous system are very rare, and melanomas originating in the spinal canal or origin of the spinal nerve root are even rarer. As a consequence, not much is known about this.

CASE SUMMARY

Here we report a case of primary malignant melanoma originating in the cervical spinal cord nerve root. A 64-year-old woman presented with symptoms of numbness in the right side of the neck, pain, and hypoesthesia in the right upper limb which persisted for 1 year. Neurological examination showed that the superficial sensation in the right upper limb had decreased with muscle strength of grade 4. Magnetic resonance imaging examination revealed a mass (approximately 2.5 cm × 1.4 cm × 1 cm) in the right side of the spinal canal in the C-2 plane. Based on findings obtained during operation, perioperative examination, pathological diagnosis, and the diagnostic criteria of primary central melanoma proposed by Hayward, the mass was confirmed to be a melanoma of intraspinal nerve root origin.

CONCLUSION

This is the first case of primary malignant melanoma originating from cervical spinal cord nerve roots and spread along the inside and outside of the spinal canal. The clinical relevance of this case is discussed to provide new insights into the differential diagnosis of intraspinal tumours. Further studies are needed to better understand the mechanisms driving the growth pattern and development of this type of tumour.

Key Words: Spinal cord; Primary melanoma; Nerve root; Primary neoplasm; Case report

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Core Tip: Primary malignant melanoma arising from the cervical nerve root, and spreading along the inside and outside regions of the spinal canal is clinically rare. The clinical symptoms and imaging features of this case are atypical and can easily be misdiagnosed. In this case report, additional clinical characteristics and differential diagnoses are presented.

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INTRODUCTION

Primary central nervous system melanomas are very rare, and account for about 1% of all melanomas[1]. In addition, primary malignant melanoma in the spinal canal is even rarer with only several cases reported so far[2]. Majority of such cases show nerve root involvement. Herein, we present an unusual case of primary malignant melanoma originating from the nerve root in the spinal canal without a history of irradiation exposure. To date, there have been only 5 similar cases[3,4]. However, as far as we know, the patient described in this report presents the first case of primary malignant melanoma in which the growth occurs along the inside and outside of the spinal canal.

CASE PRESENTATION

Imaging examinations

Magnetic resonance imaging (MRI) examination showed a mass (approximately 2.5 cm × 1.4 cm × 1 cm) in the right side of the spinal canal in the C-2 plane. The mass exhibited high signal intensity on T1-weighted images and isointense on T2-weighted images. The signal intensity did not vary significantly between the T1-weighted images after contrast enhancement. The boundary was clear and spinal cord appeared significantly compressed and displaced to the left side (Figure 1). Results shown in Figure 1D indicate that the tumour extended beyond the intervertebral foramen to the outside of the spinal canal.

Laboratory examinations

Her preoperative laboratory examination, electrocardiogram, and lung computerized tomography (CT) findings were normal.

Physical examination

Neurological examination showed that the superficial sensation in the right upper limb had decreased accompanied by a muscle strength of grade 4. A general examination did not find any subcutaneous nodules or skin lesions.

Personal and family history

No positive personal or family history.

History of past illness

The patient had no previous medical history or a family history of malignant melanoma. She denied having any previous irradiation exposure.

History of present illness

The patient presented with progressive numbness in the right side of the neck, pain, and hypoesthesia in the right upper limb that occurred in the previous 1 year.

Chief complaints

A 64-year-old woman was admitted to our hospital with numbness in the right side of

