



doi • 10.5578/tt.202404956  
Tuberk Toraks 2024;72(4):295-299  
Received: 01.08.2024 • Accepted: 14.10.2024

## CASE REPORT

# Use of radial endobronchial ultrasonography in the distinction between intraluminal and mixed type tracheal schwannoma: A case report

Ömer AYTEN(ID)  
Cengiz ÖZDEMİR(ID)  
Levent DALAR(ID)

Clinic of Pulmonary Medicine, Liv Vadi İstanbul Hospital, İstanbul, Türkiye

### ABSTRACT

#### Use of radial endobronchial ultrasonography in the distinction between intraluminal and mixed type tracheal schwannoma: A case report

Tracheal schwannomas are exceedingly rare, accounting for a minute fraction of primary tracheal tumors. They are classified into intraluminal and mixed types, with treatment strategies varying significantly between these subtypes. While thorax tomography is usually sufficient to distinguish intraluminal and mixed type, endobronchial ultrasonography (EBUS) can also be used in cases where the distinction cannot be made clearly with tomography. This case highlights the use of bronchoscopic procedures in the diagnosis and treatment of tracheal schwannomas and the role of radial EBUS in guiding clinical management in distinguishing between intraluminal and mixed type tracheal schwannomas.

**Key words:** Tracheal schwannoma; radial endobronchial ultrasonography; intraluminal; mixed

### ÖZ

#### İntralüminal ve mikst tip trakeal schwannom ayırımında radial endobronşiyal ultrasonografi kullanımı: Olgu sunumu

Trakeal schwannomlar son derece nadir tümörlerdir ve primer trakeal tümörlerin çok küçük bir kısmını oluştururlar. Trakeal schwannomlar intralüminal ve mikst tip olarak sınıflandırılır ve tedavi stratejileri bu alt tipler arasında farklılık gösterir. İntralüminal mikst tip ayırımında çoğunlukla toraks tomografisi yeterli olurken tomografi ile ayırımı net yapılamayan olgularda endobronşiyal ultrasonografi (EBUS) kullanılabilir. Bu olguda trakeal schwannomların tanı ve tedavisinde bronkoskopik işlemlerin kullanımı ve intralüminal ile mikst tip trakeal schwannom ayırımında radial EBUS'un klinik yönetime rehberlik etmedeki rolünü vurgulamak istedik.

**Anahtar kelimeler:** Trakeal schwannom; radial endobronşiyal ultrasonografi; intraluminal; mikst

**Cite this article as:** Ayten Ö, Özdemir C, Dalar L. Use of radial endobronchial ultrasonography in the distinction between intraluminal and mixed type tracheal schwannoma: A case report. Tuberk Toraks 2024;72(4):295-299.

### Address for Correspondence

Dr. Ömer AYTEN  
Clinic of Pulmonary Medicine,  
Liv Vadi İstanbul Hospital,  
İSTANBUL-TÜRKİYE  
e-mail: omerayten2002@yahoo.com

This is an open-access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution, and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes (<http://creativecommons.org/licenses/by-nc/4.0/>).

©Copyright 2024 by Tuberculosis and Thorax.  
Available on-line at [www.tuberktoraks.org](http://www.tuberktoraks.org)



## INTRODUCTION

Schwannomas are the most common tumors of the peripheral nerves arising from the peripheral nerves or nerve roots. Among them, tracheal schwannomas are extremely rare, making up only about 1 in 10.000.000 people. Tracheal schwannomas are classified under two headings: Intraluminal and mixed type (extra and intraluminal). The distinction between intraluminal and mixed-type schwannomas is very important in determining the treatment to be applied. While the primary treatment for intraluminal schwannomas is endoluminal treatments, the primary treatment for mixed type schwannomas is surgery along with endoluminal treatments (1). While thorax tomography and magnetic resonance imaging (MRI) are sufficient in most cases to distinguish between intraluminal and mixed type schwannomas, endobronchial ultrasonography (EBUS) is also very useful in cases where the distinction is difficult. In this case, we presented a tracheal schwannoma case in which intraluminal and mixed types were differentiated using EBUS for the first time in the literature.

