



Case Study



Nervous Discrepancy of Spinal Cord Schwannoma Causing Posterior Neck Swelling

Soobia Saeed¹, Rubina Ghani^{2*}, Zeelaf Shahid³, Uzma Naseeb⁴ and Ubaid Ahmed Khan⁵¹Department of Biological Sciences, Sohail University, Karachi, Pakistan²Department of Biochemistry, Jinnah Medical and Dental College/Sohail University, Karachi, Pakistan³Department of Medical Education, Jinnah Medical and Dental College, Karachi, Pakistan⁴Department of Biochemistry, Jinnah Sindh Medical University, Karachi, Pakistan⁵Department of Anatomy, Jinnah Sindh Medical University, Karachi, Pakistan

ARTICLE INFO

Keywords:

Schwannomas, Laminectomy, Spinal Midline, Cervical, Neurological

How to Cite:

Saeed, S., Ghani, R., Shahid, Z., Naseeb, U., & Khan, U. A. (2024). Nervous Discrepancy of Spinal Cord Schwannoma Causing Posterior Neck Swelling: Spinal Cord Schwannoma Causing Posterior Neck Swelling. *Pakistan Journal of Health Sciences*, 5(10). <https://doi.org/10.54393/pjhs.v5i10.1763>

*Corresponding Author:

Rubina Ghani

Department of Biochemistry, Jinnah Medical and Dental College/Sohail University, Karachi, Pakistan
rg.mussavir@sohailuniversity.edu.pkReceived Date: 26th May, 2024Acceptance Date: 13th October, 2024Published Date: 31st October, 2024

ABSTRACT

A 20-year-old man with chronic cervical pain has been diagnosed with cervical spinal schwannomas, a benign tumor in the posterior neck. **Objective:** To analyze the spinal cord schwannomas causing posterior neck swelling. **Methods:** In the first step, the vertebral canal portion of the tumor at C4 was removed entirely with a midline approach to the posterior spinal column. The patient underwent a laminectomy procedure in the second surgical session to remove tumors at C2 and C3, resulting in no neurological issues upon discharge from the hospital. **Results:** Schwannomas was diagnosed histopathologically. In patients with cervical intra-spinal schwannomas that have spread to the extra vertebral paravertebral neck region, the first goal of surgery is to treat the neurological deficits. **Conclusions:** It was concluded that the posterior midline and laminectomy approach approaches are combined in the same session or at different times in the surgical strategy.

INTRODUCTION

Most spinal tumors occur in an Intra-Dural extra-medullary and are comparatively rare which is approximately 5-10% making up all Central Nervous System (CNS) tumors [1, 2]. However, their visibility is not always pathognomonic, the doctors and physicians need to use magnetic resonance imaging (MRI) for assessment and diagnosis purposes of tumor detection. MRI often provides a quick and reliable diagnosis for these conditions. Most tumors are affiliated with the spinal nerve or dura mater, schwannomas, neuro-fibroma, and meningiomas are the majority that appear in this location [3-5]. The majority of spinal tumors occur approximately 0.5-2.5 times per 100,000 people each year, 66% of spinal tumors are located in the extradural lesion, 30% are Intra-Dural lesions, and 10% are spinal tumors are intramedullary lesions [6-8]. In the spine, 20-30% of spinal

tumors are schwannomas and spinal neuro-fibromas form which can cause neurological insufficiencies. The root of the spinal dorsal nerve is commonly affected by Schwannomas which benign mesenchymal tumor masses originating from Schwann cells [9, 10]. Spinal schwannomas are rare and compress the neck region's structure. They are rare and rarely cause swelling in the neck region. Spinal schwannomas are the most common primary Intra-Dural extra-medullary spinal tumor. Neuro-fibroma and meningioma spinal tumors are also located in the spine. Grade I, Grade II, and Grade III spine tumors are the most common types, with schwannomas being the most common [11]. This article discusses a patient with a Spinal schwannomas tumor, a rare benign condition in the cervical spinal cord. The tumor causes extreme pain and



anterior neck swelling, leading to misdiagnosis and delayed treatment.

This research aimed to explore these abnormalities, providing clinical observations and new diagnostic criteria for effective early identification and treatment [12-14].

