

Role of Endobronchial Electrocautery in Management of Neoplastic Central Airway Obstruction: Initial Experience with Seven Cases

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ABSTRACT

Background. Central airway obstruction (CAO) due to malignant and benign conditions is common. Tumour ablation by various techniques helps effective palliation of symptoms in such patients. Tumour ablation using endobronchial electrocautery (EBEC) with flexible bronchoscope (FB) is an established procedure. However, there is paucity of data from India on this topic.

Methods. EBEC was performed in seven patients with CAO; six of these patients had malignant (non-small cell carcinoma) and one had benign aetiology (tracheal fibro-epithelial polyp) as the cause of CAO. Pre- and post-procedure assessment was done with the help of Speiser's symptomatic scoring.

Results. Mean age of the patients was 52.9 ± 7.0 years; there were five males. All the patients had symptomatic relief after the procedure; in five of them the improvement in symptom scores was significant. No major complication was encountered in any patient.

Conclusions. EBEC can be a safe, effective and cost-effective tool for palliation in patients with benign or malignant CAO. It is especially beneficial for centres where cost of bronchoscopic laser and cryotherapy is prohibitive.

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Key words: Electrocautery, Endobronchial, Flexible bronchoscopy.

INTRODUCTION

Obstruction of trachea and main bronchi, called central airway obstruction (CAO), is common in patients with benign or malignant involvement of airways. In fact, more than 50% of lung cancers involve central airways¹ in the form of bulky endobronchial disease, endobronchial extension or extrinsic compression of airways by the tumour or lymphadenopathy. Such patients have respiratory symptoms due to CAO, such as shortness of breath, haemoptysis and cough. These patients are also more prone to have recurrent pneumonias. Some of these patients may benefit from endobronchial intervention as part of management of their disease. Endobronchial electrocautery (EBEC) can be used as a tool for effectively debulking the tumours and, thus, relieve CAO. It is especially well suited to the patient requiring local palliation with immediate relief of airway obstruction. We present our

experience of seven patients with CAO due to tumours of airway, managed by EBEC.

MATERIAL AND METHODS

From September to November 2011, seven patients with CAO due to tumours of the airways underwent bronchoscopy and EBEC using Olympus BF 1T 150 flexible bronchoscope in the Department of Pulmonary Medicine, Himalayan Institute of Medical Sciences, Dehradun, Uttarakhand, India. The severity of CAO was assessed before the procedure by chest radiography, bronchoscopy and if necessary, computed tomography (CT) of thorax. A written informed consent was obtained from all the patients. In five patients, the procedure was performed under sedation (midazolam and fentanyl as per protocol) and local anaesthesia (pre-procedure 4% xylocaine nebulisation and instillation of 2% xylocaine through working channel of bronchoscope). In two patients, the procedure was performed under general

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anaesthesia due to the lower respiratory reserve and a need for better airway control.

After assessment of the lesion with flexible bronchoscope and decision for EBEC, the lesion was cauterised with the help of electrocautery probe (Bipolar hemostatic catheter, Boston Scientific) or snare (Olympus, SD-5L). Adrenaline instillation (1 mL of 1: 10000) or cold saline instillation was used to control bleeding if required during the procedure. The cauterised tissue was removed in between with the help of alligator forceps (Olympus). Care was taken to avoid touching the cautery probe with normal airway mucosa. Frequent suctioning was done to prevent accumulation of smoke inside the airways. Fogarty balloon (5 or 6 French size) through the working channel of bronchoscope was used, when required, to dilate airways and stop bleeding. Pre- and post-procedure symptom score was analysed by using Speiser score.² The scores were compared by paired-t test using Statistical Package for the Social Sciences (SPSS) (version 17).

RESULTS

Seven patients (5 males) underwent the procedure. Six patients had malignant (non-small cell carcinoma) and one had benign aetiology (tracheal fibroepithelial polyp) as the cause of CAO. The patient characteristics, level of obstruction and the procedure are given in table 1. Their mean age was 52.9 ± 7.0 years. All the patients had more than 50% obstruction of the lumen. Three patients had left main bronchus obstruction and two had right main bronchus growth. The chest radiograph, bronchoscopic view before and after the procedure in one of the patients with left main bronchus obstruction (Patient No. 3, Table 1) are shown in figures 1 and 2, respectively.

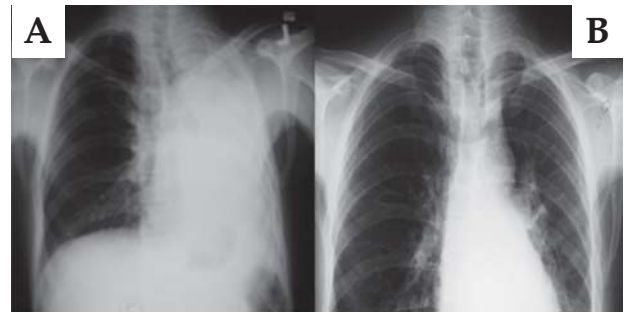


Figure 1. Chest radiograph (postero-anterior view) of Patient No. 3 before (A) and after (B) the EBEC tumour debulking.



Figure 2. Bronchoscopic view of Patient No. 3 before (A) and after (B) the procedure.

