Original Article

Access this article online
Quick Response Code:
Website:
www.eurasianjpulmonol.com
DOI:
10.4103/ejop.ejop_67_18

Continuing practice is needed to maintain competency in endobronchial ultrasound-guided transbronchial needle aspiration

Nur Safak Alici, Ibrahim Onur Alici[1]

Abstract:

BACKGROUND: It has been accepted that after training, a competent endobronchial ultrasound (EBUS) operator should perform at least twenty procedures per year. However, the literature supporting this subject is scarce. This study focuses on the return performance of an experienced bronchoscopist after a 5-year long break. The aim of this study is to reveal a possible decrease in the diagnostic performance after discontinued practice.

MATERIALS AND METHODS: The data of patients who have undergone EBUS-guided transbronchial needle aspiration (EBUS-TBNA) for mediastinal or hilar lesions (lymphadenopathies and masses) between April and September 2016 were reviewed retrospectively. All consecutive patients were involved in the study. All EBUS-TBNA procedures were performed by a single experienced bronchoscopist who have returned after a 5-year long break and restarted to perform EBUS. The patients were divided into two groups: first twenty cases and subsequent eighty cases. The diagnostic performance of EBUS was compared between the two groups.

RESULTS: One hundred consecutive patients were included (2.89 lesions per patient) in the study. Demographic and sonographic data were not different between the two groups. In overall, EBUS-TBNA was diagnostic in 281 (97.2%) of 289 lesions. The sensitivity values of EBUS-TBNA in the first and second groups were 92.9% and 98.3%, respectively. The difference was statistically significant ($P = 0.048$).

CONCLUSIONS: This study shows the need for continuing practice in EBUS. An operator should perform at least twenty procedures per year to maintain competency.

Keywords:

Endobronchial ultrasound, training, transbronchial needle aspiration

Department of Chest Diseases, Dokuz Eylül University, [1]Department of Chest Diseases, Dr. Suat Seren Chest Diseases and Thoracic Surgery Training and Research Hospital, Izmir, Turkey

Address for correspondence:
Prof. Ibrahim Onur Alici, Dr. Suat Seren Chest Diseases and Thoracic Surgery Training and Research Hospital, Yenisehir Dist., Gaziler Str., 331 Konak 35110, Izmir, Turkey.
E-mail: ioalici@gmail.com

Received: 19-12-2017
Revised: 28-12-2017
Accepted: 29-01-2018

Introduction

Performing endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) in the diagnosis of mediastinal/hilar lymphadenopathies and masses requires intensified training and continued practice.[1] There are several studies on the learning curve of EBUS; however, there are limited data on a possible "forgetting period." This study shows the return performance of an experienced EBUS operator after a 5-year long break. The results may be important to highlight the need for continuing practice to maintain competency.

Materials and Methods

The data of patients who have undergone EBUS-TBNA for mediastinal or hilar lesions (lymphadenopathies and masses) between April and September 2016 were reviewed retrospectively. All consecutive

How to cite this article: Alici NS, Alici IO. Continuing practice is needed to maintain competency in endobronchial ultrasound-guided transbronchial needle aspiration. Eurasian J Pulmonol 2018;20:118-21.

patients were included in the study. All EBUS-TBNA procedures were performed by a single bronchoscopist. The bronchoscopists have performed over 200 procedures between 2009 and 2011 until he/she assigned for another position at a different hospital where EBUS was absent. After a 5-year long break, he/she started to work in a tertiary care hospital containing a dedicated bronchoscopy suit with an EBUS. Initially, he/she observed over twenty EBUS-TBNA operations which are performed by another experienced bronchoscopist and started to perform his/her own cases subsequently.

EBUS-TBNA was performed under deep sedation with fentanyl, midazolam, and propofol in an operating room. A convex probe EBUS (BF-UC180F, Olympus, Tokyo, Japan) was used to examine the lymph nodes, and the ultrasound images were processed with a dedicated scanner (EU-ME1, Olympus, Tokyo, Japan). We used 22-gauge needles to sample the lesions. Cytologic specimens and cell blocks were obtained from every patient. The procedure was described elsewhere.[2]

The patients were divided into two groups: first twenty cases and subsequent eighty cases. The diagnostic performance of EBUS was compared between the two groups. The positive predictive value of EBUS-TBNA in malignant disease was assumed to be 100%. Benign diseases were confirmed either surgically or with a follow-up period of at least 6 months.