CASE STUDY

The neurosurgical department treats one of the rare types of Schwannomas spinal tumor patients. A 20-year-old young boy presented schwannomas in both upper and lower limbs. The patient continuously complains the intense pain from the left anterior neck region and difficulty moving. The patient experienced a hard, non-pulsatile, painless swelling in the left anterior neck region during a physical examination, but the neurological examination was normal, with no sensory deficiency. The magnetic resonance imaging (MRI) examination diagnoses the Intra-Dural extra-medullary tumor mass which is present in the region of the neck with a C2-C3 level. Furthermore, the other area of the neck declares the C1 level of tumor which is located in the posterior artery in the neck which is shown in Figures 1(a) and (b). MRI image showing T1-weighted hyper-intense material corresponding to the anterior neck region, and T2-weighted hyper-intense material corresponding to the posterior neck region. It shows the two and three core fragments that measure 0.2×0.2 cm in diameter. The rest of the part of Computed tomography (CT) angiography shows no symptoms of vascularization in the tumor. The tumor in the spine is located in the spine which is visible in the spine neck as shown in figure 1.

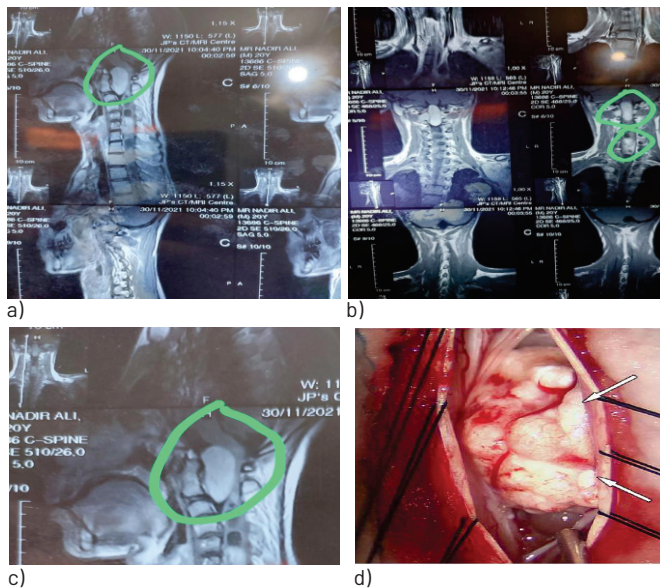


Figure 1: C1-C3 Schwannomas presenting with muscle weakness in all four of your limbs (both legs and both arms) bowel incontinence and C4 sensory level. (a) T-2 weighted MRI preoperatively showing hyper-intense Schwannomas in the sagittal plane. (b) T-1 Weighted MRI of the spine showing partially enhanced Schwannomas and severe compression of the spinal cord preoperatively. (c) T-2

Weighted MRI showing radical tumor resection. (d) MRI show the Schwannomas in the neck region.

The section examined shows spindle cell lesions, tumor cells in fascicles, nuclear palisading, eosinophilic cytoplasm, wavy hyperchromatic nuclei, and interspersed hyalinized blood vessels. There is no significant increased mitotic activity, cytological atypia or necrosis. Immunohistochemical stains were performed which show the following reactivity pattern as shown in figure 2.

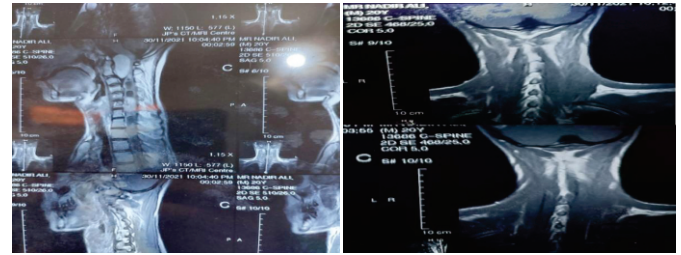


Figure 2: Sagittal (a) and Axial (b) Postoperative Magnetic Resonance Imaging (MRI) of the C3 Cortex in the T2-Weighted Plane.

The spinal cord is seen to be expanded. The surgical strategy involved anterolateral cervical and posterior midline approaches for tumor resection at C4 and C2 levels, with neuro-monitoring and general anesthesia used, as shown in figure 3.