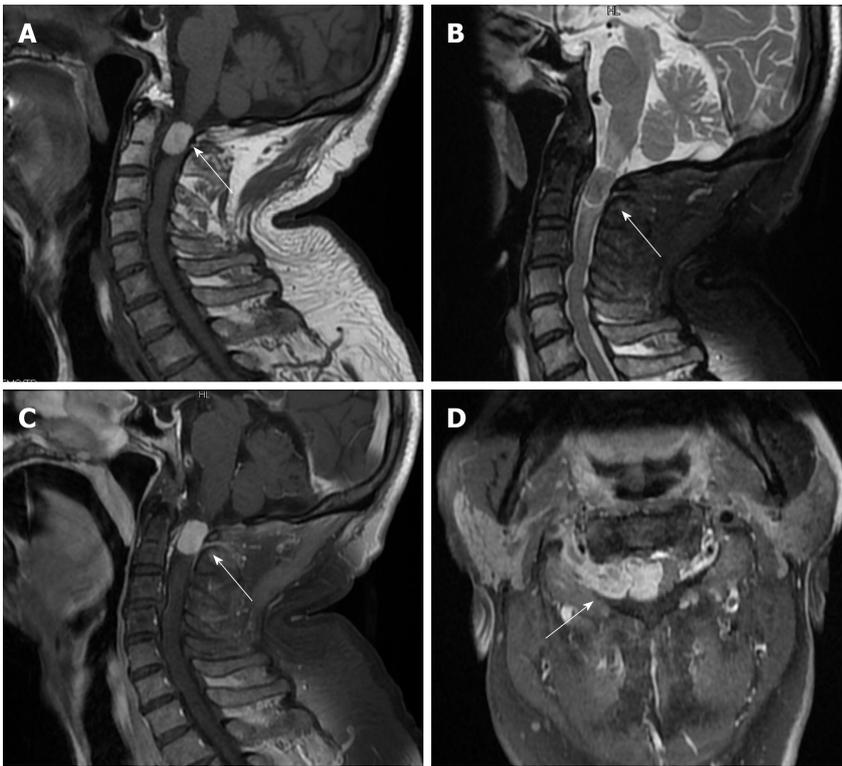


Figure 1 A: T1-weighted showed high-intensity; B: T2-weighted was equal-signal; C: Contrast Enhancement showed clear boundary, and the spinal cord is significantly compressed and displaced to the left side; D: White arrow the tumor grew out of spinal canal through intervertebral foramen.

the neck, pain, and hypoesthesia in the right upper limb which persisted for 1 year.

MULTIDISCIPLINARY EXPERT CONSULTATION

None.

FINAL DIAGNOSIS

Based on the findings obtained during operation, perioperative examination, pathological diagnosis, and the diagnostic criteria of primary central melanoma proposed by Hayward, the neoplasm was considered to be a melanoma of intraspinal nerve root origin with an atypical growth pattern.

TREATMENT

We adopted the posterior median approach which allowed us to successfully remove the tumour. During the operation, the subdural region appeared black. After opening the dura mater, a black object was seen wrapped in a membranous structure close to the nerve root. The object grew out of the spinal canal through the intervertebral foramen. The lesion was close to the pia mater surface of the spinal cord. However, it was clearly demarcated with spinal cord tissue and pia mater. It had a tough and solid texture, with little blood supply, and did not invade the dura mater (Figure 2A).

OUTCOME AND FOLLOW-UP

After operation, no postoperative neurological deficits were observed and postoperative pathological diagnosis confirmed malignant melanoma (Figure 2B-2E).

