

# Feasibility of Transoral Robotic Surgery for Cervical Spine Tumors

Angela C. Tsai, MD; Scharukh M. Jalisi, MD FACS  
Boston University Medical Center  
Division of Head & Neck Surgical Oncology  
Department of Otolaryngology - Head & Neck Surgery



BOSTON  
UNIVERSITY

## Abstract

Giant cell tumor is a benign neoplasm that may occur in the spine and is especially rare in the cervical spine. We report a case of a 36-year old male who was found to have a posterior pharyngeal mass during an allergy evaluation. MRI neck with contrast showed a 4.3 x 3.0 x 2.8 cm well-circumscribed mass in the prevertebral space at the level of C2.

This is the first reported case in which robotic surgery was used to successfully excise a cervical prevertebral giant cell tumor. We demonstrate that transoral robotic surgery is a safe and effective method of treatment for selective cervical prevertebral space masses, in particular giant cell tumors.

## Introduction

The prevertebral space (PVS) is situated between the prevertebral fascia anteriorly and the vertebral bodies posteriorly and the carotid sheaths laterally. The PVS extends from the skull base down to the level of the coccyx and includes prevertebral muscles and fat.<sup>1</sup> Diseases in the PVS include primary tumors, direct spread of tumors from adjacent spaces, metastasis, congenital/developmental lesions, inflammation, and infection. Given the PVS is intimately associated with the head and neck region in the cervical spine, the Otolaryngologist may very well encounter masses arising from this location in their clinical practice. We present a case of a patient with a prevertebral mass amenable to transoral robotic surgery (TORS) with Otolaryngology.

## Case Report

A 36 year old male first presented to his primary care physician for post-nasal drip and allergy work-up. A mass in his throat was incidentally noted and he was referred to an outside Otolaryngologist for further evaluation. An outside computer tomographic (CT) neck scan with contrast initially showed a 2.5 x 2.2 x 3.3 cm right posterolateral oropharyngeal mass. MRI neck with contrast showed a 4.2 cm well-circumscribed, homogeneously enhancing ovoid mass at the level of C2 separate of the longus colli muscle without obvious invasion of adjacent structures or osseous destruction (Figures 1-3).

The patient had noted increase in snoring for the last three months. Exam revealed a large, smooth mass occupying approximately 50% of the right posterior pharyngeal wall.

Surgery was recommended given the increasing mass effect and patient's history of worsening snoring. The patient was also referred to Orthopedic surgery for discussion of the potential need for cervical spine repair following resection. Given sparing of vertebral cortical bone, it was felt the patient could proceed safely with Otolaryngology for transoral robotic resection of this soft tissue mass without the need for Orthopedic intervention.

The patient underwent transoral robotic resection of the right prevertebral mass using the daVinci Robot (Intuitive Surgical, Inc.). Needle-tip monopolar cautery was used to make a mucosal incision over the right posterior pharyngeal wall. A 30-degree telescope was used for visualization. Dissection was carried out in an extracapsular plane. The tumor spanned the level of C1 to C4 which correlated to the level of the inferior nasopharynx down to the arytenoids. The wound was irrigated with normal saline and the wound was closed primarily using 3-0 Vicryl interrupted horizontal mattress sutures. The daVinci only for the most inferior sutures.

Patient was started on tube feeds via a Dobhoff tube on post-operative day (POD) 1 for five days, after which the Dobhoff was removed and the patient was started on a full liquid diet. He advanced to a regular diet after discharge. Final pathology demonstrated giant cell tumor for which surgery is the primary treatment modality. He was asymptomatic at his 6 month follow-up.