## CASE

A 23-year-old female patient was admitted to the pulmonology department with progressive shortness of breath and wheeze that started one year ago. The patient was diagnosed with asthma, but her complaints did not improve despite regular use of

inhaled bronchodilators and steroids. She had never smoked and had no characteristics in her medical history. On physical examination, her vital parameters were normal, and she had inspiratory wheezing. In the pulmonary function test (PFT), FEV<sub>1</sub>, FVC and FEV<sub>1</sub>/FVC were measured as 74%, 102%, and 63% (mild obstruction), respectively. Her chest X-ray revealed nodular density in the trachea at the level of the third cervical spinous process (Figure 1). On chest tomography, nodular density with a diameter of approximately 11 x 10 mm was observed in the tracheal lumen (Figure 2). The patient underwent a rigid bronchoscopy. In rigid bronchoscopy, a polypoid

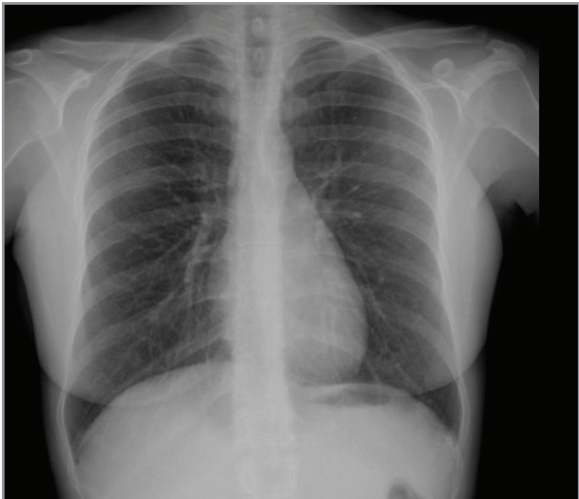


**Figure 1.** Nodular density in the trachea at the level of the third cervical spinous process on chest X-ray.



**Figure 2.** Nodular density appearance in the trachea on axial and coronal computer tomography (CT).

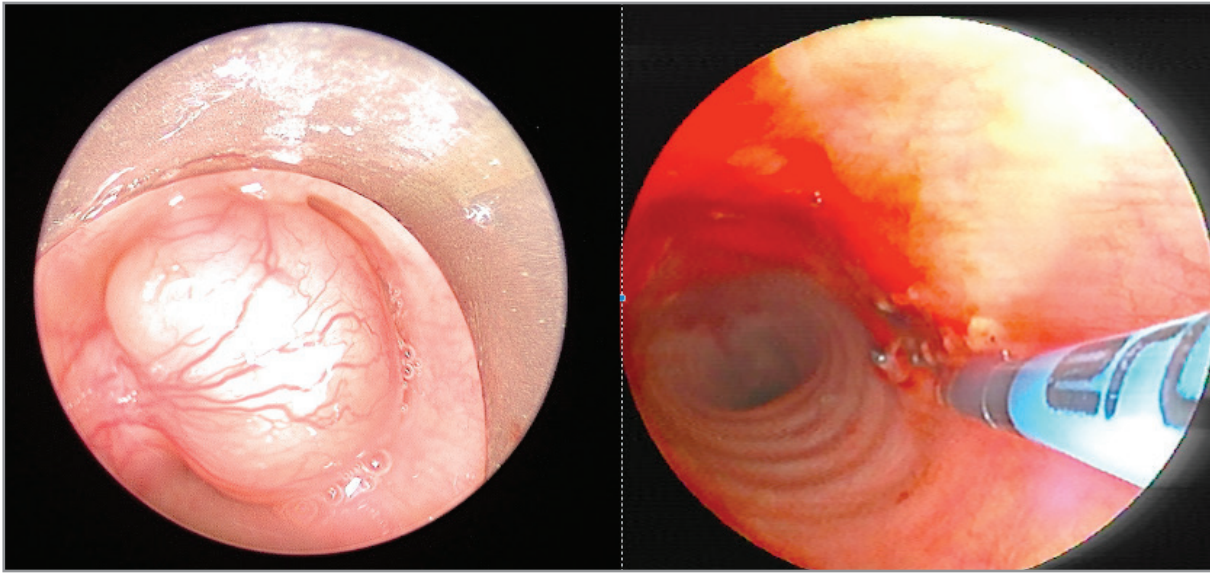


**Figure 3.** Image of polypoid lesion in the tracheal lumen before and after the procedure.

lesion was observed approximately 2.5 cm distal to the cricoid cartilage, narrowing the tracheal lumen by 90%. The polypoid lesion was completely excised and extracted using an electrocautery snare probe then cryotherapy was applied to the base of the lesion (Figure 3). After the procedure, a significant improvement was observed in the patient's symptoms. The pathology result was reported as schwannoma. Two weeks later from the procedure, the patient underwent radial EBUS in order to differentiate