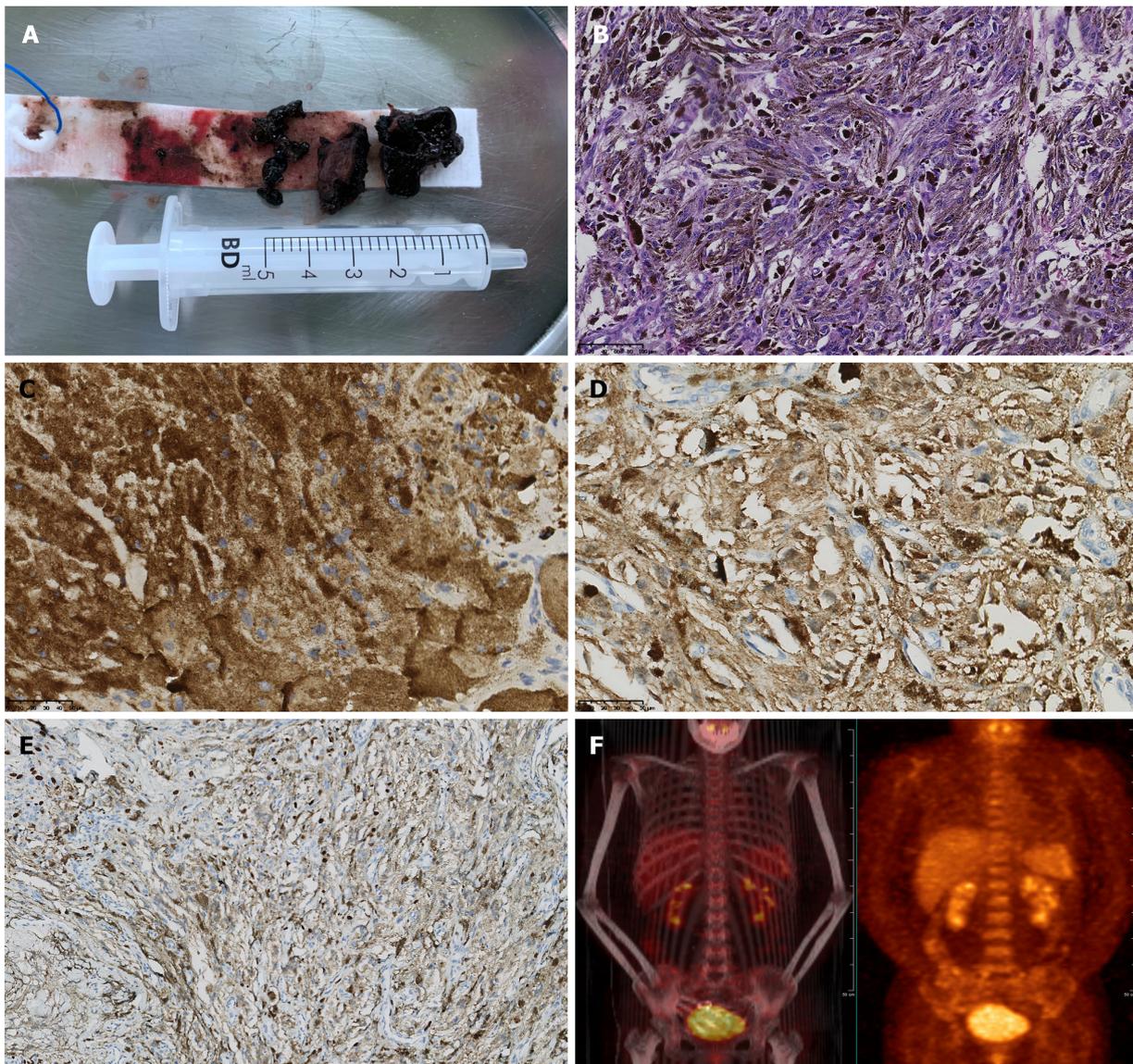


Figure 2 A: A black mass (tumor) was tough and solid, lack of blood supply; B: Hematoxylin-eosin stain (HE, original magnification $\times 200$); C: HMB45(+); D: S100(+); E: Ki67 (approximately 20%); F: Positron emission tomography/ computerized tomography scan showed negative.

A follow-up positron emission tomography/CT scan (Figure 2F) 1 mo after surgery showed total excision and no signs of metastasis and residual tumour. The postoperative course was uneventful, and the patient was discharged on the 14th day. At the last telephone follow-up in October 2021, the patient reported having no issues. We believe that her condition is stable based on routine follow-up MRIs.

DISCUSSION

Primary spinal cord melanoma is a very rare entity. Primary melanoma of the CNS originates from aberrant changes in pigment cells of the neural crest or from melanocytic elements of the pia mater during early embryonic development[5,6]. The clinical presentation of this condition varies from person to person, depending on the location of the tumour[7]. Primary spinal melanomas have been reported in different regions including intramedullary, intradural, and extradural lesions[8]. Most of such cases occur within the cervical and thoracic cord[9]. We retrospectively analysed 70 cases of primary spinal malignant melanoma between 1930 and 2021 on the PubMed Medline database. It was observed that tumours that grow from the inside to the outside of spinal canal are very rare (Table 1).