One patient had a large growth at carina extending in to both the main bronchi (Patient No. 2 in Table 1) and one patient had a large polyp in the upper trachea (Patient No. 1 in Table 1, Figure 3). Pre- and post-procedure Speiser's scores are given in table 2. A significant improvement in Speiser's score was observed in five of the seven patients. We observed significant reduction in the scores of dyspnoea, cough, haemoptysis, pneumonia and obstruction for most of the patients (Table 2). The total score showed a difference ranging from 2-16 [mean+standard deviation (SD), 9.85 ± 5.27 ; 95% confidence interval

Table 1. Patient characteristics, location of lesion, aetiology and complications

Patient No.	Age (in years)	Gender	Level of Obstruction	Aetiology (based on Histopathology)	Procedure Done	Complications
1	40	Female	Upper trachea	Benign polyp	Polypectomy by cautery snare	Nil
2	52	Female	Carina and both main bronchi	Bronchogenic cancer	Tumour debulking	Mild bleeding
3	52	Male	Left main bronchus	Bronchogenic cancer	Tumour debulking	Nil
4	50	Male	Left main bronchus	Bronchogenic cancer	Tumour debulking	Nil
5	60	Male	Right main bronchus	Bronchogenic cancer	Tumour debulking	Nil
6	55	Male	Left main bronchus	Bronchogenic cancer	Tumour debulking	Mild bronchospasm
7	61	Male	Right main bronchus	Bronchogenic cancer	Tumour debulking	Nil

(CI) 4.97-14.73; $p=0.003$]. Change in obstruction scores ranged from 0-8 (mean \pm SD, 4.14 \pm 2.91; 95% CI 1.45-6.83; $p=0.009$).

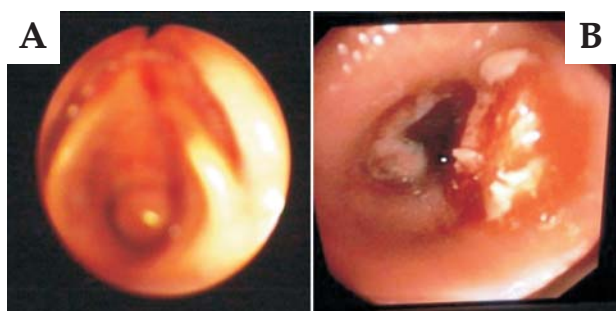


Figure 3. Bronchoscopic view of Patient No. 1 before (A) and after (B) removal of tracheal polyp by EBEC snare.

EBEC=Endobronchial electrocautery

Table 2. Pre- and post-procedure Speiser's scores²

Patient No.	Pre-procedure Scores						Post-procedure Scores					
	Dyspnoea	Cough	Haemoptysis	Pneumonia or Elevated Temperature	Obstruction Score	Total Score	Dyspnoea	Cough	Haemoptysis	Pneumonia or Elevated Temperature	Obstruction Score	Total Score
1	4	4	0	0	10	18	0	0	0	0	2	2
2	3	4	4	2	12 (6+6)	25	2	1	2	2	6 (3+3)	13
3	4	3	3	0	10 (6+4)	20	1	1	0	0	3	5
4	4	3	0	0	10 (6+4)	17	3	2	0	0	10 (6+4)	15
5	3	2	3	0	12 (6+6)	20	2	2	2	0	10 (6+4)	16
6	2	3	2	2	10 (6+4)	19	0	1	0	0	7(3+4)	8
7	4	3	2	0	12 (6+6)	21	2	1	0	0	9 (3+6)	12

Though two patients (Patient No. 4 and 5, Table 1) did not show a significant improvement in the total/obstruction score (difference less than mean score), they had symptomatic improvement as reflected by decrease in dyspnoea scores. No major complication was observed during the procedure. Mild bronchospasm in one patient, possibly due to the smoke produced during cautery, was controlled by levalbutamol (1.25 mg) and ipratropium (0.5 mg) instillation through bronchoscope's working channel. Mild bleeding during the procedure was easily controlled by cautery coagulation, adrenaline instillation and balloon compression.

DISCUSSION

CAO due to tumours of airway, especially malignant, is very common.¹ Conventional management of lung cancer comprises of surgery, chemotherapy, radiotherapy or a combination of two or more of these modalities depending on the tumour, node, metastasis (TNM) staging for non-small cell lung cancer. However, the outcome with these modalities is measured in terms of treatment outcomes, 5-year survival and recurrence rates. But, in patients with

endobronchial disease, other parameters like quality of life, dyspnoea indices and symptom free survival also need to be evaluated. Many studies have shown not only symptom free survival but also improved overall survival with the use of endobronchial management techniques.³⁻⁵

Various techniques comprising Nd-Yag laser, argon plasma coagulation, cryotherapy, stent placement and electrocautery can be used for endobronchial symptom management. Each modality has its own advantages and disadvantages. Electro-cautery has its advantages in terms of low cost, ease of availability and ability to snare pedunculated lesions. Its disadvantages include contagious mode of action, risk of airway fire and perforation a haemoptysis due to probing and eschar removal.

We could successfully palliate all seven patients without any major or life-threatening complications. Few studies have documented the utility of this procedure in published studies. The safety and efficacy of electrocautery for the management of endobronchial lesions has been reported by Coulter *et al.*⁶ Use of EBEC and other modalities in benign endobronchial lesions is well summarised in another review article.⁷ A case of endobronchial hamartoma, successfully managed with electrocautery has been reported from India.⁸ We successfully used EBEC to snare resect a benign fibro-epithelial polyp of upper trachea.

EBEC appears to be a safe and effective tool to palliate symptoms of benign as well as malignant endobronchial involvement. Its efficacy and safety needs to be studied by larger studies in Indian context to promote its use in diseases of central airways.

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