

## Interventional treatment of endobronchial hamartomas and lipomas

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**Summary.** *Objective:* Endobronchial benign tumors are rarely seen in lung cancers or in pulmonary benign tumors. In recent years, endoscopic treatment has increasingly been used to treat benign endobronchial lesions. *Methods:* Data from all adult patients diagnosed with a histologically proven endobronchial hamartoma and lipoma were collected between 2009 and 2014 at our clinic in the Yedikule Chest Diseases Education and Research Hospital. *Results:* 9 patients were included in the study; 6 patients were diagnosed with endobronchial hamartoma (66%) and 3 had endobronchial lipoma. Six patients were symptomatic. All patients underwent rigid bronchoscopy and biopsies taken during treatment were diagnostic in all cases. Lesions were mostly located at the lobar bronchus. Seven (77%) cases were successfully treated and there were no complications because of the procedure. Two patients were sent for lobectomy because of inadequate debulking. Recurrence was not seen in any patient. *Conclusion:* Interventional bronchoscopic techniques may be a safe and effective method for diagnosing and treating endobronchial benign tumors.

**Key words:** benign tumors, interventional bronchoscopy, safety

### «INTERVENTI PER IL TRATTAMENTO DI AMARTOMA E LIPOMA ENDOBRONCHIALI»

**Riassunto.** *Obiettivo:* Tra i tumori benigni e maligni del polmone si osservano raramente tumori benigni endobronchiali. Negli ultimi anni c'è stato un aumento nell'utilizzo dei trattamenti endoscopici per trattare le lesioni benigne endobronchiali. *Metodi:* Dal 2009 al 2014, nella nostra clinica, al Yedikule Chest Disease Education & Research Hospital, sono stati raccolti i dati provenienti da tutti i pazienti adulti aventi diagnosi istologiche di lipoma e amartoma endobronchiale. *Risultati:* Lo studio includeva 9 pazienti, 6 avevano diagnosi di amartoma bronchiale (66%) e 3 di lipoma endobronchiale. Sei pazienti erano asintomatici. Tutti i pazienti sono stati sottoposti a broncoscopia rigida e le biopsie effettuate durante il trattamento sono servite come diagnosi in tutti i casi. Le lesioni erano frequentemente localizzate a livello dei bronchi lobari. Sette casi (77%) sono stati trattati con successo senza complicazioni dovute alle procedure. A 2 pazienti è stata fatta una lobectomia a causa di una inadeguata citoreduzione. Non sono state osservate recidive nei pazienti. *Conclusioni:* Le tecniche di interventi bronchoscopici potrebbero essere metodi di diagnosi e trattamento sicuri ed efficaci nei tumori benigni endobronchiali.

**Parole chiave:** tumori benigni, interventi di broncoscopia, sicurezza

## Introduction

Benign tumors originating from the tracheobronchial tree are very uncommon (1). Pulmonary hamartomas are the most common benign tumors of the lung but endobronchial hamartomas are only 1.4–20% of all pulmonary hamartomas (2). In their turn, pulmonary lipomas are rare benign tumors accounting for 0.01% of all bronchial tumors and less than 5% of all benign pulmonary tumors (3).

These tumors can cause irreversible postobstructive pulmonary destruction with respiratory symptoms. Early diagnosis and treatment is very important (4). In recent years, endoscopic treatment has been used increasingly to treat benign endobronchial lesions. In selected cases, therapeutic bronchoscopy is effective, safe, and minimally invasive, offering the possibility of same-day discharge after the procedure (5).

We present the clinical features and results of bronchoscopic treatment on nine cases of benign tumor of the bronchial tree.

## Methods

The study was a retrospective analysis of all adult patients diagnosed with a histologically proven endobronchial hamartoma and lipoma between 2009 and 2014 at our clinic in the Yedikule Chest Diseases Education and Research Hospital. The following data were abstracted: age, gender, presenting symptoms, comorbidities, CXR findings, chest CT findings, bronchoscopic findings, histopathology, treatment, complications, and recurrence.

### *Bronchoscopic intervention*

Bronchoscopic removal was performed on patients with bronchoscopically accessible tracheobronchial tumors when one of the following criteria was met: (i) the tumor had a benign histology on pretherapeutic biopsy; and (ii) bronchoscopic findings or chest CT scans indicated a benign morphology.

Rigid bronchoscopy was performed under general anesthesia using intravenous propofol. After the induction of general anesthesia, patients were intu-

bated with a rigid bronchoscope; then a flexible bronchoscope (EVIS BF 1T240, Olympus, Tokyo, Japan) was introduced through the rigid bronchoscope, and the tumor was evaluated. Endobronchial tumors were removed using an electrocoter snare, cryo, apc or by mechanical removal using the blade of a rigid tube or rigid forceps. The technique for removal depended on the decision of an experienced bronchoscopist (EC).