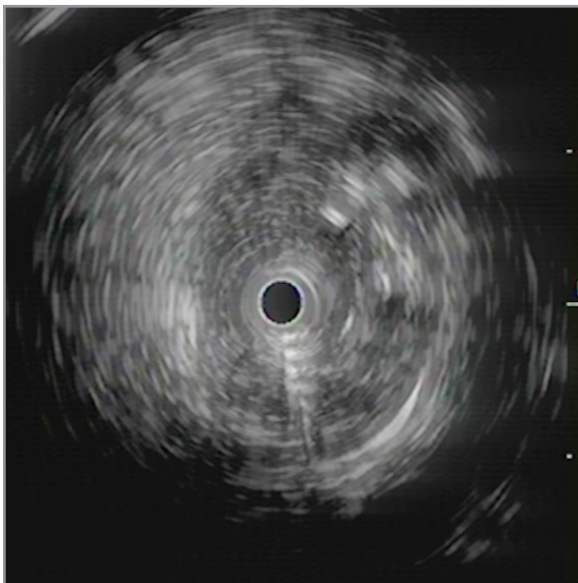


**Figure 4.** EBUS image of invasion of the tracheal wall and adventitial layer.

intraluminal and mixed-type schwannoma. EBUS revealed that the tumor had progressed along the tracheal wall and the adventitial layer was also involved (Figure 4). Final decision is to perform a tracheal resection to the patient with the diagnosis of mixed-type tracheal schwannoma. Now, the patient is waiting for surgery.

## DISCUSSION

Schwannomas are very rare tumors of the trachea. They are generally seen in the distal third of the trachea, more frequently in young adults and women. Tracheal schwannomas are slow-growing tumors and patients may be asymptomatic in the early stages. Cough, wheezing, and shortness of breath are the most common symptoms depending on the location and size of the lesion and the degree of airway obstruction. Most patients are treated with a mistaken diagnosis of asthma, and this causes delays in diagnosis and causes patients to present with more serious airway obstruction symptoms (2). The average time from the onset of symptoms to diagnosis is 17 months (3). Our patient was a young female patient. She started complaining of shortness of breath and wheezing one year ago, used inhaler therapy for a long time with the diagnosis of asthma, and applied to us with severe airway obstruction.

The diagnosis of tracheal schwannomas is made by bronchoscopic biopsy. In lesions that cause significant airway stenosis, excision and extraction of the lesion

via laser or electrocautery snare probe, preferably accompanied by rigid bronchoscopy, is the safest method for both diagnosis and ensuring lumen patency (4). The most important step in determining the treatment to be applied in tracheal schwannomas is to distinguish between intraluminal and mixed type (extra and intraluminal). In this distinction, thorax CT is the most important imaging method in terms of providing information about the presence, size, localization, degree of obstruction, and extra tracheal extension (mixed type) of the lesion. Although thorax MRI is also used in the evaluation of extra tracheal extension, its superiority over CT has not been demonstrated. Routine use of positron emission tomography and CT in tracheal schwannomas is not recommended (1,5). EBUS is a very useful method to demonstrate extra tracheal extension in cases where it is difficult or cannot be distinguished between intraluminal and mixed radiologically. Convex probe EBUS or radial probe EBUS can be used in the evaluation. However, since the radial probe, EBUS frequency is 20 MHz and the penetration depth reaches 4-5 cm, it provides a better evaluation opportunity by providing high-resolution images. Li J et al. showed that radial EBUS has a very high sensitivity of 90% in the evaluation of tracheobronchial wall invasion (6). In our case, the lesion that narrowed the tracheal lumen by 90% was successfully extracted using a snare probe, and full lumen patency was achieved. Cryotherapy was also applied to the base of the lesion. After the pathology result showed schwannoma, radial EBUS was performed on the patient to evaluate extra tracheal extension, as the distinction between intraluminal and mixed could not be made on thorax CT. EBUS showed that the tracheal wall and adventitia were invaded, and the patient decided to undergo surgery. Our case is important as it is the first case in the literature that we know of in terms of the evaluation of extra tracheal extension with radial EBUS in tracheal schwannomas.

