Primary Tumors of the Cervical and Brachial Plexus

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1. Abstract

Objectives: The infrequently seen tumors primarily involving the cervical and brachial plexus commonly present to the head and neck surgeon. We will review the various pathologies, presenting symptoms, surgical approaches, and patient outcomes in our series treated over the last 15 years.

Study Design: Case series of patients having cervical or brachial plexus tumors requiring surgical intervention at a tertiary care referral center from 2000-2014.

Methods: Chart review from EMR.

Results: Fourteen patient charts met inclusion criteria (12 women, 2 men, age 14-73 years.) Neurofibroma (28.5%), 1/4 malignant and schwannoma (28.5%, 1/4 malignant) were the most commonly presenting pathologies. The remainder of pathologies included vascular lesions, chordoma, Castlemans disease, and desmoid tumor. Most present with a tender or asymptomatic mass. With no intracordal extension, the lesions of the cervical plexus were treated solely by our team via a transcervical approach. In one patient with intraforaminal extension we partnered with the neurosurgical spine team. For treatment of brachial plexus lesions we partnered with the orthopedic hand surgery team. Brachial plexus function was initially preserved in all patients, however one patient with malignant schwannoma died of recurrent disease following radiation therapy.

Conclusions: This case series examines our surgical management of patients presenting with primary tumors of the cervical and brachial plexus. In all cases, MRI was the preferred imaging modality for preoperative evaluation of the soft tissue involvement of the tumors. In lesions of the brachial plexus or cervical plexus lesions with intraforaminal extension, it is important to form appropriate surgical teams to achieve the best outcome.

2. Introduction

- Primary tumors of the cervical and brachial plexus are rare, with their description in the literature being limited in nature.
- These infrequently seen tumors primarily involving the cervical and brachial plexus commonly present to Head & Neck Surgeons.
- In our experience, utilization of multidisciplinary teams working in collaboration has resulted in excellent outcomes patients

3. Methods & Materials

- An IRB approved retrospective review of patients presenting to the Department of Otolaryngology at Vanderbilt University Medical Center between 2000-2015 with primary cervical or brachial plexus pathology ultimately receiving surgical intervention.

4. Results

A total of 14 patients received surgical treatment for either cervical or brachial plexus lesions between January 2000 and April 2015. The ages of these patients ranges from 14 to 73, with the average age being 41.3. There was a strong female preponderance with males only comprising 14.3% of study subjects (9/14). The remaining observed pathologies included vascular lesions, chordoma, Castlemans disease, and desmoid tumor.

Presentations varied but an asymptomatic presentation (5/14) was the most common presentation. Symptoms of swelling, pain, paresthesias, or shoulder weakness. With no intracordal extension, the lesions of the cervical plexus were treated solely by our team via a transcervical approach. In one patient with intraforaminal extension we partnered with the neurosurgical spine team. For treatment of brachial plexus lesions we partnered with the orthopedic hand surgery team. Brachial plexus function was initially preserved in all patients, however one patient with malignant schwannoma died of recurrent disease following radiation therapy.

5. Discussion

- The presentation of patients with either cervical or brachial plexus tumors is often asymptomatic but may be accompanied by symptoms such as a painless mass, fullness, pain, paresthesias, or shoulder weakness.
- Imaging is key to planning surgical approach, often using MRI for optimal soft tissue visualization.
- In consideration of primary tumors being a small percentage of lesions appearing in the cervical and brachial plexus, it is advisable to perform biopsy despite the equivocal role of biopsy in this case series.
- The most common pathologies were neurofibromas and schwannomas.
- Of note, schwannomas may be addressed using enucleation in order to spare the patient the post-operative morbidity that accompanies nerve resection.
- Collaboration with appropriate surgical teams is important in addressing surgically challenging pathologies.
- In the case of a brachial plexus tumor, collaboration with the Orthopedics service may be considered.
- Collaboration will be likely necessary in the case of intraforaminal extension.
- Consider consultation of the intraoperative Nerve Monitoring service.

6. Conclusion

- This case series adds to the limited existing literature regarding primary tumors of the cervical and brachial plexus, uniquely highlighting the role of collaboration between specialists at addressing primary tumors of the cervical and brachial plexus.
- Creation of appropriate collaborative surgical teams may assist in achieving optimal patient outcomes.

7. References


8. Acknowledgements

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Figure 1: Preoperative and intraoperative imaging of cervical (Pt 7; ABC) and brachial plexus (Pt 11; DEF) tumor cases. A. Gadolinium-contrasted T2 MRI axial cut of C1-C2 cervical plexus schwannoma. B. Intraoperative photo demonstrating approach and dissection for cervical plexus tumor. C. Intraoperative photo of vagus lying on carotid artery and facial edge of sympathetic trunk retracted; demonstrating structures are intact and isolated from cervical plexus schwannoma. D. Gadolinium-contrasted STIR MRI coronal cut of C7 root brachial plexus schwannoma. E. Intraoperative photo demonstrating approach and dissection for enucleation of brachial plexus schwannoma. F. Intraoperative photo demonstrating successful enucleation of schwannoma.