

Case Report

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# Successful Treatment with Radiation Therapy in an Older Patient with Endobronchial Schwannoma

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## Keywords

Bronchoscopy · Endobronchial schwannoma · Radiation therapy · Surgical resection

## Abstract

Bronchial schwannoma is extremely rare, accounting for a small percentage of benign bronchial tumors, with no determined standardized treatment. An 89-year-old woman with a persistent cough underwent CT scan which revealed a tracheal tumor. A diagnosis of endobronchial schwannoma was confirmed based on tissue obtained by high-frequency snare polypectomy. A hybrid stent was implanted in the trachea due to tumor regrowth; however, stent migration occurred, and it was removed after 1 month. Subsequently, radiation therapy was performed, and airway patency was well maintained for over 3 years. In general, surgical resection is recommended for endobronchial schwannoma; however, due to the age of this patient, resection was deemed invasive. Therefore, radiation therapy was administered as an alternative treatment.

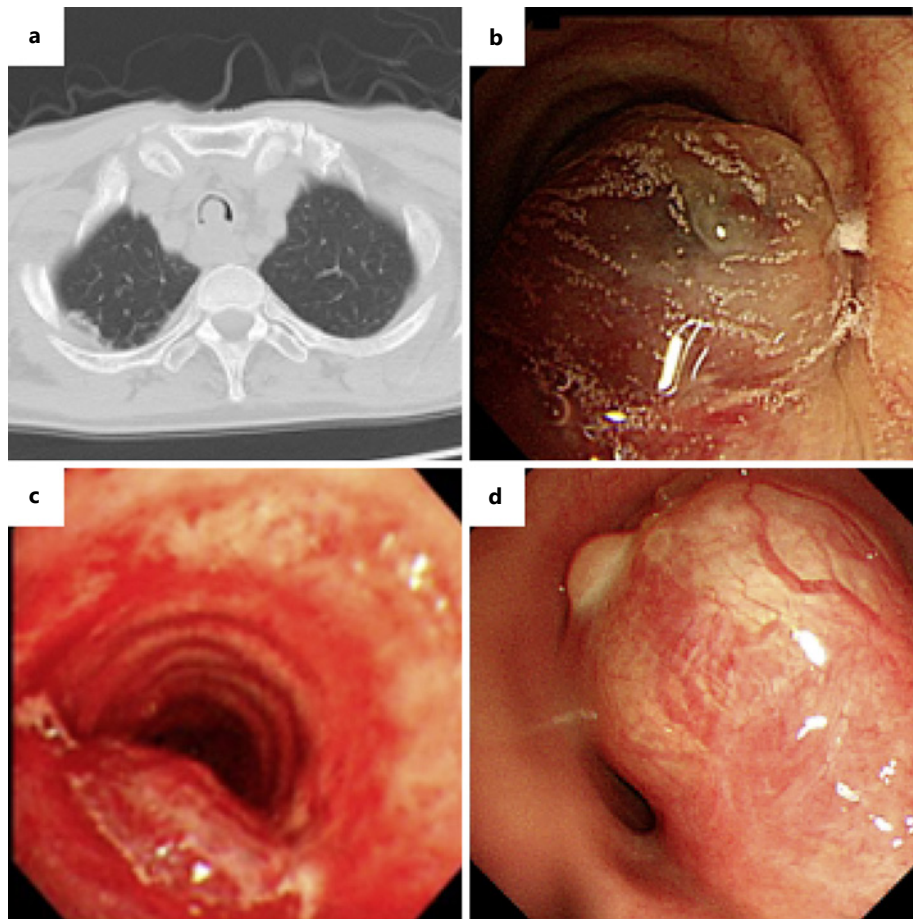
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## Introduction

Bronchial schwannoma is an extremely rare condition that affects a small percentage of benign bronchial tumors. Surgical resection is usually the first choice of treatment, but due to the slow progression of the disease, bronchoscopic resection can also be performed [1].

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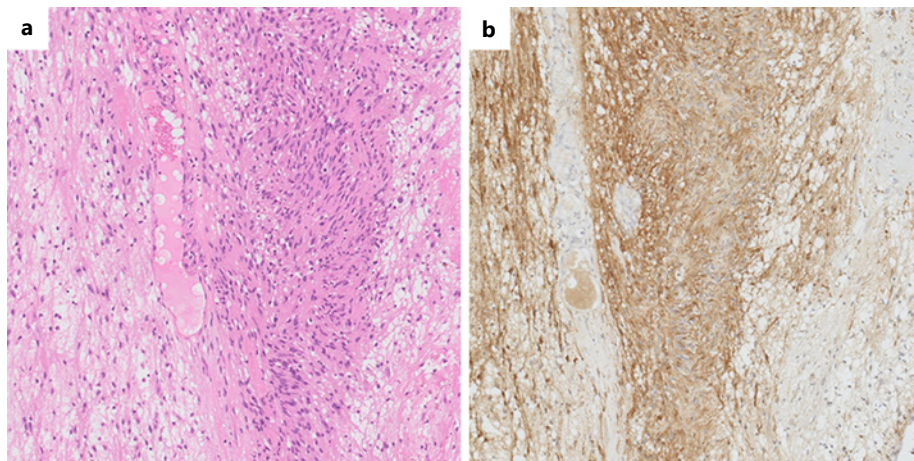


