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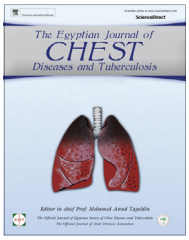

CASE REPORT

Bronchoscopic electrocauterization versus argon plasma coagulation as a palliative management for patients with bronchogenic carcinoma

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KEYWORDS

Electrocauterization;
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Abstract One of the main indications for therapeutic endoscopic treatment is palliation of advanced cancerous lesions. The main purpose is the relief of dyspnea due to central airway obstruction, and the pre-operative evaluation to confirm that the lung beyond the obstruction is viable and that dyspnea is effectively related to the obstruction (Wahidi et al., 2007) [1].

This study was carried out in the Chest Department at Tanta and Zagazig University Hospitals from May 2012 to December 2012 on 20 cases with endobronchial tumor 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 (Rami-Porta et al. (2011) [2]).

This study aimed to compare the clinical, functional and radiological outcome of electrocauterization and argon plasma coagulation as a palliative treatment for bronchogenic carcinoma.

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 (15–40 min each), with one week interval between each session.

After application of bronchoscopic electrocautery on patients in group I, and argon plasma coagulation on patients in group II, there was more significant control of hemoptysis in group I compared to group II. Both groups showed a significant improvement in ventilatory function tests and arterial oxygen tension PaO_2 before and after bronchoscopic intervention. Also, there was no significant difference between the 2 groups as regards post treatment complications.

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It was concluded that, therapeutic bronchoscopic intervention either by electrocautery or argon plasma coagulation is a safe and effective method for palliative management of patients with central malignant airway obstruction.

Introduction

Endobronchial electrosurgery is used to remove endobronchial 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 which ionizes air resulting in tissue destruction or hemostasis or both [3].

Argon plasma coagulation (APC) is a relatively recent electrosurgical method whereby there is argon gas ionization by an electric current to create a non-contact, homogeneous "bridge" for tissue coagulation or ablation [4,5].

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 assessment and investigations including pulmonary function tests and radiological findings.

Patients and methods

This study was carried out in the Chest Departments at Tanta and Zagazig University Hospitals from May 2012 to December 2012 on 20 cases. This study was approved by the ethics committee, Tanta Faculty of Medicine.

Inclusion criteria

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

- Endobronchial tumor in which its main component is endoluminal and 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 [2].
- In good general health without clinically significant medical history.
- No prior chemotherapy or radiotherapy.

Exclusion criteria

- Patients with respiratory or other organ failure.
- Patients with bleeding disorders.
- Patients with past history of allergic disorders to anesthetic drugs.
- Patients with grades 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 (15–40 min each), with one week interval between each session.

Preoperative fasting

Solid food should be avoided for 8 h preoperatively to allow sufficient time for gastric emptying. But liquid ingestion could be allowed up to 2 h preoperatively [6].

Premedication

Regular cardiovascular medication including antihypertensive drugs and respiratory medication should be continued until the day of intervention. Also intravenous atropine 0.5 mg could be given immediately prior to intervention [7].

Monitoring

Intraoperative monitoring including pulse, oxygen saturation, electrocardiography, and intermittent noninvasive measurement of blood pressure was done [7].

Table 1 Comparison between the 2 studied groups according to symptoms before and after 1 week of bronchoscopic therapy.

Symptoms	Group (I): number of improved patients/patients having symptoms, no. (%)		Group (II): number of improved Patients/patients having symptoms, no. (%)		*P* value
	Before treatment	1 week after	Before treatment	1 week after	
Cough	10/10 (100%)	6/10 (60%)	10/10 (100%)	7/10 (70%)	0.085
Hemoptysis	9/10 (90%)	5/10 (50%)	8/10 (80%)	7/10 (70%)	0.048*
Dyspnea	10/10 (100%)	6/10 (60%)	10/10 (100%)	7/10 (70%)	0.085
Fever	7/10 (70%)	6/10 (60%)	6/10 (60%)	5/10 (50%)	0.057

* $p < 0.05$.

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

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

* $p < 0.05$.

Table 3 Comparison between the 2 studied groups according to (PaO_2) before and after 1 week of bronchoscopic therapy.

PaO_2 (mmHg)	Group (I)	Group (II)
Before treatment	68.9 ± 8.94	77.8 ± 6.04
1 week after	76.6 ± 7.61	83.5 ± 4.99
P value	*0.005	*0.048

* $p < 0.05$.

Table 4 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
Hemoptysis	1 (10%)	1 (10%)	0.999
Pneumothorax	1 (10%)	0 (0%)	
Esophagitis	0 (0%)	0 (0%)	
Pneumonia	0 (0%)	0 (0%)	

Anesthetic technique

For interventional flexible bronchoscopy we used intravenous anesthesia consisting of hypnotic ''midazolam'' and analgesia ''fentanyl'' [7].