IBM SPSS Statistics® 20.0 (IBM Corp., New York, USA, 2016) was used for statistical analyses. Descriptive statistics were given as mean ± standard deviation for continuous variables and frequency (in percent) for categorical variables. Pearson's Chi-square test was used to determine the association between categorical variables. When comparing continuous variables, Mann–Whitney U test and independent samples *t*-test were used. $P < 0.05$ was considered statistically significant. This study was approved by the ethical committee of the institution (93796732/604.02). Informed consent was obtained from every patient.

Results

We included one hundred consecutive patients and analyzed the data of 289 lesions. On average, 2.89 lesions per patient were sampled. Several features of the lesions are given in Table 1. Demographic data and lesion characteristics were not different between the two groups. The indications for EBUS-TBNA procedure were a diagnostic work (45%), diagnosis and staging (24%), staging (23%), and restaging (20%). The distribution of the locations of the lesions is given in Table 2. Most common locations were subcarinal and right lower paratracheal stations. The distribution of the diagnoses achieved by EBUS-TBNA is shown in Table 3. One hundred and seventy-two lesions with a benign result were subjected to either a surgical intervention (confirmation or resection) or a follow-up.

In overall, EBUS-TBNA was diagnostic in 281 (97.2%) of 289 lesions. Forty-nine lesions were surgically confirmed. Of eight lesions in which EBUS-TBNA have failed, four were in the first twenty cases. The definitive diagnoses were achieved by surgical resection (four lesions), excisional lymph node biopsy (three lesions), and transthoracic fine-needle aspiration (one lesion). Five lesions revealed a definitive diagnosis of nonsmall cell lung cancer (three squamous cell carcinomas and one adenocarcinoma), while the remaining three lesions had lymphoma. When compared, the sensitivity values of EBUS-TBNA in the first and second groups were 92.9% and 98.3%, respectively. The difference was statistically significant ($P = 0.048$). When the patients were clustered ordinally by twenty, the difference has lost the significance ($P = 0.054$); however, an increasing trend has been noticed [Graph 1].

Discussion

Training in EBUS-TBNA is a detailed process containing a comprehensive information on "bronchocentric" mediastinal anatomy, ultrasound physics, competency in handling EBUS for examination of peribronchial structures, interpretation of ultrasound images, and performing TBNA with the dedicated needle. There are several studies on the learning curve for EBUS-TBNA.[3-6] It is accepted that a bronchoscopist should perform at least fifty procedures under supervision to be competent in EBUS-TBNA.[1] Moreover, it has been shown that the skills may improve even after 200 clinical cases.[6] The bronchoscopist who performed the EBUS-TBNA procedures in this study was an experienced operator with >200 operations before 2011 (diagnostic sensitivity in the last twenty cases was 55/58 lesions, 94.8%; unpublished data). However, being a competent does not ensure the skills to last forever. The American College of Chest Physicians' guideline for interventional pulmonary procedures states that an operator should perform at least twenty examinations per year to maintain competency.[1] This statement is not just an expert opinion. It has been shown that the diagnostic yield of EBUS-TBNA is lower in the hands of operators who perform <10 procedures per year.[3] To increase the data on this subject, we conducted this study which focuses on the need for a continuing practice in EBUS-TBNA. We showed that the diagnostic performance of EBUS-TBNA is lower in the first twenty cases when compared with consecutive procedures. This is of particular importance as it highlights the accuracy of the suggestion. There may be several factors responsible for the loss of skills.

Table 1: Several features of the patients

	All patients	First twenty patients	Subsequent eighty patients	*P*
Number of patients	100	20	80	-
Male:female	72:28	15:5	57:23	0.488
Mean age±SD (minimum-maximum)	61±10 (22-81)	63±9 (46-81)	60±10 (22-78)	0.287
Number of lesions	289	56	233	-
Average number of lesions per patient	2.89	2.8	2.91	0.739
Mean lesion size (mm)	14.6±8.5 (3.5-56.9)	14.8±7.1 (3.5-29.1)	14.6±8.8 (4.4-56.9)	0.444
Mean pass per lesion	3.04±0.23 (3-5)	3.05±0.22 (3-4)	3.04±0.24 (3-5)	0.765
Localization of the lesions				
Mediastinal	104	17	87	0.576
Subcarinal	76	15	61	
Hilar	109	24	85	

