

# A rare thoracic intraspinal schwannoma in twin pregnancy with aggravated clinical presence

## A case report following CARE

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### Abstract

**Introduction:** This is the first case report about a thoracic intraspinal schwannoma in twin pregnancy with aggressive clinical presentation.

**Clinical presence and diagnoses:** A 21-year-old woman presented with a 2-month history of back pain and slight lower extremity numbness and weakness, and her symptoms were misdiagnosed as normal reactions to pregnancy until she progressed to complete paralysis and incontinence within 2 weeks. She was then confirmed to have thoracic intraspinal schwannoma through MRI.

**Interventions and outcomes:** Surgery was performed using a unilateral hemilaminectomy approach with a comfortable lateral position during operation. The patient exhibited significant improvements in sensation and muscle strength after surgery. She delivered 2 healthy baby girls by eutocia in her 38th week of pregnancy.

**Lessons:** The diagnosis of this disease and the 4 possible mechanisms of its aggravated clinical presence are discussed. Intraspinal schwannomas during pregnancy are rare but may cause critical consequences for both the mother and the fetus. Timely diagnosis and multidisciplinary treatment by obstetricians, anesthesiologists, surgeons, oncologists, and neonatologists are essential for the clinical management of this disease.

**Abbreviations:** MDT = multidisciplinary treatment, MRI = magnetic resonance imaging.

**Keywords:** intraspinal schwannoma, multidisciplinary treatment, pregnancy

## 1. Introduction

Schwannomas are among the most common benign neurogenic tumors in the spinal canal and represent approximately 25% of intradural spinal tumors in adults.<sup>[1]</sup> Natural history of schwannomas in the spinal canal has been reported to be 6.7 ± 2.7 years with chronic clinical progress.<sup>[2]</sup> In pregnant patients, the diagnosis of spinal schwannomas may be delayed because the early symptoms are similar to the normal reactions to pregnancy. Furthermore, pregnant-related factors might accelerate its clinical progress. Knowledge of thoracic intraspinal schwannoma in

pregnant patients is currently insufficient due to the limited literature. The present case is the first report of spinal schwannoma manifesting as a short history of rapidly aggravated clinical presence in a patient pregnant with twins.

## 2. Case report

This was a 21-year-old woman (gravida 1, para 0), in her 24th week of twin pregnancy, who presented with a 2-month history of back pain and slight lower extremity numbness and weakness. Her symptoms were misdiagnosed as normal reactions to pregnancy, and no further imaging was scheduled due to the concern of potential impact on the fetus. During the observation period, her symptoms rapidly progressed, reaching complete paralysis and incontinence within 2 weeks. She was sent to the emergency department of our hospital. Magnetic resonance imaging (MRI) revealed an oval-shaped tumor (2.5 × 2 × 1.5 cm) on the 7th thoracic vertebra (Fig. 1). The initial diagnosis was intradural spinal tumor. A multidisciplinary treatment (MDT) consulting discussion that included obstetricians, anesthesiologists, neurosurgeons, oncologists, and neonatologists was conducted to formulate the perioperative plan. During the 3-day waiting time before surgery (MRI waiting list), she showed elevated blood pressure and presented with preeclampsia. Magnesium sulfate was administered on the advice of obstetricians. The patient successfully underwent tumor resection through a unilateral hemilaminectomy approach with a comfortable lateral position during operation (Figs. 2 and 3). The pathological diagnosis after surgery was schwannoma. The patient exhibited significant improvements in sensation in both limbs and in muscle strength after surgery. Upon discharge, the