Table 1 Primary spinal melanoma: A review of the available English literature since 1930

Tumor feature	Number of patients
Growth pattern	
Communicating the intervertebral Foramen	1
Extradural	5
Intradural-extramedullary	33
Intradural-intra-and extra-medullary	4
Intramedullary	22
Other	5
Location	
Cervical	24
Thoracic	33
Lumbar	10
Sacral	3

In terms of clinical manifestation, the most common initial symptom of spinal schwannoma is pain, followed by loss of nerve function[9]. In our case, symptoms of nerve root stimulation were pronounced before operation, which matched the typical clinical manifestations of spinal schwannoma. For the spinal Schwannoma, MRI imaging shows a dumbbell shape and widening of intervertebral foramen[10]. In our case, this growth pattern was first seen in the spinal melanoma. Using MRI, the primary imaging modality used for evaluation of spinal neoplasm[11], the signal of this lesion emerged from under the epidural of spinal cord, as in the case of schwannoma and meningioma[10]. Besides, most of these lesions show signal hyperintensity on T1-weighted images[8,11], rarely iso-intensity on T2-weighted images[12, 13], as well as mild to moderate homogenous enhancement[14,15]. It should be that the MRI signal of the lesion showed signal hyperintensity on T1 weighted image and equal signal on T2. The signal intensity after enhancement was not significantly different from that on T1-weighted images. It has been postulated that a higher blood supply in a lesion yields a higher signal intensity after enhancement[16]. The signal hyperintensity on T1-weighted image was due to the concentration of melanin, haemorrhages, and fat deposits[17,18]. The signal characteristics of MRI may easily lead to misdiagnosis. It is important for surgeons to make an accurate diagnosis and be aware of the limitations of the diagnostic value of MRI. For instance, enhanced MRI revealed a pronounced dural tail sign, which is a classic characteristic of meningioma. However, T1-weighted images with hyperintensity and T2-weighted images with hypointensity are typical features for melanoma, and atypical for meningioma. In addition, intra-tumoral bleeding may cause uneven hyper-intensive signal in T1weighted images. However, it has been reported that enhancement scan of melanoma originating from intramedullary melanoma will be significantly enhanced. Moreover, if there is bleeding in the tumour, the signal will show mixed density[19].

Moreover, blood supply within a tumour seen during the operation was not abundant. As a consequence, we hypothesized that there was no obvious enhancement in the enhanced scan of melanoma originating from the nerve root. These factors make the preoperative diagnosis of atypical cases difficult, and our case reveals the diverse growth patterns associated the imaging findings of primary central nervous system melanoma. This is extremely important for the design of surgical strategies[20]. Thus, when making a preoperative diagnosis based on neuroimaging and clinical experience, there is need to make a more comprehensive prediction of the benign and malignant lesions before preventive measures are applied during operation and the tumour is excised. This only prevents metastasis and influences prognosis of patients.

In most melanomas occurring in the spine, they have primary lesions or metastases in other parts of the spine[21]. Therefore, the present case adds to the understanding on such melanomas. Notably, the positive rate of Ki-67 index in the postoperative pathological examination of present case was more than 20%. In theory, cancer cells of this case will proliferate rapidly and are likely to metastasize[22,23]. However, patients didn't receive radiotherapy and chemotherapy. No recurrence or metastasis was found during follow-up, indicating that the primary malignant melanoma originating from

the nerve root may have different biological characteristics[24], or such tumours have a better prognosis than do cutaneous melanomas[25]. As a consequence, the primary malignant melanoma in the spinal canal may be less invasive than in other parts, which require more evidence-based medicine from the clinical experience. The choice of treatment[26,27] for such cases is extremely important. Gross total resection has been shown to results in longer progression-free survival and survival compared with no or partial resection[28,29]. Because the gross total resection of the tumour result in good outcomes and a longer longevity[30,31]. Nevertheless, the efficacy of post-operative radiotherapy or chemotherapy is still controversial[32,33].

CONCLUSION

In the present report, we present the first case of a primary malignant melanoma originating from the cervical spinal cord nerve roots and grew from the inside to the outside of the spinal canal. Unlike most primary melanomas of the spinal canal, this case has an unusual tumour origin, growth pattern, and imaging findings. Therefore, it provides new insights into the understanding and differential diagnosis of intraspinal tumours. Further studies are needed to reveal the mechanisms driving the development and growth pattern of such a tumour.

