

Prospective and retrospective study of bronchoscopic electro cauterization versus argon plasma coagulation as a palliative management for patients with bronchogenic carcinoma

Abstract

One of the main Indications for therapeutic endoscopic treatment is palliation of advanced cancerous lesions. Which is mainly for the relief of dyspnea due to central airway obstruction, and the pre-operative evaluation should confirm that the lung beyond the obstruction is viable and that dyspnea is effectively related to the obstruction.¹ In this study we recommend that the role of therapeutic bronchoscopy should be used by chest physicians as a safe and effective method in management of patients with central malignant airway obstruction.

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Introduction

Endo bronchial electro surgery is used to remove endo bronchial lesions in the trachea and bronchial tree, using either a rigid or a flexible bronchoscope. The thermal property of electric current is used to destroy tissue or coagulate bleeding sites.

Many terms are used to describe the use of heat for tissue destruction as: Electrosurgery, electrocautery, electrotherapy and surgical diathermy. We specifically use the term electrocautery (EC) to describe the electrosurgical effect that requires contact between probe and tissue for the conduction of electric current ionizes air resulting in tissue destruction or hemostasis or both.²

Argon plasma coagulation (APC) is a relatively recent electrosurgical method whereby there is argon gas ionization by an electric current to create a noncontact, homogeneous “bridge” for tissue coagulation or ablation.³ Both EC and APC are effective methods for tissue coagulation and ablation.⁴

The aim of the study is to compare between the two interventions (electrocauterization and argon plasma coagulation) as a palliative treatment for bronchogenic carcinoma by both clinical study and investigations including pulmonary function tests and radiological findings.

Materials and methods

This is a study was carried out in the Chest department at Tanta University Hospitals from May 2012 to December 2012 on 20 cases.

Inclusion criteria

To be eligible for the study, patients had to have:

- i. Endo bronchial tumor which its main component is endo luminal present in the proximal main or lobar bronchi and proved to be Non-Small Cell Lung Carcinoma (NSCLC) by histopathological examination of stage IIIA or IIIB according to the AJCC staging.⁵
- ii. In good general health without clinically significant medical history.
- iii. No prior chemotherapy or radiotherapy.

Exclusion criteria

- i. Patients with respiratory or heart failure.
- ii. Patients with renal or liver failure.
- iii. Patients with bleeding disorders.
- iv. Patients with past history of allergic disorders to anesthetic drugs.
- v. Patients with grade I,II, IV of bronchogenic carcinoma.

Included patients were classified into 2 groups:

Group 1: Included 10 patients and they were managed by palliative electrocautery.

Group 2: Included 10 patients and they were managed by palliative Argon Plasma Coagulation.

The number of therapy sessions was ranged from one to four sessions (15-40minutes each), with one week interval between each session.

Preoperative fasting

Solid food should be avoided for 8hours preoperatively to allow

sufficient time for gastric emptying. But liquid ingestion could be allowed up to 2 hours preoperatively.

Premedication⁷

Regular cardiovascular medication including antihypertensive drugs also respiratory medication should be continued until the day of intervention. Also intravenous atropine 0.5mg could be given immediately prior to the intervention.

Monitoring⁷

Intraoperative monitoring including pulse, oxygen saturation, electrocardiography, and intermittent noninvasive measurement of blood pressure.

Anesthetic technique⁷

For interventional flexible bronchoscopy we used intravenous anesthesia consisting of hypnotic "midazolam" and analgesia "fentanyl".

Ventilatory support during fiber optic bronchoscopy⁸

Ventilatory support was done by connector tube which has 3 ends, one connected to EndoTrachealTube and the second connected to mechanical ventilator and last end through which Fiberoptic Bronchoscope introduced.