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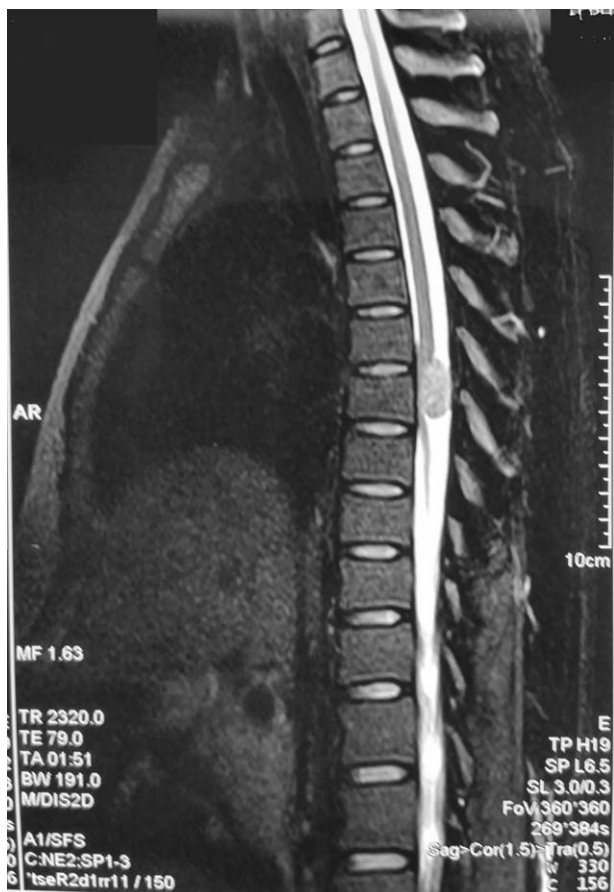
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**Figure 1.** MRI imaging of the patient. Tumor was located on the 7th thoracic vertebra. MRI = magnetic resonance imaging.

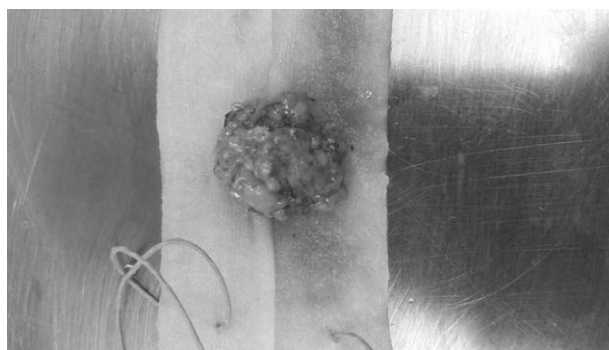
patient exhibited grade-4 muscle strength in both lower extremities without apparent neurological dysfunction. She delivered 2 healthy baby girls by eutocia in her 38th week of pregnancy.

### 3. Discussion

The diagnosis of spinal tumors in pregnant women might be delayed because the early symptoms, such as back pain and numbness of the lower extremities, are similar to some normal reactions to pregnancy. This delay may lead to serious



**Figure 2.** Comfortable lateral position during surgery.



**Figure 3.** Tumor resection through a unilateral hemilaminectomy approach.

consequences for both the mothers and fetuses and may even cause abortion or premature delivery according to some case reports.<sup>[3,4]</sup> These cases illustrate that pregnant patients who complain of neurological symptoms warrant vigilance and timely follow-up, particularly when the symptoms are aggravated rapidly. This rapid aggravation of symptoms may distinguish normal pregnancy-related back pain from that caused by spinal tumors.

The reasons for these rapid changes in patient symptoms remain controversial due to the limited number of cases described in the literature. Here, we propose 4 potential mechanisms. (1) Increased weight bearing: as the most important weight-bearing bone structure, the spinal cord is under significantly greater pressure during pregnancy. This additional burden might aggravate the symptoms of spinal tumors. (2) Endocrine changes: previous studies revealed strong expression of the progesterone and glucocorticoid receptors in schwannoma cells.<sup>[5]</sup> As the levels of steroids, including progesterone and glucocorticoid, fluctuate dramatically during pregnancy, this may stimulate tumor growth and potentially contribute to the aggravation of symptoms.<sup>[6]</sup> (3) Hemodynamic changes: intratumoral hypervascularity, edema, and spontaneous hemorrhage, or tumor necrosis, may accelerate the disease process. (4) Oncofetal antigens: during pregnancy, oncofetal antigens, fetal antigens analogous to the antigens present on tumor cells, may be expressed. The immune evasion of these antigens might result in enhanced tumor growth during pregnancy.<sup>[7,8]</sup> Based on our case, we believe that the aggravation of symptoms is likely related to pregnancy, but the precise mechanism requires further study.