**Fig. 1.** **a** CT scan revealed a tumor in the upper trachea. **b** Bronchoscopic image of the tumor in the upper trachea. **c** Bronchoscopic image after high-frequency snare and APC under rigid bronchoscope. **d** Bronchoscopic image 5 months after intervention revealed a tracheal stenosis due to tumor regrowth.

Radiation therapy has been reported to be useful for auditory nerve tumors among schwannomas, and it is also thought to be useful for bronchial nerve tumors [2]. When there is no determined surgical treatment for bronchial schwannoma, radiation therapy might be a treatment option. In this case, we describe bronchial schwannoma that was successfully treated by radiation therapy. Written informed consent was obtained from the patient for publication of this case report.

### Case Report/Case Presentation

An 89-year-old woman presenting with a cough underwent CT scan which revealed a tumor in the upper trachea (shown in Fig. 1a). She was admitted to our institution for bronchoscopic intervention (shown in Fig. 1b). However, due to her advanced age and the highly invasive nature of surgical resection, high-frequency snare and APC were performed under rigid bronchoscope (shown in Fig. 1c). After bronchoscopic intervention, her symptoms improved; however, 5 months post intervention, she developed dyspnea and subsequent bronchoscopy confirmed a tracheal stenosis due to tumor regrowth (shown in Fig. 1d).



**Fig. 2.** **a** Histopathological findings revealed densely arranged spindle-shaped cells and nuclear palisading formations (HE stain,  $\times 100$ ). **b** Immunohistochemical findings were positive for S-100 protein antibody.

Histopathological findings revealed spindle cells and nuclear palisading formations (HE stain,  $\times 200$ ) (shown in Fig. 2a). Further, immunohistochemical findings were positive for S-100 protein antibody and the MIB-1 index was 10% (shown in Fig. 2b).

High-frequency snare and APC were again performed, and an AERO stent (Merit Medical Systems, South Jordan, UT, USA), 14 mm in diameter and 30 mm in length, was implanted at the site of the tracheal lesion (shown in Fig. 3a). However, 1 month later, tumor regrowth was observed, and stent migration to the distal side of the tumor was confirmed (shown on Fig. 3b). Due to this migration, the stent was removed (shown in Fig. 3c).

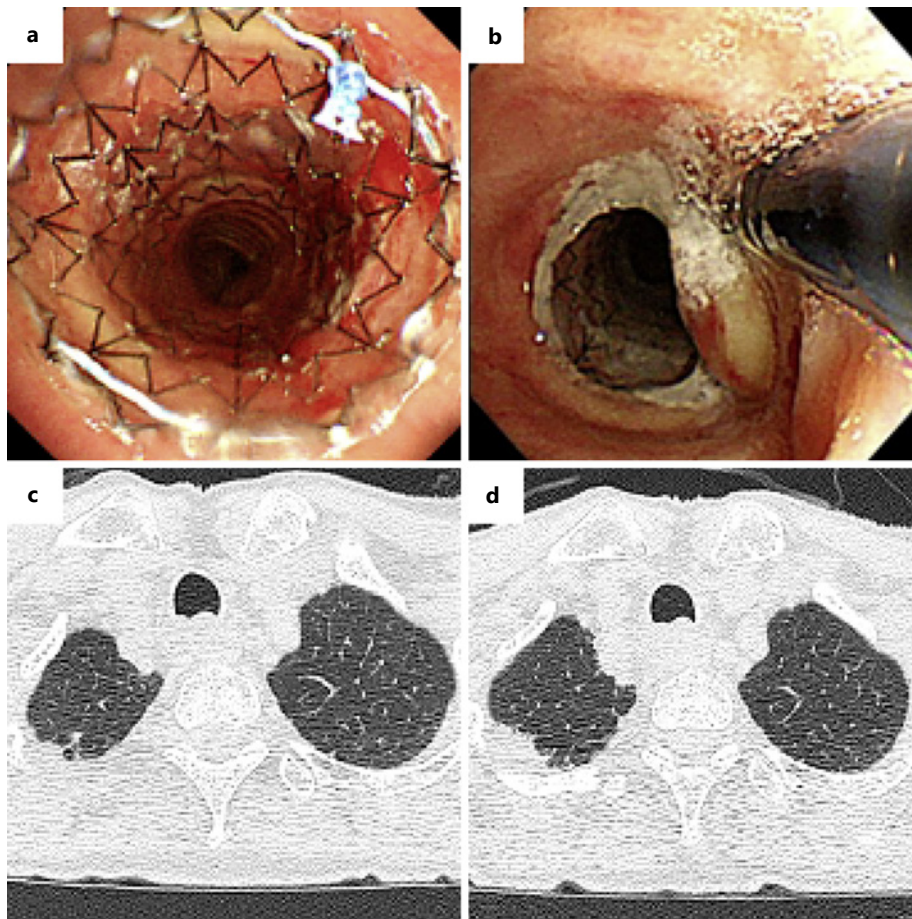
After removal of the stent, we reconsidered surgical resection, but the patient and her family declined surgery due to her advanced age. Subsequently, we consulted with the radiation therapy department, and radiation therapy (60 Gy/30fr) was performed. There has been no recurrence of the tumor over the 3-year follow-up (shown in Fig. 3d).