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REFERENCES

- 1 **Puyana C**, Denyer S, Burch T, Bhimani AD, McGuire LS, Patel AS, Mehta AI. Primary Malignant Melanoma of the Brain: A Population-Based Study. *World Neurosurg* 2019; **130**: e1091-e1097 [PMID: 31323401 DOI: 10.1016/j.wneu.2019.07.095]
- 2 **Zhang M**, Liu R, Xiang Y, Mao J, Li G, Ma R, Sun Z. Primary Spinal Cord Melanoma: A Case Report and a Systemic Review of Overall Survival. *World Neurosurgery* 2018; **114**: 408-420 [DOI: 10.1016/j.wneu.2018.03.169]
- 3 **Lee CH**, Moon KY, Chung CK, Kim HJ, Chang KH, Park SH, Jahng TA. Primary intradural extramedullary melanoma of the cervical spinal cord: case report. *Spine (Phila Pa 1976)* 2010; **35**: E303-E307 [PMID: 20308942 DOI: 10.1097/BRS.0b013e3181ccb1b3]
- 4 **Zou C**, Cheng W, Zhu C, Guo Q, Wu A. Primary Extradural Melanoma Arising in Cervical Spinal Nerve Root. *World Neurosurg* 2018; **111**: 211-215 [PMID: 29288844 DOI: 10.1016/j.wneu.2017.12.117]
- 5 **PAPPENHEIM E**, BHATTACHARJI SK. Primary melanoma of the central nervous system. Clinical-pathological report of a case, with survey and discussion of the literature. *Arch Neurol* 1962; **7**: 101-113 [PMID: 14483757 DOI: 10.1001/archneur.1962.04210020023003]
- 6 **Yamasaki T**, Kikuchi H, Yamashita J, Asato R, Fujita M. Primary spinal intramedullary malignant melanoma: case report. *Neurosurgery* 1989; **25**: 117-121 [PMID: 2755570 DOI: 10.1097/00006123-198907000-00023]
- 7 **Vij M**, Jaiswal S, Jaiswal AK, Behari S. Primary spinal melanoma of the cervical leptomeninges: report of a case with brief review of literature. *Neurol India* 2010; **58**: 781-783 [PMID: 21045512 DOI: 10.4103/0028-3886.72209]
- 8 **Farrokh D**, Fransen P, Faverly D. MR findings of a primary intramedullary malignant melanoma: case report and literature review. *AJNR Am J Neuroradiol* 2001; **22**: 1864-1866 [PMID: 11733317]
- 9 **Tuz Zahra F**, Ajmal Z, Qian J, Wrzesinski S. Primary Intramedullary Spinal Melanoma: A Rare Disease of the Spinal Cord. *Cureus* 2021; **13**: e16194 [DOI: 10.7759/cureus.16194]
- 10 **Olex-Zarychta D**. Clinical Significance of Pain in Differential Diagnosis between Spinal Meningioma and Schwannoma. *Case Rep Oncol Med* 2020; **2020**: 7947242 [PMID: 32670651 DOI: 10.1155/2020/7947242]
- 11 **Jaiswal S**, Vij M, Tungria A, Jaiswal AK, Srivastava AK, Behari S. Primary melanocytic tumors of the central nervous system: a neuroradiological and clinicopathological study of five cases and brief review of literature. *Neurol India* 2011; **59**: 413-419 [PMID: 21743173 DOI: 10.4103/0028-3886.82758]
- 12 **Kounin GK**, Romansky KV, Traykov LD, Shotekov PM, Stoilova DZ. Primary spinal melanoma with bilateral papilledema. *Clin Neurol Neurosurg* 2005; **107**: 525-527 [PMID: 16202828 DOI: 10.1016/j.clineuro.2004.10.013]
- 13 **Lee NK**, Lee BH, Hwang YJ, Sohn MJ, Chang S, Kim YH, Cha SJ, Cho HJ. Findings from CT, MRI,