Follow up⁹

- i. Symptoms were recorded and scored before treatment then one week after treatment using the Speiser symptom score.¹⁰
- ii. Chest radiograph was done 1 week after bronchoscopic session for evaluation of re-expansion of atelectasis and prognosis of post obstruction pneumonia.
- iii. Pulmonary function tests and arterial blood gases were done 1 week after bronchoscopic session for prognosis of endo-bronchial obstruction (Figure 1-8).

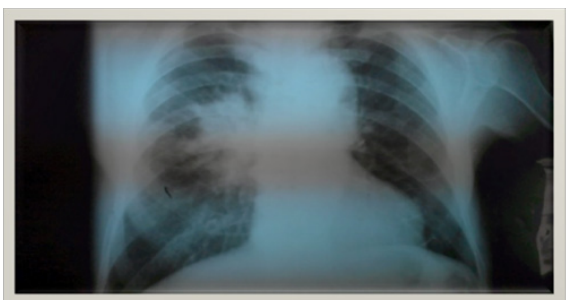


Figure 1 Showing a case with right central mass associated with post obstructive pneumonia.



Figure 2 Showing reduction in the size of the mass with improvement in pneumonia after the application of electrocautery.

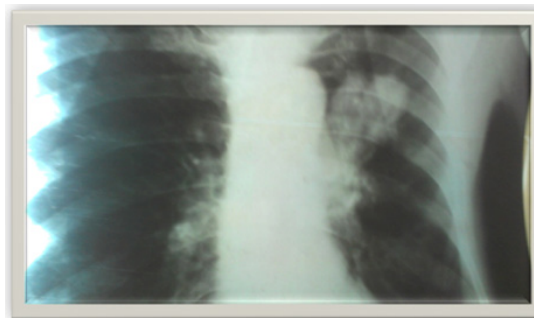


Figure 3 Show left apical mass.

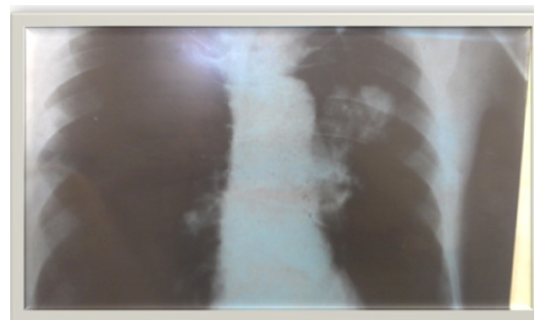


Figure 4 Show improvement after application of argon plasma coagulation



Figure 5 Show left lower mass with collapse.



Figure 6 Show improvement after electrocautery.

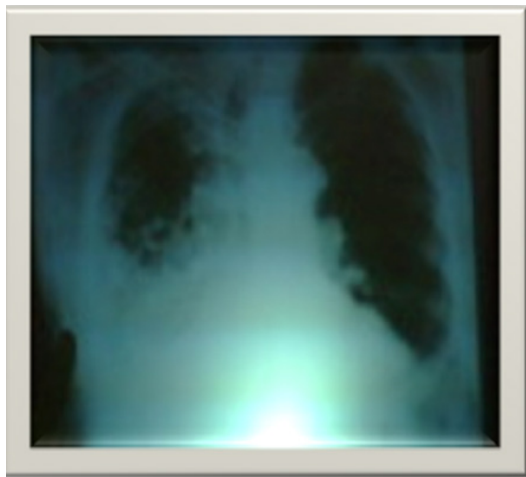


Figure 7 Show right lower mass with collapse.



Figure 8 Show improvement after application of argon plasma coagulation.

Clinical results

Statistical presentation and analysis of the present study was conducted, using the mean, standard deviation and chi-square test by SPSS (statistical package for social sciences) V.16.

After application of bronchoscopic electrocautery on the included patients in group I. And argon plasma coagulation on the included patients in group II our study results showed that: There was a significant difference as regards control of hemoptysis between the 2 groups as group (II) show more control in hemoptysis than group (I). But there was no significant difference between the 2 groups as

regards improvement of other symptoms as cough, dyspnea and fever (Table1).