### Discussion/Conclusion

Endobronchial schwannoma is a rare disease, with no established standard of care [1]. Generally, bronchial intervention or surgery can be used to treat primary bronchial tumors, with surgical resection considered to be the first treatment for primary bronchial tumors.

We previously reported that flexible bronchoscopy was safe for patients over 85 years of age [3]. Bronchoscopic interventions, such as high radiofrequency snare and APC, are less invasive treatments than surgical resection for advanced age patients. Although bronchoscopy is considered useful for diagnosis, resection is associated with a high residual rate and recurrence occurs in around 50% of cases [4–8]. This case revealed a repeated rapid regrowth of tracheal schwannoma with severe airway obstruction. In previous case reports, 3.5–5.0% of the MIB-1 index in schwannoma reported poorer prognosis and rapid recurrence [9]. In this case, the MIB-1 index was 10% and tracheal schwannoma grew rapidly creating a tracheal obstruction. This case involved an older patient nearing her nineties, and therefore, surgical resection was considered high risk.

We approached this case using two treatment options. First, we performed bronchoscopic intervention, which included high-frequency snare resection and APC, as initial



**Fig. 3.** **a** Bronchoscopic image of the implanted hybrid AERO stent. **b** Bronchoscopic image 1 month after stent placement revealed stent migration to the distal side with tumor regrowth. **c** CT image after stent removal due to migration. **d** CT image after radiation therapy. There has been no recurrence of the tumor over the 3-year follow-up.

treatments [10]. However, tumor regrowth occurred, and she was readmitted to our institution. An AERO stent was subsequently implanted, but it was again difficult to control tumor regrowth. Since high radiofrequency snare and airway stenting were ineffective, surgical resection would have been a desirable treatment. However, due to the patient's advanced age, surgery was avoided. It was also deemed high risk for repeated high radiofrequency snare and APC procedures.

Although there are no reports investigating radiotherapy as a treatment for endobronchial schwannoma, there have been reports on the benefits of radiation therapy for vestibular schwannoma using stereotactic radiation therapy and cyberknife [11]. For our case, after receiving radiation therapy, there have been no recurrences of schwannoma for 3 years.

To the best of our knowledge, this report is the first case detailing the effectiveness of radiation therapy in a patient with endobronchial schwannoma. Although surgical resection is recommended in cases of endobronchial schwannoma, bronchoscopic intervention and radiation therapy may be considered in cases of advanced age, due to the less invasive nature of these treatments. Radiation therapy was shown to be a potential alternative treatment to surgical resection.

## Statement of Ethics

The research in this case report was conducted ethically and in accordance with the World Medical Association Declaration of Helsinki. Written informed consent was obtained from the patient for publication of this case report and any accompanying images. Ethical approval is not required for this study in accordance with national guidelines. This retrospective review of patient data did not require ethical approval in accordance with national guidelines.

## Conflict of Interest Statement

The authors have no conflicts of interest to declare.

## Funding Sources

The authors received no funding for this report.

## Author Contributions

Y.N. and H.H. had full access to data in this case report and take responsibility for the integrity and accuracy of data analysis. H.T., T.I., and S.N. contributed to bronchoscopic examination, interventions, and interpretation. Y.N., H.H., T.A., and M.M. contributed to the scientific review and final approval of this manuscript. All authors read and approved the final manuscript.

## Data Availability Statement

All data generated or analyzed during this study are included in this article. Further enquiries can be directed to the corresponding author.

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