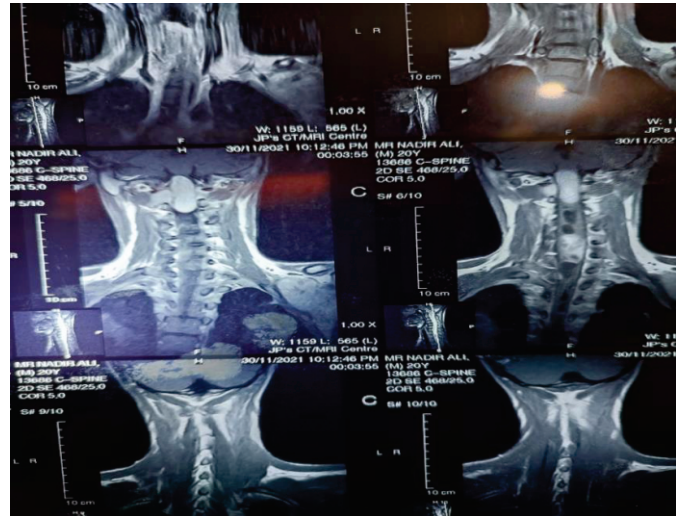


Figure 3: Removal of Tumor from C3 Cortex in the T2-Weighted Plane

DISCUSSION

In the case of cervical schwannoma, pre-operative T2-weighted MRI demonstrated hyper-intensity schwannomas at C1-C3 with muscle weakness, bowel incontinence, sensory level C4. T1-weight MRI showed that schwannomas were partially enhanced and put great pressure on the spinal cord. Intra-operatively, on a T2-weight MRI, radical resection of the tumor was confirmed; neck MRI depicted the presence of schwannomas in the neck. In post-op, sagittal and axial MRI images of the C3 cortex showed spinal cord expansion [15-17]. This tumor

was surgically removed with anterior lateral cervical and posterior midline approach at C2 and C4 during neuromonitoring under general anesthesia. The tumor from the C3 cortex was removed; this is shown in the T2-weighted plane in Figure 3. The standard treatment of cervical schwannoma has been posterior laminectomy, conventionally considered the safest way to obtain intradural extramedullary lesions removal. Due to the slow growing rate of tumor, diagnosis was quite difficult; however, CT angiography and MRI constitute crucial imaging methods for surgical planning and may confer favorable outcomes with a high rate of neurological recovery following tumor resection [18-20].

CONCLUSIONS

In summary, shifting the focus towards mechanical displacement and nerve displacement as mediating factors in the presentation of posterior neck swelling is the unique contribution the present study makes to the literature on cervical schwannomas. Even though other studies have noted posterior neck swelling in a large number of cases, our findings illustrate the influence of tumor size, tumor location, and patient factors on the presentation of symptoms. This proposed research attempts to advance the understanding of cervical schwannomas and addresses the need to consider the patient in the diagnosis and treatment processes, especially about invasive surgical procedures such as laminectomy, which is informed by knowledge of how the schwannomas and clinical manifestation relate.

Ethical Statement

Written Informed consent was taken from patient regarding the publication of their medical data. The study was approved by the Institutional Review Board, under the Ethical Letter No. 000217/23

Authors Contribution

Conceptualization: SS

Methodology: SS, RG

Formal analysis: SS

Writing-review and editing: SS, RG, ZS, UN

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

- [1] Musarhad Mn, Salih Sa, Hussein Sa. A Cross-Sectional Study to Determine the Results of Spinal Tumor Surgery. *European Journal of Modern Medicine and Practice*. 2024 Aug; 4(8): 324-31.
- [2] Miñana SR, Marín AC, Morón EG, Quesada MR, Rapagna AM, Hernández MS et al. Intra-Dural-Extramedullary and Intramedullary Tumors: Keys to Their Differential Diagnosis and Pathological Correlation. *Seram*. 2024 May 22; 1(1).
- [3] Murphy OC, Salazar-Camelo A, Jimenez JA, Barreras P, Reyes MI, Garcia MA et al. Clinical and MRI Phenotypes of Sarcoidosis-Associated Myelopathy. *Neurology: Neuro-immunology & Neuro-inflammation*. 2020 Apr; 7(4): e722.doi:10.1212/NXI.0000000000000722.
- [4] Korolishin V and Poluektov YM. Surgical and Combined Tactic for Multi-Level Spinal Cord Tumor Compression in Patients with Neurofibromatosis. In *Neurofibromatosis-Diagnosis and Treatments*. 2023 Apr. Intech Open.
- [5] Arab AA, Eltantawy MH, Elmaghrabi MM. Evaluation of Intra-Dural Extra-Medullary Spinal Tumors Management: Single Institutional Experience. *The Egyptian Journal of Hospital Medicine*. 2022 Oct; 89(1): 5317-22. doi:10.21608/ejhm.2022.262323.
- [6] Sartika D, Risdianto A, Saputro A, Brotoarianto HK, Priambada D, Muttaqin Z et al. Endoscopic Spine Surgery For Cervicothoracic Spine Neurofibroma: A Case Report. *Bali Medical Journal*. 2021 Apr; 10(1): 373-6. doi:10.15562/bmj.v10i1.2184.
- [7] Kim M, Kim HS, Oh SW, Adsul NM, Singh R, Kashlan ON et al. Evolution of Spinal Endoscopic Surgery. *Neurospine*. 2019 Mar; 16(1): 6. doi: 10.14245/ns.1836322.161.
- [8] Sial M and George KJ. A Review of Spinal Lesions in Neurofibromatosis Type 1 in A Large Neurofibromatosis Type 1 Center. *World Neurosurgery*. 2023 Jan; 169: e157-63.doi:10.1016/j.wneu.2022.10.100.
- [9] Martínez F, Domínguez-Páez M, Cuadros-Romero M, Moragues R, Noguerras MS, Casales N et al. Peripheral Nerve Tumors: Retrospective Study of 66 Cases. *Neurocirugía (English Edition)*. 2020 May; 31(3): 105-11. doi: 10.1016/j.neucie.2019.12.001.
- [10] Lee JH, Kim HS, Yoon YC, Cha MJ, Lee SH, Kim ES. Differentiating Between Spinal Schwannomas and Meningiomas Using MRI: A Focus on Cystic Change. *PLoS One*. 2020 May; 15(5): e0233623.doi:10.1371/journal.pone.0233623.
- [11] Saeed S, Ghani R, Shahid Z. Prevalence of Low Back Pain and Its Associated Factors in an Underdeveloped Country: Pakistan: Prevalence of Low Back Pain in Pakistan. *Journal of Health and Rehabilitation Research*. 2024 Sep; 4(3): 1-7.doi:10.61919/jhrr.v4i3.1004.
- [12] Elsayed MA, Ibrahim AM, El Darawany MA, Ellabban MA. A Huge Carotid Space Schwannoma Arising from