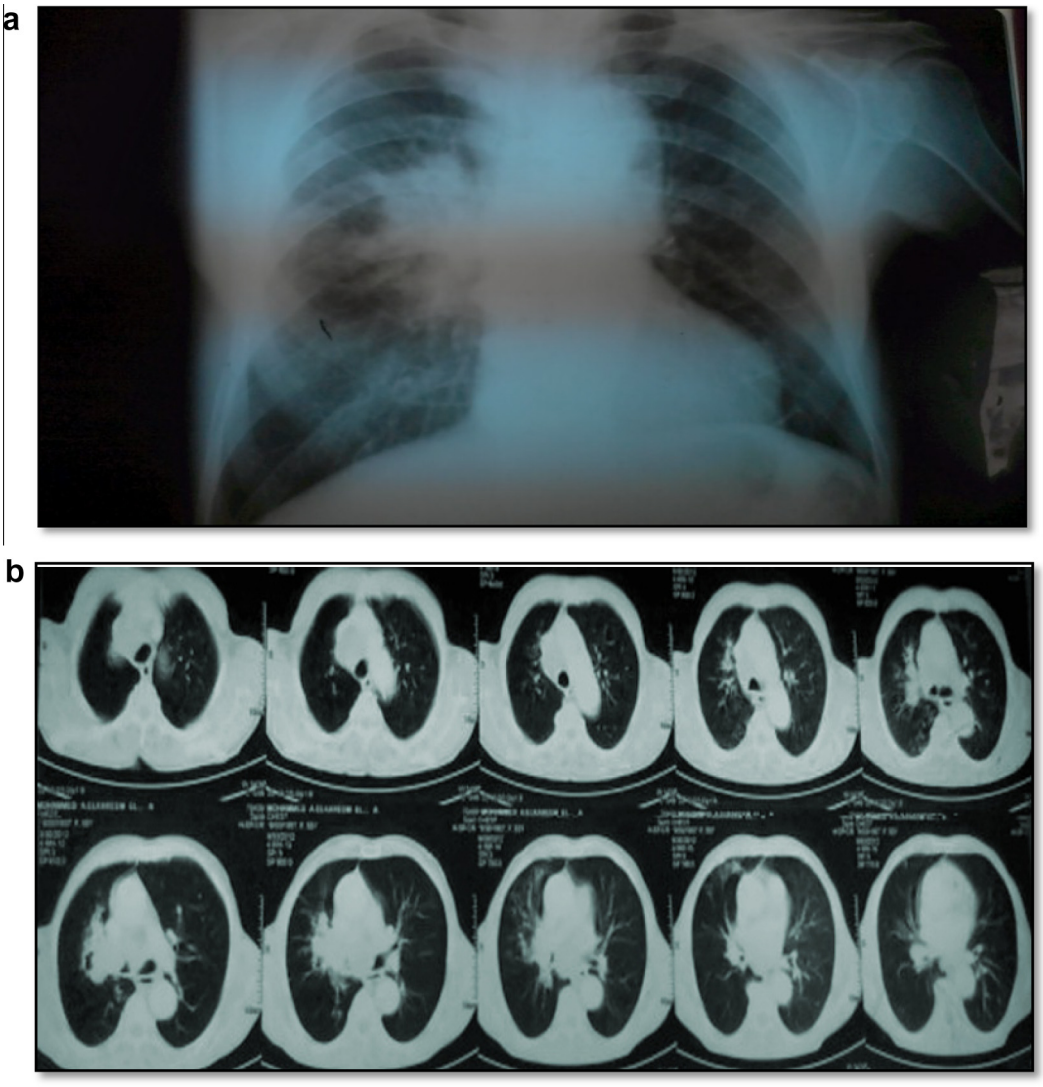

Figure 1 (a) and (b) show a case with right central mass associated with post obstructive pneumonia.

Ventilatory support during fiberoptic bronchoscopy

Ventilatory support was done by a connector tube which has 3 ends, one connected to Endo Tracheal Tube and the second connected to mechanical ventilator and the last end through which Fibreoptic Bronchoscope was introduced [8].

Follow up

(1) Symptoms were recorded and scored before treatment then one week after treatment using the Speiser symptom score [9,10].
(2) Chest radiograph was done before and 1 week after bronchoscopic session for evaluation of re-expansion of atelectasis and prognosis of post obstruction pneumonia.
(3) Pulmonary function tests and arterial blood gases were done before and 1 week after bronchoscopic session for prognosis of endo-bronchial obstruction.

