Clinical outcomes of bronchoscopic cryotherapy for central airway obstruction in adults: 11-year experience of single center

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Background

Although bronchoscopic cryotherapy (BC) is a pragmatic modality for recanalization of central airway obstruction (CAO), the risk of bleeding complications is still the concerning point. This study aimed to present the clinical outcomes of BC and evaluate the factors associated with complication.

Methods

In this retrospective study, we reviewed the medical records of patients who underwent BC for CAO at Asan Medical Center, South Korea. Most sessions were conducted via flexible bronchoscopy under moderate sedation with local anesthesia. A multivariate logistic regression analysis was used to identify risk factors for complication.

Results

A BC was performed 262 sessions in 208 patients between January 2009 and December 2020. The most common cause of cryotherapy was recanalization of endobronchial tumor related CAO (233 of 262, 88.9%). More than partial reestablishment of airway patency were achieved in 212 out of 233 sessions (91.0%), symptoms relief after cryotherapy was found in 83 out of 110 sessions (75.5%), and a recurrence was reported in 72 of 233 sessions (30.9%). Most common complication was intrabronchial bleeding (78 of 233, 35.5%), but severe bleeding occurred only in 1 case (0.4%). One patient died of severe bleeding and respiratory failure after cryorecanalization. Univariate and multivariate logistic regression analysis revealed that diabetes mellitus (OR 2.466, 95% CI 1.136-5.353, p=0.022) and respiratory failure before BC (OR 3.046, 95% CI 1.015-9.139, p=0.047) were independently associated with moderate to severe complication, while histologic type of tumor was not related to bleeding. BC for CAO caused by blood clot or foreign body was successful in all cases, and there were no complications.

Conclusions

Bronchoscopic cryotherapy is an efficient and relatively safe interventional procedure for patients with CAO. Our finding suggested that diabetes and respiratory failure before cryotherapy might be a risk factor of moderate to severe bleeding complication.

Figure 1. Cryotherapy for endobronchial metastasis of renal cell carcinoma. A, huge exophytic tumor mass in left upper lobe bronchus (white arrow); B, freezing and extracting the tumor mass with cryoprobe; C, left upper lobe bronchus after cryotherapy; D, extracted tumor mass.

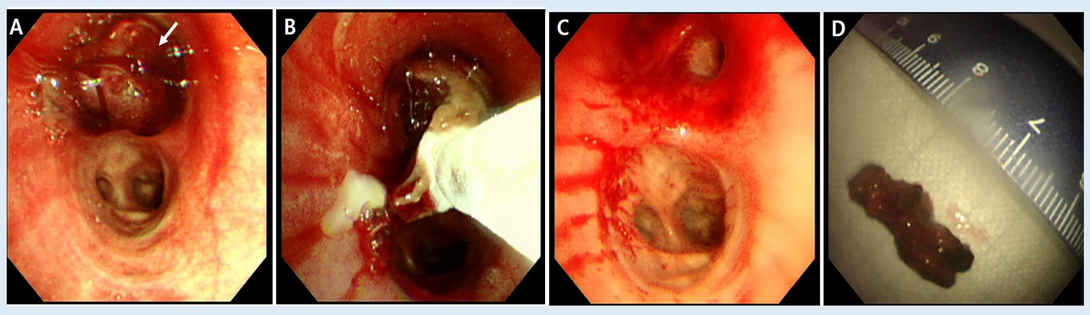

Table 1. Univariate and multivariate analyses of factors associated with moderate to severe complication rate (n sessions=240).

	Univariate analysis		Multivariate analysis	
	OR (95% CI)	P value	OR (95% CI)	P value
Female sex	1.227 (0.626–2.402)	0.551		
Old age (≥75)	2.646 (1.067–6.565)	0.036	2.131 (0.807–5.628)	0.127
Smoking history (≥30PYS)	0.872 (0.491–1.549)	0.641		
FEV1<50%	1.464 (0.635–3.378)	0.371		
Comorbidity				
DM	2.235 (1.124–4.446)	0.022	2.466 (1.136–5.353)	0.022
HTN	2.045 (1.103–3.791)	0.023	1.564 (0.782–3.126)	0.206
Stroke history	2.714 (0.534–13.800)	0.229		
Ischemic heart disease	0.988 (0.254–3.843)	0.986		
COPD	1.477 (0.798–2.734)	0.214		
Location				
Trachea & carina	Reference			
Rt. main	0.799 (0.375–1.702)	0.561		
Lt. main	0.822 (0.356–1.900)	0.647		
Upper lobe	0.305 (0.092–1.003)	0.051	0.300 (0.087–1.032)	0.056
Middle lobe	2.056 (0.377–11.213)	0.405		
Lower lobe	0.685 (0.232–2.022)	0.493		
Etiology				
NSCLC	Reference			
SCLC	0.500 (0.057–4.422)	0.533		
Meta of thyroid cancer	2.500 (0.595–10.510)	0.211		
Meta of colon cancer	0.417 (0.049–3.578)	0.425		
Meta of RCC	0.741 (0.309–1.775)	0.501		
Meta of HCC	2.500 (0.595–10.510)	0.211		
Benign	0.833 (0.307–2.260)	0.720		
Other malignancy	0.667 (0.208–2.138)	0.495		
Stent placement	2.800 (0.870–9.016)	0.084	2.542 (0.727–8.889)	0.144
Rigid bronchoscopy	1.216 (0.523–2.826)	0.650		
ECMO apply	1.183 (0.351–3.980)	0.786		
Respiratory failure before BC	3.767 (1.341–10.578)	0.012	3.046 (1.015–9.139)	0.047

Disclosure of Conflict of Interest

All authors declare no potential conflicts of interest.

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