- and PET/CT of a primary malignant melanoma arising in a spinal nerve root. *European spine journal* 2010; **19**: 174-178 [DOI: [10.1007/s00586-010-1285-1](https://doi.org/10.1007/s00586-010-1285-1)]
- 14 **Kinnen F**, Fleck S, Baldauf J, Hans V, Daeschlein G, Rathmann E, Schroeder HWS, Marx S. Primary leptomeningeal melanocytic tumors of the spine: report of two cases and review of the literature. *World neurosurgery* 2019; **124**: 228-236 [DOI: [10.1016/j.wneu.2019.01.015](https://doi.org/10.1016/j.wneu.2019.01.015)]
 - 15 **Kanatas AN**, Bullock MD, Pal D, Chakrabarty A, Chumas P. Intradural extramedullary primary malignant melanoma radiographically mimicking a neurofibroma. *Br J Neurosurg* 2007; **21**: 39-40 [PMID: [17453774](https://pubmed.ncbi.nlm.nih.gov/17453774/) DOI: [10.1080/02688690701242235](https://doi.org/10.1080/02688690701242235)]
 - 16 **Unal B**, Castillo M. MRI features of a primary thoracic epidural melanoma: a case report. *Clin Imaging* 2007; **31**: 273-275 [PMID: [17599623](https://pubmed.ncbi.nlm.nih.gov/17599623/) DOI: [10.1016/j.clinimag.2007.02.023](https://doi.org/10.1016/j.clinimag.2007.02.023)]
 - 17 **Smith A**, Rushing E, Smirniotopoulos J. Pigmented lesions of the central nervous system: radiologic-pathologic correlation. *Radiographics* 2009; **29**: 1503-1524 [DOI: [10.1148/rg.295095109](https://doi.org/10.1148/rg.295095109)]
 - 18 **Isiklar I**, Leeds NE, Fuller GN, Kumar AJ. Intracranial metastatic melanoma: correlation between MR imaging characteristics and melanin content. *AJR Am J Roentgenol* 1995; **165**: 1503-1512 [PMID: [7484597](https://pubmed.ncbi.nlm.nih.gov/7484597/) DOI: [10.2214/ajr.165.6.7484597](https://doi.org/10.2214/ajr.165.6.7484597)]
 - 19 **Chatterjee R**, Nascimento FA, Heck KA, Ropper AE, Sabichi AL. Primary Spinal Cord Melanoma - An Uncommon Entity. *Can J Neurol Sci* 2019; **46**: 348-350 [PMID: [31084668](https://pubmed.ncbi.nlm.nih.gov/31084668/) DOI: [10.1017/cjn.2019.28](https://doi.org/10.1017/cjn.2019.28)]
 - 20 **Larson TC 3rd**, Houser OW, Onofrio BM, Piepgras DG. Primary spinal melanoma. *J Neurosurg* 1987; **66**: 47-49 [PMID: [3783259](https://pubmed.ncbi.nlm.nih.gov/3783259/) DOI: [10.3171/jns.1987.66.1.0047](https://doi.org/10.3171/jns.1987.66.1.0047)]
 - 21 **Haberfellner E**, Elbaroody M, Alkhamees AF, Alaosta A, Eaton S, Quint E, Shahab S, O'Connor A, Im J, Khan A, El-Gohary Y, Lottfy M, Sawan M, Shamisa A, Soliman MAR. Primary Spinal Melanoma: Case Report and Systematic Review. *Clin Neurol Neurosurg* 2021; **205**: 106649 [PMID: [33932774](https://pubmed.ncbi.nlm.nih.gov/33932774/) DOI: [10.1016/j.clineuro.2021.106649](https://doi.org/10.1016/j.clineuro.2021.106649)]
 - 22 **Asi-Bautista MC**, Heidemann SM, Meert KL, Canady AI, Sarnaik AP. Tumor necrosis factor-alpha, interleukin-1 beta, and interleukin-6 concentrations in cerebrospinal fluid predict ventriculoperitoneal shunt infection. *Crit Care Med* 1997; **25**: 1713-1716 [PMID: [9377887](https://pubmed.ncbi.nlm.nih.gov/9377887/) DOI: [10.1097/00003246-199710000-00022](https://doi.org/10.1097/00003246-199710000-00022)]
 - 23 **Schöder H**, Larson S, Yeung H. PET/CT in oncology: integration into clinical management of lymphoma, melanoma, and gastrointestinal malignancies. *J Nucl Med* 2004; **45**: 72S-81S [DOI: [10.1097/00003072-200412000-00012](https://doi.org/10.1097/00003072-200412000-00012)]