## Imaging

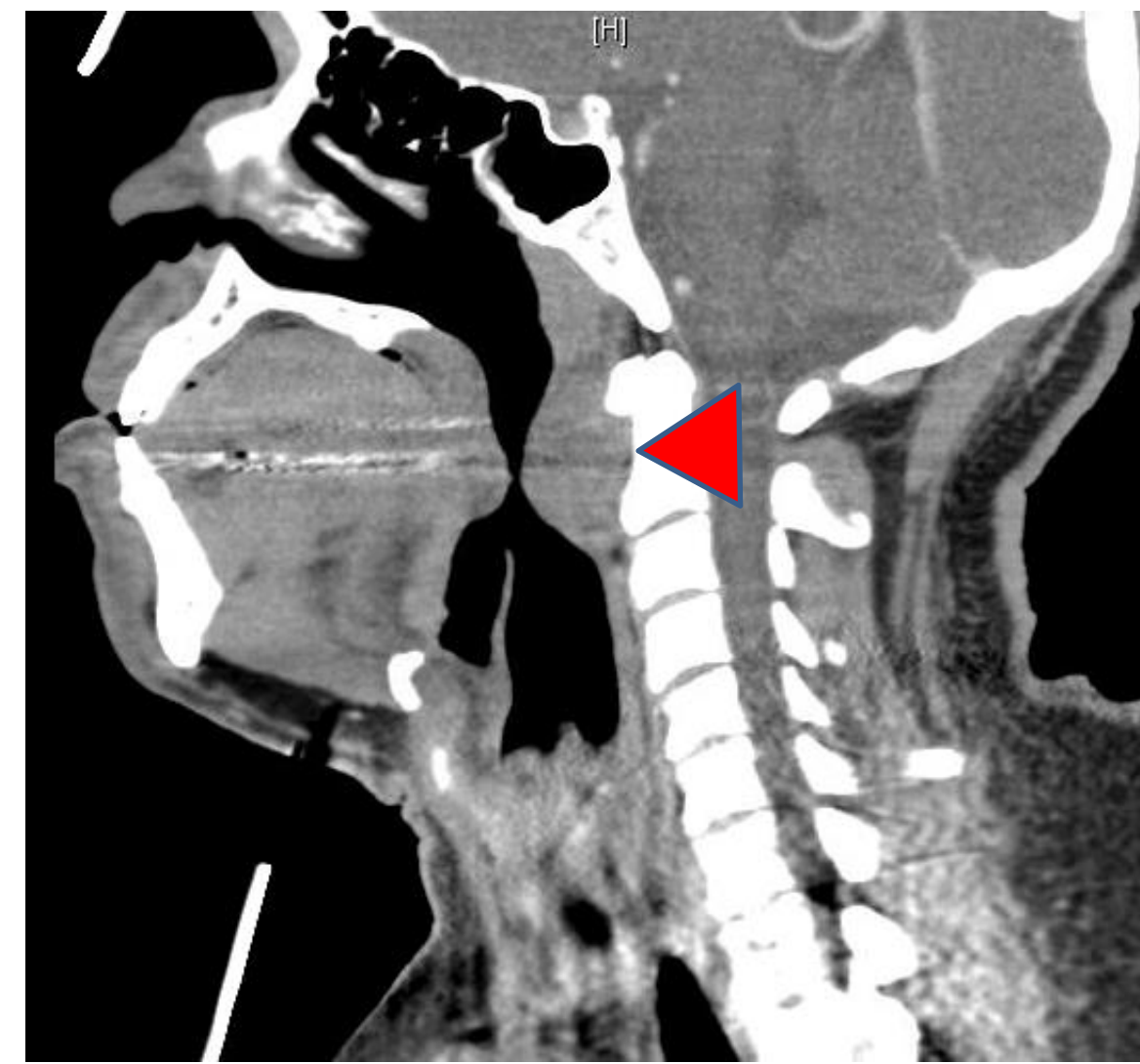


Figure 1. CT neck with contrast with sagittal view, soft tissue window. Arrow marks prevertebral mass.