Results

Statistical presentation and analysis of the present study were 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 significantly higher difference as regards the control of hemoptysis in group I compared to group II (Table 1).

Both groups showed a significant difference in the results of ventilatory function tests for the included patients before and after 1 week of bronchoscopic intervention (Table 2).

Both groups showed a significant improvement in the results of (PaO_2) for the included patients before and 1 week after bronchoscopic therapy (Table 3).

There was no significant difference between the 2 studied groups as regards the post treatment complications (Table 4).

In the following cases Fig. 1(a and b) and Fig. 2 show improvement in a patient with the right central mass after the application of electrocautery as the size of the mass was reduced and post obstruction pneumonia was improved.

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

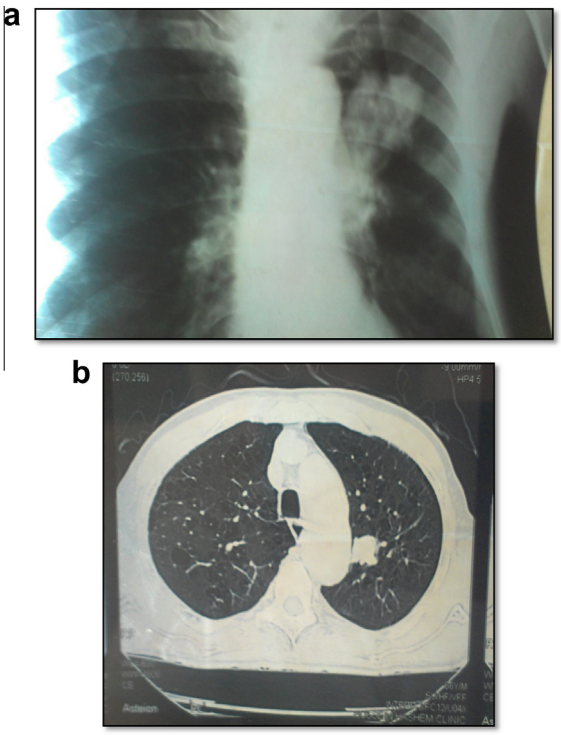

Figure 3 (a) and (b) show left upper mass.

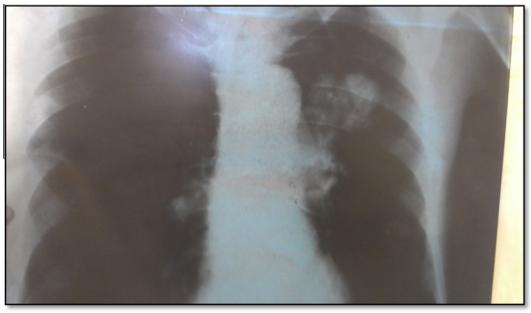

Figure 4 Shows improvement after application of argon plasma coagulation.

Figure 5 Shows left lower mass with collapse.

Figure 6 Shows improvement after electrocautery.

Figure 7 Shows right lower mass with collapse.

Figure 8 Shows improvement after application of argon plasma coagulation.

Fig. 3(a and b) and Fig. 4 show reduction in the size of the left upper mass after application of argon plasma coagulation.

Also Figs. 5 and 6 show improvement in post obstructive collapse in a patient with the left lower lobe mass after application of electrocautery.

Figs. 7 and 8 show the improvement in post obstructive collapse and pneumonia in a patient with right basal mass after application of argon plasma coagulation.

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].

In this study, there was improvement in clinical symptoms as regards cough, dyspnea, hemoptysis and fever in the two studied groups after bronchoscopic intervention with a significant control of hemoptysis in group I compared to group II.

Morice et al. (2001) 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%) [12]. Also, Kvale et al. (2003) showed immediate relief of dyspnea with electrocautery in 55–75% of patients [13], and Sawang et al. (2006) reported that all the included patients showed significant improvement of symptoms including hemoptysis [14].

In this study, there was significant improvement in ventilatory function tests and arterial oxygen tension PaO2 before and after bronchoscopic intervention in the two studied groups.

Hosni et al. (2007) 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 [15]. Also, Rajif et al. (2012) reported that most of included patients with central air way obstruction showed improvement after bronchoscopic electrocautery as regards clinical manifestations and pulmonary function tests [16].

In this study, only 1 patient suffered from pneumothorax in group I and one patient in each group suffered from increased hemoptysis.

Crosta et al. (2001) demonstrated that no dangerous complications among the included patients have been observed [10] and Bolliger et al. (2006) reported that no lethal complications related to the bronchoscopic electrocautery treatment and no episodes of respiratory failure [11].

Conflict of interest

There is no conflict of interest.

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