

Research Article

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Diagnostic yield and safety of C-TBNA in elderly patients with lung cancer

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Abstract: Conventional transbronchial needle aspiration (C-TBNA) is a minimally invasive technique used primarily in the diagnosis and staging of lung cancer. Currently lung cancer is mostly considered a disease of the elderly and the management of this disease in older patients is a growing concern.

In this study we aimed to assess the diagnostic yield and safety of C-TBNA in elderly patients.

A retrospective review of 88 consecutive C-TBNA procedures for nodal staging in suspected or confirmed primary lung cancer or pathological confirmation in suspected advanced lung cancer was performed. Patients were divided into less than 70 (<70yrs) or 70 and older (≥ 70 yrs) age groups for analysis. There were no significant differences either in the diagnostic yield (69% in patients aged < 70 yrs and 74% patients aged ≥ 70 yrs ($p=0.5$) nor in the complication rate (respectively 8.8% in patients aged < 70 yrs and 6.9% in patients aged ≥ 70 yrs ($p=0.7$)) between the two age groups. Reported complications were minor bleeding and poor tolerance; no major complications were observed.

Based on our experience, C-TBNA represents a useful and safe alternative procedure for the diagnosis and staging of lung cancer in elderly patients.

Keywords: Bronchoscopy; Transbronchial needle aspiration – TBNA; lung cancer; elderly

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1 Introduction

Conventional transbronchial needle aspiration (C-TBNA or TBNA) is a minimally invasive technique used to obtain diagnostic samples from peribronchial or submucosally located lesions [1-43]. For over 30 years, until the introduction of endobronchial ultrasound guided (EBUS)-TBNA, conventional TBNA was considered the standard bronchoscopic modality for the evaluation of undiagnosed mediastinal lymphadenopathy [1-43].

C-TBNA can be used in various pathological conditions but is used primarily for obtaining mediastinal or hilar lymph node tissue for the diagnosis and staging of bronchogenic carcinoma [1-43].

Lung cancer is one of the leading causes of cancer deaths worldwide. It is mostly considered a disease of the elderly: the median age at diagnosis is 70 years and the incidence of lung cancer increases with age [29]. Data from cancer statistics revealed that in United States in 2011, 82 % of those living with lung cancer were 60 years of age or older [30].

Currently, the management of lung cancer in older patients is a growing concern, particularly with the increase of elderly population [29,30].

Accurate staging is crucial to evaluate the most appropriate therapy and the prognosis of lung cancer. Although the recent advancements in imaging modalities, such as computed tomography (CT) and positron emission tomography (PET), have drastically improved the detection and evaluation of lung cancer, these non-invasive methods do not provide definitive disease confirmation and have limitations in nodal staging.

A meta-analysis of both CT (sensitivity 51%) and PET scan (sensitivity 75%) showed relatively low sensitivity for the detection of nodal metastases, underlining the importance of pathological nodal staging [31].

Until recently, mediastinoscopy has been the “gold standard” to establish mediastinal involvement. However the use of mediastinoscopy, performed in an operative

suite under general anesthesia, is potentially limited in older patients with concomitant diseases.

Several studies assessed the usefulness and safety of C-TBNA in diagnosis and staging of lung cancer; however data about the efficacy of this procedure in elderly populations are scant.

In the present study, we aimed to assess the diagnostic yield and safety of C-TBNA in older patients.

2 Patients and methods

We performed a retrospective review of 88 consecutive C-TBNA procedures for nodal staging in suspected or confirmed primary lung cancer or pathological confirmation in suspected advanced lung cancer.

All the procedures were performed on an inpatient basis, in the bronchoscopy unit at San Giovanni di Dio e Ruggi d'Aragona Hospital of Salerno from 2010 to 2015.

The procedures were done as part of the routine clinical care. Informed consent for the procedure was obtained from all the patients. Ethical approval for the study was not required as the intervention and data collection form part of our standard clinical care.

For every patient undergoing C-TBNA, a systematic examination of mediastinum was performed and criteria for sampling a lymph node were the following: a short axis greater than 10 mm on CT or abnormal nodal fluorodeoxyglucose avidity above that of the mediastinal blood pool on PET-CT.

Flexible bronchoscopy was performed through the nasal route, using the Olympus BF TE2 bronchofiberscope (Olympus, Japan) with a 2.8 mm working channel. For patient preparation, local anesthesia included application of 2% lignocaine jelly nasally along with spray application of lignocaine over the pharynx and vocal cords prior to and during insertion of the flexible bronchoscope. All the procedures were performed under conscious sedation. In patients over 70 years, mean doses of sedation were lower. Respiratory rate, heart rate, and pulse oximetric oxygen saturation was monitored throughout during the procedure.

Rapid on-site cytology examination (ROSE) was not available.

Cytological samples were considered diagnostic if results revealed malignant cells or polymorphous lymphocytes without any other findings (reactionary lymph node). Cytological samples were considered not diagnostic if results revealed inadequate cytological material or only bronchial epithelial cells, mucus, or blood elements.

3 Results

Overall 88 patients underwent C-TBNA. Patients were divided into less than 70 (<70 yrs) or 70 and older (≥ 70 yrs) age categories for analysis. Most of patients were male (74/88, 84%) and mean age was 68.3 ± 10.4 years (range, 43–83 years). 45 patients were less than 70 years (51.3%) and 43 (48.8%) were 70yrs or older. 14 patients were aged over 80 yrs. We evaluated the efficacy in nodal staging and pathological confirmation in advanced disease and the safety of C-TBNA.