 - 24 **Sanz-Trelles A**, Arranz-Salas IM, Valenzuela-Serrano MI. Melanoma arising in and limited to a spinal nerve root of the cauda equina. *Histopathology* 2003; **43**: 603-604 [PMID: [14636261](https://pubmed.ncbi.nlm.nih.gov/14636261/) DOI: [10.1111/j.1365-2559.2003.01679.x](https://doi.org/10.1111/j.1365-2559.2003.01679.x)]
 - 25 **Brat DJ**, Giannini C, Scheithauer BW, Burger PC. Primary melanocytic neoplasms of the central nervous systems. *Am J Surg Pathol* 1999; **23**: 745-754 [PMID: [10403296](https://pubmed.ncbi.nlm.nih.gov/10403296/) DOI: [10.1097/00000478-199907000-00001](https://doi.org/10.1097/00000478-199907000-00001)]
 - 26 **Balakrishnan R**, Porag R, Asif DS, Satter AM, Taufiq M, Gaddam SS. Primary Intracranial Melanoma with Early Leptomeningeal Spread: A Case Report and Treatment Options Available. *Case Rep Oncol Med* 2015; **2015**: 293802 [PMID: [26294993](https://pubmed.ncbi.nlm.nih.gov/26294993/) DOI: [10.1155/2015/293802](https://doi.org/10.1155/2015/293802)]
 - 27 **Fujimori K**, Sakai K, Higashiyama F, Oya F, Maejima T, Miyake T. Primary central nervous system malignant melanoma with leptomeningeal melanomatosis: a case report and review of the literature. *Neurosurg Rev* 2018; **41**: 333-339 [PMID: [28986666](https://pubmed.ncbi.nlm.nih.gov/28986666/) DOI: [10.1007/s10143-017-0914-0](https://doi.org/10.1007/s10143-017-0914-0)]
 - 28 **Salpietro FM**, Alafaci C, Gervasio O, La Rosa G, Baio A, Francolini DC, Batolo D, Tomasello F. Primary cervical melanoma with brain metastases. Case report and review of the literature. *J Neurosurg* 1998; **89**: 659-666 [PMID: [9761064](https://pubmed.ncbi.nlm.nih.gov/9761064/) DOI: [10.3171/jns.1998.89.4.0659](https://doi.org/10.3171/jns.1998.89.4.0659)]
 - 29 **Yu J**, Zhao DD, Chen S, Zhang JM, Xu J. Primary melanoma of the cervical spine with cerebral metastases: case report and review of the literature. *J Int Med Res* 2012; **40**: 1207-1215 [PMID: [22906295](https://pubmed.ncbi.nlm.nih.gov/22906295/) DOI: [10.1177/147323001204000341](https://doi.org/10.1177/147323001204000341)]
 - 30 **Marx S**, Fleck SK, Manwaring J, Vogelgesang S, Langner S, Schroeder HW. Primary leptomeningeal melanoma of the cervical spine mimicking a meningioma-a case report. *J Neurol Surg Rep* 2014; **75**: e93-e97 [PMID: [25083399](https://pubmed.ncbi.nlm.nih.gov/25083399/) DOI: [10.1055/s-0034-1372474](https://doi.org/10.1055/s-0034-1372474)]
 - 31 **Wu L**, Yao N, Fang J, Yang J, Xu Y. Clinical features and long-term outcomes of primary spinal malignant melanoma: a single center experience. *J Neurooncol* 2017; **135**: 513-519 [PMID: [28819705](https://pubmed.ncbi.nlm.nih.gov/28819705/) DOI: [10.1007/s11060-017-2593-7](https://doi.org/10.1007/s11060-017-2593-7)]
 - 32 **Patchell R**, Tibbs P, Regine W, Payne R, Saris S, Kryscio RJ, Mohiuddin M, Young B. Direct decompressive surgical resection in the treatment of spinal cord compression caused by metastatic cancer: a randomised trial. *Lancet (London, England)* 2005; **366**: 643-648 [DOI: [10.1016/s0140-6736\(05\)66954-1](https://doi.org/10.1016/s0140-6736(05)66954-1)]
 - 33 **Fuld AD**, Speck ME, Harris BT, Simmons NE, Corless CL, Tsongalis GJ, Pastel DA, Hartford AC, Ernstoff MS. Primary melanoma of the spinal cord: a case report, molecular footprint, and review of the literature. *J Clin Oncol* 2011; **29**: e499-502 [DOI: [10.1200/jco.2010.34.0695](https://doi.org/10.1200/jco.2010.34.0695)]



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