It has been shown that in intraluminal schwannomas, extraction of the lesion via laser and electrocautery and subsequent application of cryotherapy to the base of the lesion is an effective treatment and patients can be followed for a long time without recurrence. However, since the risk of recurrence is high in mixed-type schwannomas, the first treatment option is surgery. Bronchoscopic excision and

extraction of the intraluminal component of the lesion and cryotherapy are alternative treatment methods for mixed-type schwannomas that are not suitable for surgery and cannot undergo surgery (7,8).

## CONCLUSION

The distinction between intraluminal and mixed types is very important in determining the treatment to be applied in tracheal schwannomas. The success of bronchoscopic treatments in intraluminal schwannomas is quite high. In mixed-type schwannomas, the primary treatment is surgery. Although thorax CT is sufficient in distinguishing between intraluminal and mixed-type schwannoma in most cases, the use of radial EBUS is very useful in cases where discrimination is difficult.

## CONFLICT of INTEREST

The authors have no conflict of interest to declare.

## AUTHORSHIP CONTRIBUTIONS

Concept/Design: All of authors

Analysis/Interpretation: All of authors

Data acquisition: All of authors

Writing: ÖA

Clinical Revision: ÖA, LD

Final Approval: All of authors

## REFERENCES

1. Hamouri S, Novotny NM. Primary tracheal schwannoma a review of a rare entity: Current understanding of management and follow up. *J Cardiothorac Surg* 2017; 12(1): 105. <https://doi.org/10.1186/s13019-017-0677-2>
2. Alkhars HF, Al Muhaimid T, Al Abdulwahid F, Alharbi MA. Endoscopic excision of primary tracheal schwannoma: A case report. *Am J Case Rep* 2023; 24: e939823. <https://doi.org/10.12659/AJCR.939823>
3. Ge X, Han F, Guan W, Sun J, Guo X. Optimal treatment for primary benign intratracheal schwannoma: A case report and review of the literature. *Oncol Lett* 2015; 10(4): 2273-6. <https://doi.org/10.3892/ol.2015.3521>
4. Kasahara K, Fukuoka K, Konishi M, Hamada K, Maeda K, Mikasa K, et al. Two cases of endobronchial neurilemmoma and review of the literature in Japan. *Intern Med* 2003; 42(12): 1215-8. <https://doi.org/10.2169/internalmedicine.42.1215>
5. Takeda K, Horiuchi M, Nakaya M, Yamaguchi K, Fujikawa A. Schwannoma of the trachea: A new resection technique. *Auris Nasus Larynx* 2003; 30(4): 425-7. [https://doi.org/10.1016/S0385-8146\(03\)00088-9](https://doi.org/10.1016/S0385-8146(03)00088-9)

6. Li J, Chen PP, Huang Y, Chen ZX. Radial probe endobronchial ultrasound scanning assessing invasive depth of central lesions in the tracheobronchial wall. *Chin Med J (Engl)* 2012; 125(17): 3008-14.
7. Gelb AF, Tashkin DP, Epstein JD, Zamel N. Nd-YAG laser surgery for severe tracheal stenosis physiologically and clinically masked by severe diffuse obstructive pulmonary disease. *Chest* 1987; 91: 166-70. <https://doi.org/10.1378/chest.91.2.166>
8. Girard C, Chambonnière ML, Vergnon JM. Diagnostic et traitement d'une tumeur bénigne de la trachée: Un schwannome [Diagnosis and treatment of a benign tracheal tumour: A schwannoma]. *Rev Mal Respir* 2004; 21 (5 Pt 1): 983-8. [https://doi.org/10.1016/S0761-8425\(04\)71480-1](https://doi.org/10.1016/S0761-8425(04)71480-1)