The unpaired t-test was used to detect difference between data.

Overall the diagnostic yield of 88 procedures was 71.5% (63/88). The diagnostic yield was 69% (31/45) in the group of patients < 70 yrs and 74% (32/43) in the group of patients ≥ 70 yrs ($p=0.5$).

A specific diagnosis was made in 60% (27/45) of patients < 70 yrs and in 65% (28/43) of patients ≥ 70 yrs ($p=0.6$).

Apart from minor bleeding at biopsy sites, no major complication (significant bleeding, pneumothorax or pneumomediastinum) occurred due to C-TBNA. Overall three cases of poor tolerance were reported in the two age cohorts. No complications were recorded in the 14 patients aged over 80 years. There was no statistically significant difference in complication rate between the two age cohorts (8,8% (4/45) in patients aged < 70 yrs and 6.9% (3/43) in patients aged ≥ 70 yrs ($p=0.7$)).

Results are reported in Table 1.

4 Discussion

The aim of this study was to evaluate the diagnostic yield and the safety of C-TBNA in elderly patients (defined as ≥ 70 yrs to correspond to the median age of lung cancer diagnosis and a common cut off point in clinical trials). The diagnostic yield of C-TBNA varies considerably among various studies. As reported in American College of Chest Physician 2013 guidelines (ACCP), mean sensitivity of C-TBNA for lung cancer was 76%, ranging from 14 to 100%. C-TBNA had a higher diagnostic yield for malignancy (64.7%) compared to non-malignant diseases (17.6%) [34, 35]. Nevertheless there are few data about efficacy and safety of this procedure in elderly patients with lung cancer.

In our study the diagnostic yield of 88 procedures was 73% overall. No significant difference in diagnostic yield was seen according to age threshold in the two groups,

Table 1: Table of Results

Age Group	< 70	≥ 70	
n	45 (8F)	43 (6F)	
Diagnostic Yield	31 (69%)	32 (74%)	p 0,5
Positives	27(60%)	28(65%)	
Subtypes			
Adenocarcinoma	16 (59,2% of positives)	15 (53,5% of positives)	
Oat- cells	8 (29.6% of positives)	8 (28.7% of positives)	
Squamous	3 (11,1% of positives)	5 (17.8% of positives)	
NSCLC-NOS	0	0	
Metastases	0	0	
Complications	4 (8.8%)	3 (6,9%)	p 0,7
Major complications	0	0	
Minor complications :			
Minor bleeding	2 (4,4%)	2 (4,6%)	
Poor tolerance	2 (4,4%)	1 (2,3%)	

NSCLC-NOS = non-small-cell carcinoma “not otherwise specified;”

69% in the group of patients aged less 70 years and 74% in the group of patients older than 70 yrs ($p=0.5$).

Not all results were verified with invasive methods such as mediastinoscopy or surgery due to different reasons such as a high rate of patient comorbidities, poor performance status, patient or family preference; as consequence, it's likely that this group might contain false negative diagnoses, since C-TBNA is just a diagnostic procedure with a low sensitivity, but very high specificity [36].

Recently a large prospective study has demonstrated that EBUS-TBNA is a safe and well-tolerated procedure in elderly patients with lung cancer; nevertheless the additional training required and higher costs of this procedure prevent its routine use in all bronchoscopy centers [37]. Conventional TBNA is generally a safe procedure with a reported low incidence of complications. Potential complications are bleeding (severe bleeding occurs even after

a major vessel puncture, a rarely reported event), pneumothorax or pneumomediastinum. In a meta-analysis of Holty et al., overall major complication rate (two major bleeds and one pneumothorax requiring chest tube) was 0.26% [37]. Other reported complications after C-TBNA procedures are fever, bacteremia and hemomediastinum [38, 39].

In our study no major complications occurred due to C-TBNA. As minor complications, minor bleeding and poor tolerance were reported, and their incidence wasn't significantly different between the two age cohorts (respectively 8.8% in the group of patients aged less 70 years and 6.9% in the group of patients older than 70 yrs ($p=0.7$)).

Based on our experience, C-TBNA should be considered a safe and efficacious procedure in diagnosis and staging of lung cancer before other more invasive procedures such as mediastinoscopy or surgery in elderly patients.

This study has several limitations: it's a retrospective study, results didn't include any comparison between C-TBNA results with invasive pathological sampling methods like mediastinoscopy or thoracotomy and analyses were mainly done to evaluate sampling success, thus adequate samples without any specific diagnoses may require further diagnostic procedures.

5 Conclusions

The management of lung cancer in the elderly is a current issue. Despite lung cancer being mostly considered a disease of the elderly, several studies show that older patients obtain lower histological confirmation rates, less accurate staging, and lower rates of definitive treatments than younger patients [40-43]. These differences are probably due to the perception that older patients might not be able to withstand invasive techniques and treatment.

In our study C-TBNA has been proven to be a safe and efficacious procedure in elderly patients with suspected or confirmed lung cancer. Recently EBUS-TBNA has been proven to be safe and well-tolerated in older patients however this procedure can be used more difficulty routinely since it is more complicated, requires additional training and has higher costs.

Based on our experience, C-TBNA still represents a very useful and safe alternative procedure for the diagnosis and staging of lung cancer in elderly patients.

Conflict of interest statement: Authors state no conflict of interest.

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