- The Cervical Sympathetic Chain-A Case Report. *Annals of Maxillofacial Surgery*. 2021 Jan; 11(1): 144-7. doi: 10.4103/ams.ams_230_19.
- [13] Singh G, Kumar A, Verma PK, Bhaisora KS, Mehrotra A, Srivastava AK et al. C2 Nerve Sheath Tumors: An Analysis of Radiological-Intraoperative Concordance for Intra-Dural Extension and Systematic Review. *Journal of Spinal Surgery*. 2024 Apr; 11(2): 47-55. doi: 10.4103/joss.joss_9_24.
- [14] Chhabra S, More B, Ranade D, Gotecha S, Punia P, Raghu V et al. Clinical Profile, Management and Surgical Outcome of Spinal Cord Tumors. *International Surgery Journal*. 2021 Sep; 8(10): 3013-8. doi: 10.18203/2349-2902.isj20213986.
- [15] Wang L, Yu J, Shu D, Huang B, Wang Y, Zhang L. Primary Endodermal Hemangiopericytoma/Solitary Fibrous Tumor of the Cervical Spine: A Case Report and Literature Review. *BioMed Central Surgery*. 2021 Dec; 21: 1-7. doi: 10.1186/s12893-021-01399-6.
- [16] Palmisciano P, Ferini G, Watanabe G, Conching A, Ogasawara C, Scalia G et al. Surgical Management of Craniovertebral Junction Schwannomas: A Systematic Review. *Current Oncology*. 2022 Jul; 29(7): 4842-55. doi: 10.3390/currenco129070384.
- [17] Mohammad A, Iqbal MA, Wadhwanian A. Schwannomas of the Head and Neck Region: A Report of Two Cases with A Narrative Review of the Literature. *Cancer Research, Statistics, and Treatment*. 2020 Jul; 3(3): 51725. doi: 10.4103/CR=ST.CRST_149_20.
- [18] Behuria S, Rout TK, Pattanayak S. Diagnosis and Management of Schwannomas Originating from the Cervical Vagus Nerve. *The Annals of the Royal College of Surgeons of England*. 2015 Mar; 97(2): 92-7. doi: 10.1308/003588414X14055925058355.
- [19] Suárez C, López F, Rodrigo JP, Mendenhall WM, de Bree R, Mäkitie AA et al. Benign Peripheral Non-Cranial Nerve Sheath Tumors of the Neck. *Advances in Therapy*. 2022 Aug; 39(8): 3449-71. doi: 10.1007/s12325-022-02191-5.
- [20] Singh A, von Vogelsang AC, El-Hajj VG, Buwaider A, Fletcher-Sandersjö A, Pettersson-Segerlind J et al. Health-Related Quality of Life and Return to Work after Surgery for Spinal Schwannoma: A Population-Based Cohort Study. *Cancers*. 2024 May; 16(10): 1882. doi: 10.3390/cancers16101882.