## Results

Six patients were diagnosed with endobronchial hamartoma (66%) and 3 had endobronchial lipoma. The clinical characteristics of the study subjects are summarized in Table 1. One patient was female (12%) and the others were male (88%). Six patients had respiratory symptoms; shortness of breath (n:4, 44%), cough (n:3, 33%), chest pain (n:1, 12%) and asymptomatic (n:3, 33%). Three patients had comorbidities.

### *Pulmonary function test*

Pulmonary function tests were performed in 6 of the 9 patients before intervention (66%). Four patients had normal lung function, two had a restrictive pattern of lung function.

### *Radiological features*

Chest radiology in the form of a CXR was available for 7 cases. Infiltration (n:2, 22%), volume loss (n:2, 22%) and hilar enlargement (n:2, 22%) was seen frequently. All patients had a CT performed. These CT images revealed endoluminal lesions (n:5, 55%), consolidation (n:3, 33%), or atelectasis (n:3, 33%).

### *Endoscopic features*

Flexible bronchoscopy was performed in 6 cases (66%) and all cases underwent therapeutic bronchoscopy. Specimens obtained during flexible bronchoscopy were diagnostic in 1 (11%) case but samples obtained during rigid bronchoscopy were diagnostic in all cases. In 6 (66%) patients the lesion was located in the lobar bronchus and in 2 (22%) patients in the

**Table 1.** Clinical and radiologic characteristics of the patients.

Characteristics	Patients with endobronchial hamartoma (n: 6.66%)	Patients with endobronchial lipoma (n: 3.34%)	All patients (n: 9)
Male (n)	5 (83%)	3 (100%)	8 (88%)
Age at diagnosis - median (range)	62 (57-72)	60 (52-64)	62 (52-72)
Smoking (n)	4 (66%)	2 (66%)	6 (66%)
<b>Symptom</b>			
Shortness of breath	4 (66%)	-	4 (44%)
Cough	3 (50%)	-	3 (33%)
Chest pain	-	1 (33%)	1 (12%)
Asymptomatic	1 (16%)	2 (66%)	3 (33%)
<b>CXR findings (n=7)</b>			
Infiltration	2 (33%)	-	2 (22%)
Volume loss	2 (33%)	-	2 (22%)
Consolidation	-	1 (33%)	1 (12%)
Hilar enlarge	2 (33%)	-	2 (22%)
No findings	1 (16%)	-	1 (12%)
<b>Chest CT</b>			
Consolidation	2 (33%)	1 (33%)	3 (33%)
Endoluminal lesion	4 (66%)	1 (33%)	5 (55%)
Atelectasis	2 (33%)	1 (33%)	3 (33%)
Ground glass opacity	1 (16%)	-	1 (12%)

main stem bronchus. Four endobronchial lesions were found in the right-side bronchi and five in the left-side bronchi. Endoscopic features of lesions can be seen in Table 2. Eight patients were diagnosed by rigid bronchoscopy and one patient was diagnosed by both rigid and flexible bronchoscopy.

#### *Treatment and outcomes*

Therapeutic bronchoscopy was performed once in 5 patients (55%), twice in 3 cases (33%) and five times in 1 case (11%) to obtain complete debulking. Treatment modalities used during rigid bronchoscopy were electrocoter snare (n=9), cryo (n=4) and APC (n=3). There was no complication because of therapy. Two patients were sent for lobectomy because of inadequate debulking. Recurrence was not seen in any patient.

#### **Discussion**

Interventional bronchoscopic techniques are safe and effective methods for the treatment of endobron-