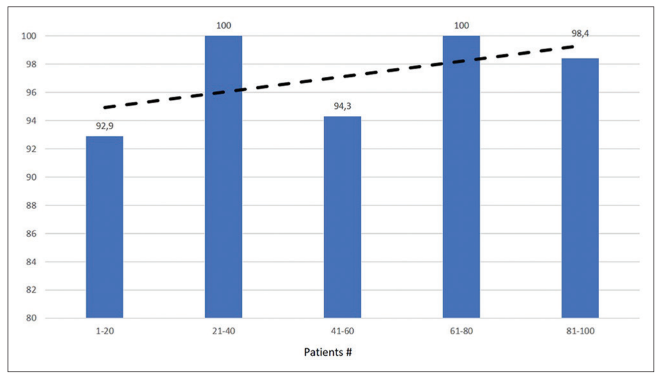
SD: Standard deviation

Table 2: Distribution of locations of the lesions

	n (%)
7	76 (26.3)
4R	70 (24.2)
11R	44 (15.2)
11L	42 (14.5)
4L	33 (11.4)
10R	17 (5.9)
12R	4 (1.4)
10L	2 (0.7)
2R	1 (0.3)

Table 3: The diagnoses achieved by endobronchial ultrasound-guided transbronchial needle aspiration

	n (%)
Normal architecture with or without anthracosis	172 (59.5)
Adenocarcinoma	46 (15.9)
Granulomatous inflammation	39 (13.5)
Small cell lung cancer	16 (5.5)
Squamous cell carcinoma	15 (5.2)
Nondiagnostic	1 (0.3)



Graph 1: The diagnostic sensitivity of endobronchial ultrasound-guided transbronchial needle aspiration in consecutive clusters (*P* = 0.054)

It may be argued that an experienced operator will not forget the basic science behind EBUS-TBNA and interpretation of ultrasound images. Rather, a "muscle memory" may be lost in time, which may affect handling of instruments (mainly needle).

Stather *et al*. concluded that the skills may improve after 200 clinical cases. Although there are some other confounding factors such as patient characteristics in this small sample, the diagnostic sensitivity has reached up to 98.3% after 300 procedures, in our study. These data confirm the results of the previous study. The skills seem to be still improving in experienced bronchoscopists even after 300 cases.

It should be noted that there are several limitations of this study. At first, this was a retrospective analysis and was not designed to show a hypothesis. Second, the diagnostic sensitivity in the first twenty cases was higher than expected, which seems to be a limitation for showing the need for continuing practice. Several factors might be responsible for this. The bronchoscopist continued to perform fiberoptic bronchoscopy (albeit no conventional TBNAs, but mainly transbronchial biopsies) during that 5 years, which might preserve some skills for handling EBUS (but not needle). Another factor was that the bronchoscopists have observed several cases before performing their own cases. This, also, might affect the overall performance. However, it would not be ethical to perform EBUS instantly after 5 years of break. As another limitation, the data on the operation time would be valuable, which was absent in the records. Finally, the data rely on the personal performance of a single bronchoscopist. As the learning curve varies extensively, maintenance of the skills would be different among operators. However, it is difficult to find another operator with a similar time-out period; hence, the methodology is not replicable easily.

Conclusions

Despite all those limitations, we think the data are still remarkable for highlighting the need for continuing practice in EBUS, which was suggested by the American College of Chest Physicians International Chest/Diagnostic Procedures Network Committee. An

EBUS operator should perform at least twenty procedures per year to maintain competency. The diagnostic sensitivity may still improve even after 300 procedures.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Ernst A, Silvestri GA, Johnstone D; American College of Chest Physicians. Interventional pulmonary procedures: Guidelines from the American College of Chest Physicians. Chest 2003;123:1693-717.
2. Alici IO, Demirci NY, Yılmaz A, Demirag F, Karakaya J. The combination of cytological smears and cell blocks on endobronchial ultrasound-guided transbronchial needle aspirates allows a higher diagnostic yield. Virchows Arch 2013;462:323-7.
3. Bellinger CR, Chatterjee AB, Adair N, Houle T, Khan I, Haponik E. Training in and experience with endobronchial ultrasound. Respiration 2014;88:478-83.
4. Fernández-Villar A, Leiro-Fernández V, Botana-Rial M, Represas-Represas C, Núñez-Delgado M. The endobronchial ultrasound-guided transbronchial needle biopsy learning curve for mediastinal and hilar lymph node diagnosis. Chest 2012;141:278-9.
5. Medford AR. Learning curve for EBUS-TBNA: Longer than we may think. Respiration 2015;90:173.
6. Stather DR, Chee A, MacEachern P, Dumoulin E, Hergott CA, Gelberg J, *et al.* Endobronchial ultrasound learning curve in interventional pulmonary fellows. Respirology 2015;20:333-9.