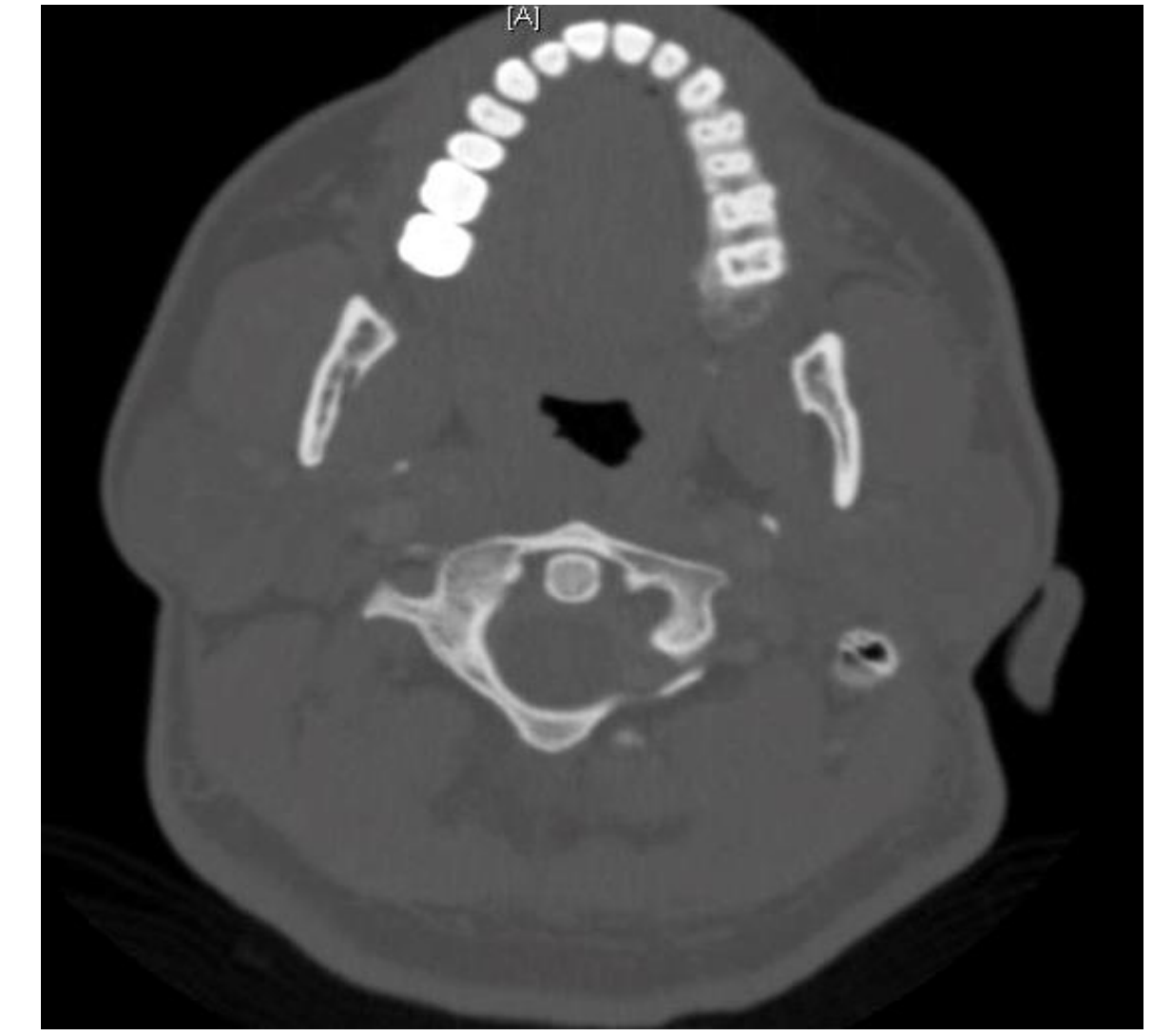


Figure 2. CT neck with contrast with axial view, bone window at the level of C1 and C2. No osseous destruction noted.