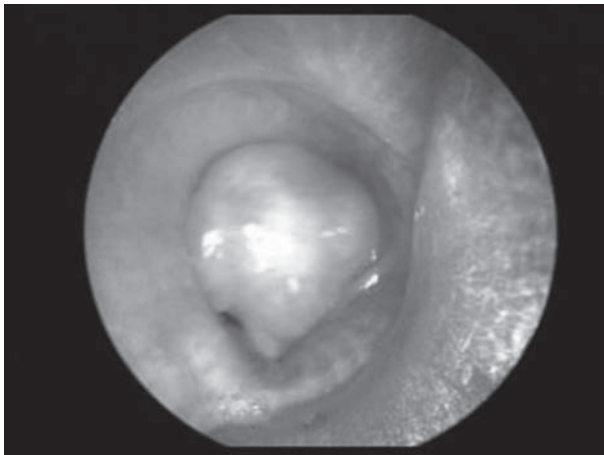
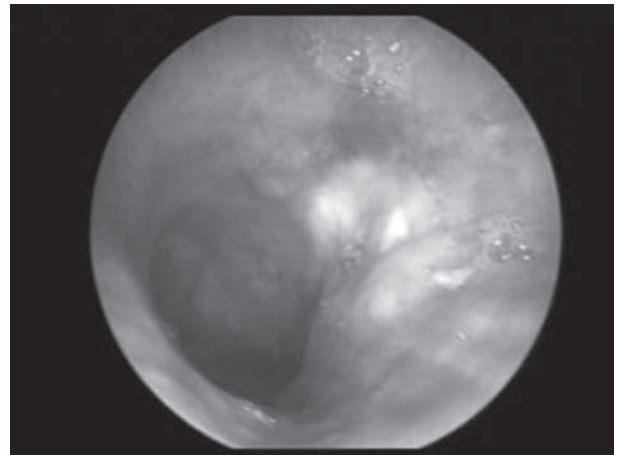
chial benign tumors. In our study 7 (77%) cases were successfully treated and there were no complications because of the procedure. In one study by Su-A. Kim *et al.* 87.5% of patients were successfully treated with bronchoscopic resection and had minimal procedure-related complications (2).

Patients with endobronchial benign tumors generally had at least one respiratory complaint due to bronchial obstruction, such as obstructive pneumonia, hemoptysis, cough, or dyspnea. Sixty-seven percent of our patients had respiratory symptoms and this is similar to some other trials with 74% (2, 3).

Radiological techniques are very important at diagnosis. Chest X-ray can be normal or nonspecific postobstructive changes such as atelectasis or pneumonia may be seen (6). In one trial 80% of patients who had endobronchial lipomas had abnormal chest X-ray (7). As in the literature, 6 out of 7 cases had abnormal chest X-ray (85%) in this study. Again, all patients had CT findings such as endoluminal lesions, consolidation and atelectasis. In our CT reports there was no information to indicate calcification or areas of focal fat in hamartoma patients. In one study,

**Table 2.** Bronchoscopic characteristics and endoscopic treatment modalities of patients.

Characteristics	Patients with endobronchial hamartoma (n: 6.66%)	Patients with endobronchial lipoma (n: 3.34%)	All patients (n: 9)
Location of the lesion			
Main stem bronchus	1 (16%)	1 (33%)	2 (22%)
Lobar bronchus	5 (83%)	1 (33%)	6 (66%)
Segmental bronchus		1 (33%)	1 (11%)
Single/multiple lesions	6/0	3/0	9/0
Endoscopic features			
Mobility			
Pediculated lesion	5 (83%)	2 (66%)	7 (77%)
Sessile lesion	1 (16%)	1 (33%)	2 (22%)
Surface			
Smooth	4 (66%)	3 (100%)	7 (77%)
Lobulated	2 (33%)	-	2 (22%)
Histology obtained at			
Flexible bronchoscopy	1 (16%)	-	1 (11%)
Rigid bronchoscopy	6 (100%)	3 (100%)	9 (100%)
Therapeutic modalities			
Snare	6 (100%)	3 (100%)	9 (100%)
Criyo	2 (33%)	2 (66%)	4 (44%)
APC	2 (33%)	1 (33%)	3 (33%)

**Figure 1.** Endobronchial lipoma.**Figure 2.** After treatment.

these above reported findings were found in 65% of patients (8).

We use electrocoater snare, criyo and APC for treatment and had 77% success. All patients had a diagnosis with rigid bronchoscopy specimens. Huisman *et al.* also had a successful outcome with snare in their endobronchial lipoma cases (9). Nassiri *et al.*

used laser with mechanical debulking in 76.3% of cases and did not see any recurrence at follow-up (3). Any of these procedures can be used for treatment, depending on the choice of the bronchoscopist.

Muraoka *et al.* published a meta-analysis of 64 cases in 2003 (7). In this study treatment included surgical resection in 40 cases and bronchoscopic resec-

tion in 17 cases. They concluded that bronchoscopic treatment should be the first choice, but cautioned that surgical resection may be required if there are atypical features suggesting a possible malignant process or if there is permanent distal damage. Like our study, several studies have shown favorable outcomes from endobronchial treatment techniques with minimal complication rates (1-3, 5).

As a result of all these studies, interventional bronchoscopic techniques seem to be a safe and effective method for diagnosing and treating endobronchial benign tumors.

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