Women with spinal cord lesions, including tumors, present specific challenges during pregnancy and are at greater risk for unattended deliveries.<sup>[9]</sup> Therefore, the ideal treatment outcome for these cases would be to maintain the safety of both the patients and fetuses. We believe that MDT (multidisciplinary treatment) is critical for ensuring a good prognosis. Our MDT group consisted of obstetricians, anesthesiologists, neurosurgeons, oncologists, and neonatologists. The essential suggestions identified in MDT meetings were as follows. (1) Magnesium sulfate was administered for 3 days while waiting for surgery to avoid pregnancy-induced hypertension syndrome, especially eclampsia. (2) A comfortable lateral position was employed during surgery. (3) Fetal monitoring was performed during the perioperative period. (4) An appropriate surgical approach was used: the unilateral hemilaminectomy approach is a minimally invasive operation for the removal of intraspinal extramedullary

tumors without spinal stability damage. The use of both an operating microscope and electrophysiological monitoring ensured complete tumor resection with preservation of the spinal cord. The patient underwent successful surgical resection of the tumor and obtained satisfactory recovery of sensory and motor recovery in the lower extremities.

Intraspinal schwannomas during pregnancy are rare but may cause serious consequences for both the mother and fetus due to the potential of a sudden, occasionally life-threatening aggravation of clinical presence. For patients with persistent or progressive back pain during pregnancy, obstetricians should have a heightened level of suspicion of spinal tumors. Pregnancy-related symptom aggravation might be related to the weight gain, hormone fluctuations, hemodynamic changes, and immunological factors or to a combination of these factors. MDT was essential for the clinical management of this case, and unilateral hemilaminectomy permitted complete tumor resection with preservation of the spinal cord.

## References

- [1] Jeon JH, Hwang HS, Jeong JH, et al. Spinal schwannoma; analysis of 40 cases. *J Korean Neurosurg Soc* 2008;43:135–8.
- [2] Ozawa H, Onoda Y, Aizawa T, et al. Natural history of intradural–extramedullary spinal cord tumors. *Acta Neurol Belg* 2012;112:265–70.
- [3] Kathiresan AS, Johnson JN, Hood BJ, et al. Giant cell bone tumor of the thoracic spine presenting in late pregnancy. *Obstet Gynecol* 2011;118 (part 2):428–31.
- [4] Komiya S, Zenmyo M, Inoue A. Bone tumors in the pelvis presenting growth during pregnancy. *Arch Orthop Trauma Surg* 1999;119:22–9.
- [5] Carroll R, Zhang J, Black PML. Hormone receptors in vestibular schwannomas. *Acta Neurochir* 1997;139:188–93.
- [6] Jaiswal S, Agrawal V, Jaiswal AK, et al. Expression of estrogen and progesterone receptors in vestibular schwannomas and their clinical significance. *J Negat Results Biomed* 2009;8:9.
- [7] Rocklin RE, Kitzmiller J, Kaye M. Immunobiology of the maternal-fetal relationship. *Annu Rev Med* 1979;30:375–404.
- [8] Ishibe M, Ishibe Y, Ishibashi T, et al. Low content of estrogen receptors in human giant cell tumors of bone. *Arch Orthop Trauma Surg* 1994;113:106–9.
- [9] Sterling L, Keunen J, Wigdor E, et al. Pregnancy outcomes in women with spinal cord lesions. *J Obstet Gynaecol Can* 2013;35:39–43.