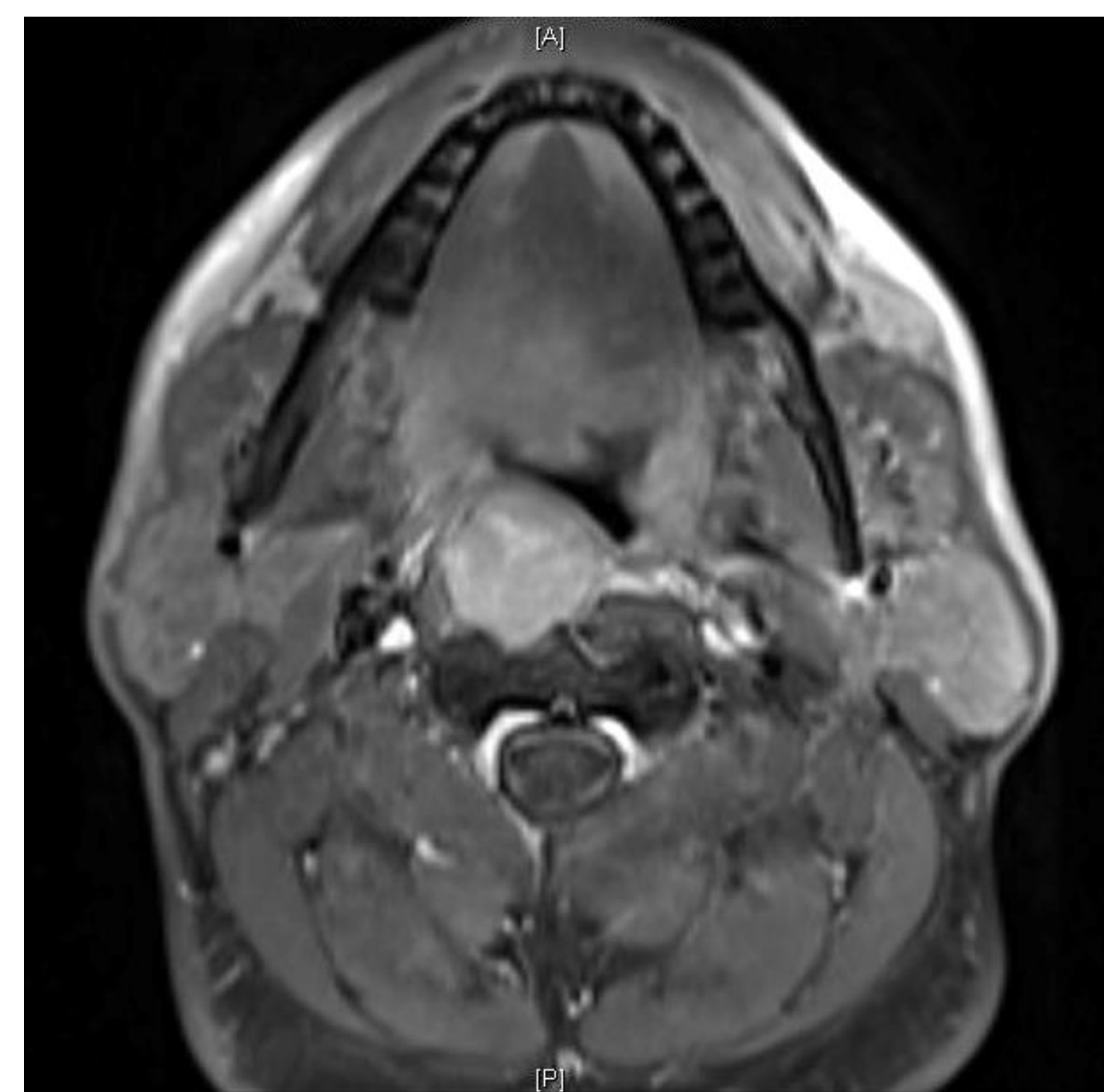


Figure 3. MRI neck with contrast with axial view, T1 post-contrast. There is a 2.6 x 2.7 x 4.3 (transverse x AP x CC) mass in the right prevertebral space at C2 causing anterolateral displacement of the right longus colli and longus capitis muscles.

## Discussion

TORS in head and neck surgery can be used in several sites from the nasopharynx to the hypopharynx. The most common application has been for malignant disease in the oropharynx. Here, we report the first case in which Otolaryngology was able to utilize TORS in resection of a prevertebral mass.

Primary tumors of the PVS include tumors of the longus colli and longus capitis muscles and are predominantly sarcomas. Davis et al. found in a series of 52 patients with para- and prevertebral masses, 29 had a malignancy such as metastases, lymphoma, chordoma, or squamous cell carcinoma by direct invasion. Schwannoma was the most common benign tumor occurring in 5 patients.

If a PVS mass appears benign, however, and there is no need to obtain margins, one can consider TORS. We propose that if the following features are present, one may consider TORS for a prevertebral space mass:

- Mass is visible in the oropharynx, specifically along the posterior pharyngeal wall spanning the level of C1-C4.
- Mass is encapsulated and well-circumscribed.
- There is no bony invasion or significant soft tissue involvement.
- Mass is extramedullary (does not arise from within the spinal cord).

## Conclusions

We demonstrate that transoral robotic surgery is a safe and effective method of treatment for select cervical prevertebral space masses with benign features.

## Contact

Angela C. Tsai, MD  
Boston Medical Center  
Email: angela.tsai@bmc.org

## References

1. Debnam JM and Guha-Thakurta N. Retropharyngeal and Prevertebral Spaces. *Otolaryngol Clin North Am.* 2012 Dec; 45(6): 1293-1310.
2. Davis WL and Harnsberger HR. CT and MRI of the normal and diseased perivertebral space. *Neuroradiology.* 1995 Jul;37(5):388-94.
3. Weinstein GS et al. Understanding contraindications for transoral robotic surgery (TORS) for oropharyngeal cancer. *Eur Arch Otorhinolaryngol.* 2015. 272:1551-1552.
4. Safaee et al. Association of tumor location, extent of resection, and neurofibromatosis status with clinical outcomes for 221 spinal nerve sheath tumors. *Neurosurg Focus.* 2015 Aug;39(2):E5.
5. Luksanapruksa P et al. Management of spinal giant cell tumors. *Spine J.* 2016 Feb;16(2):259-69.
6. Mendenhall WM, Zlotecki RA, Scarborough MT, Gibbs CP, Mendenhall NP. Giant cell tumor of bone. *Am J Clin Oncol.* 2006;29:96-9.