There was no significant difference in the comparison between the 2 groups as regards ventilatory function tests before bronchoscopic therapy and 1week after. But there was a significant difference in the results of each individual group as regards ventilatory function tests for its included patients before bronchoscopic therapy and 1week after (Table 2).

There was no significant difference between the 2 groups as regards post treatment complications (Table 3).

Table 1 comparison between the 2 groups according to symptoms before bronchoscopic therapy and 1 week after it

Symptoms	Group (I) number of improved patients/patients having symptoms No (%)		Group (II) number of improved patients/patients having symptoms No (%)		P value
	I week after	Before treatment	I week after	Before treatment	
Cough	06-Oct	10/10(100%)	07-Oct	10-Oct	0.085
	-60%		-70%	-100%	
Hemoptysis	05-Sep	09-Oct	06-Aug	08-Oct	0.048*
	-55.50%	-90%	-75%	-80%	
Dyspnea	06-Oct	10-Oct	07-Oct	10-Oct	0.085
	-60%	-100%	-70%	-100%	
Fever	05-Jul	07-Oct	04-Jun	06-Oct	0.057
	-71.40%	-70%	-66.60%	-60%	

Table 2 Comparison between the 2 groups according to ventilatory function tests before bronchoscopic therapy and 1 week after it

Ventilatory- unction test	Group(I)	Group(II)	P Value
FEV1% Mean ±SD			
Pre-treatment	45.9±11.9	65.9±7.01	0.051
1 week-after	60.5±11.24	74.10±6.52	0.068
P value	*0.009	0.003*	
FVC%mean±SD			
pre- treatment	57.8±10.83	72.4±5.52	0.059
1 week- after	70±8.62	79.10±5.28	0.063
P value	0.002*	0.020*	

Table 3 Comparison between the 2 groups according to post treatment complications

Complications No (%)	Group(I)	Group(II)	P value
No -complications	8(80%)	9(90%)	0.966
Heamoptysis	1(10%)	1(10%)	0.999
Pneumothorax	1(10%)	0(0%)	
Esophegitis	0(0%)	0(0%)	
Pneumonia	0(0%)	0(0%)	

Discussion

When the airway obstruction is mainly endoluminal, endoscopic debulking provides immediate and safe relief of symptoms. This may be achieved by various techniques including electrocautery and argon plasma coagulation.¹¹ It is clear from the available data that electrocautery and argon plasma coagulation are effective and safe procedures as palliative therapy for endobronchial obstruction.¹² Morice et al.,¹³ demonstrated that there was an immediate improvement in chest symptoms after tumor destruction in all patients. With marked improvement in dyspnea immediately after endobronchial tumor debulking in 37 cases (53%). Kvale et al.,¹⁴ showed immediate relief of dyspnea with electrocautery in 55 to 75% of patients. Sawang et al.,¹⁵ reported that all the included patients showed significant improvement of symptoms including hemoptysis. Hossni et al.,¹⁶ reported that improvement of pulmonary function tests (PFT) in the included patients after application of bronchoscopic electrocautery were FVC 15.8%±6.6 and FEV1 12.6%±4.9.¹⁶ Rajif et al.,¹⁷ reported that most of included patients with central airway obstruction showed improvement after bronchoscopic electrocautery as regards clinical manifestations and pulmonary function tests. Crosta et al.,¹¹ demonstrated that no dangerous complications among the included patients have been observed. Sutedja et al.,¹⁸ reported that no lethal complications related to the bronchoscopic electrocautery treatment and no episodes of respiratory failure.

Conclusion

The role of therapeutic bronchoscopy should be kept in mind among chest physicians as a safe and effective method in management of patients with central malignant airway obstruction. Application of bronchoscopic techniques as electrocautery and argon plasma

coagulation should be considered in other fields as benign airway obstruction and as a curative therapy in early malignant lesions.

Acknowledgements

None.

Conflict of interest

The author declares no conflict of interest.

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