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Diagnostic Yield of Transbronchial Needle Aspiration in Intrathoracic Lymphadenopathy

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ABSTRACT

Background: *Transbronchial needle aspiration (TBNA) is a safe and effective technique for the diagnosis of mediastinal lesions. The aim of this study was to evaluate diagnostic yield of TBNA in patients with benign and malignant lesions involving mediastinal and hilar lymph nodes.*

Materials and Methods: *TBNA procedures were performed using a flexible bronchoscope and a 22-gauge cytologic needle in 22 patients with mediastinal or hilar adenopathy identified on CT of the chest. Based on the clinical diagnosis or presence of endobronchial lesions, other procedures such as bronchoalveolar lavage, bronchial biopsy, and transbronchial lung biopsy were performed.*

Results: *Among 22 patients with a mean age of 50±18 years, 13 were males (59%) and 9 were females (41%). Adequate lymph node samples were obtained in 16 patients (72.7%). Among 9 patients with malignancy, TBNA provided diagnostic results in 5 patients (55.5%). TBNA provided adequate specimen in 10 out of 13 patients with sarcoidosis, but in 2 patients (15.4%) diagnosis was made by TBNA. Overall, TBNA yield was 31.8%. There was no complication during TBNA procedures.*

Conclusion: *TBNA is a minimally invasive technique for diagnosis of intrathoracic lymphadenopathy, especially in malignant diseases. The procedure also can be used as a diagnostic tool in patients with sarcoidosis, although the yield is low.* ***(Tanaffos 2008; 7(2): 23-27)***

Key words: *Intrathoracic lymphadenopathy, Transbronchial needle aspiration, Flexible bronchoscopy, Sarcoidosis*

INTRODUCTION

Transbronchial needle aspiration (TBNA) was first introduced by Wang et al. in late 1970s. TBNA is a beneficial, safe, and minimally invasive bronchoscopic technique used for tissue sampling from submucosal layers, parabronchial and paratracheal lymph nodes and masses and also for diagnosis and staging of bronchogenic carcinoma (1,2). Major indications for TBNA include diagnosis of mediastinal or hilar adenopathy, extrinsic

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compression of the airway by a peribronchial process, submucosal disease, and peripheral nodule (3). Available studies have shown a high yield for diagnostic means, especially in malignant mediastinal and hilar lesions (4-7). The yield for TBNA varies widely in the literature (i.e., 20 to 89%), and seems to be related to the size and location of the lesions , as well as to the operator's experience (8,9). However, the method is still underutilized (10). In a study conducted in the United States, only 11% of respondents (practicing pulmonologists) reported performing TBNA routinely (11).

The aim of this study was to evaluate the diagnostic yield of TBNA in patients with benign and malignant lesions involving mediastinal and hilar lymph nodes.

MATERIALS AND METHODS

In this prospective study from 2006 to 2007, TBNA procedures were performed on 22 patients with 22-gauge cytology needles(ENDO-FLEX GmbH, Germany) as previously described by Wang (12,13). Before bronchoscopy, mediastinal or hilar adenopathies were identified using chest CT-scan with the size range of 1.5 to 4 cm. One to three TBNA procedures were performed in one or two different endobronchial locations according to the location of pathologic lymph nodes on CT-scan. TBNA was performed prior to other bronchoscopic procedures to avoid false-positive results. Needle content was smeared on glass slides and fixed with 95% alcohol solution for cytologic examination. According to the clinical diagnosis or presence of endobronchial lesions, other procedures such as bronchoalveolar lavage (BAL), endobronchial biopsy (EBB), or transbronchial lung biopsy (TBLB) were performed.

The presence of numerous benign lymphocytes, or a clear pathologic diagnosis was considered as an adequate sample (14).

Malignancy was diagnosed by the presence of malignant cells in cytologic specimens (15).

If clinical and radiologic features, consistent with sarcoidosis were observed, diagnosis was made by TBNA based on the following criteria: presence of epitheloid cell granuloma, lymphocytes, epithelioid histiocytes as clusters or palisadic groups, and multinucleated giant cells with no or minimal necrosis with negative acid fast bacilli (AFB) smear.(15,16) Final diagnosis was made based on clinical and radiologic findings, cytopathologic specimen obtained by TBNA consistent with sarcoidosis, granolumatous inflammation without necrosis in bronchial biopsy or transbronchial lung biopsy or mediastinoscopy, clinical and radiologic stability or regression with or without corticosteroid treatment.

RESULTS

Among 22 patients with a mean age 50±18 years, 13 were males (59%) and 9 were females (41%). Adequate lymph node samples were obtained in 16 patients (72.7%). We were able to make a diagnosis in 7 out of 16 patients (43.7%) whose adequate lymph node samples were obtained by TBNA. Overall TBNA yield was 31.8%. Locations of lymphadenopathies according to CT-scan and anatomic sites for TBNA are shown in table 1.

Table 1.Locations of lymphadenopathies according to CT-scan and anatomic sites for TBNA

Variable	No.
Location of Lymphadenopathy	
Right paratracheal	11
Subcarina	10
Right hilar	16
Left hilar	14
Anatomic sites for TBNA	
Subcarina	9
Right hilar	12
Left hilar	2

According to the final diagnosis, patients were classified into 2 groups of patients with malignancy and patients with sarcoidosis (Table 2).

Table 2. Diagnostic yield of TBNA in patients with malignancy and sarcoidosis

Variables	No.		No. of diagnostic TBNA	Diagnostic TBNA%
	Male	Female		
Overall patients	13	9	7	31.8
Malignancy	6	3	5	55.5
Sarcoidosis	7	6	2	15.4

In patients with malignancy, TBNA provided diagnostic results in 5 patients (55.5%). Final diagnosis in these patients included: Signet ring cell carcinoma, undifferentiated metastatic carcinoma (a patient with a history of nasopharyngeal tumor), lung adenocarcinoma, anaplastic large cell lymphoma, and lung squamous cell carcinoma. Inadequate materials were obtained from 3 patients with malignancy. In one patient with lymphoma TBNA had non-diagnostic result and only large lymphocytes without atypia were reported.

TBNA provided adequate specimens in 10 out of 13 patients with sarcoidosis. In 2 patients with sarcoidosis (15.4%), diagnosis was made by TBNA. In the remaining patients, diagnosis of sarcoidosis was confirmed by bronchial biopsy in 6 patients, TBLB in 1 patient and mediastinoscopy in 2 patients. Sarcoidosis was diagnosed in 2 patients by following patients, demonstration of lymph node regression and clinical stability.

No complications were seen other than minimal bleeding during TBNA procedures.

DISCUSSION

TBNA is a safe and effective technique that has a major role in the diagnosis of mediastinal lesions and in staging of bronchogenic carcinoma (17, 18). Our study also suggested that TBNA performed by using a 22-gauge needle was a useful and safe method in the diagnosis of variety of mediastinal and hilar lesions. Overall yield of TBNA in this study was 31.8% and there was a higher yield in malignant lesions (55.5 %.). The higher yield of TBNA in diagnosis of malignant lesions has been shown in previous studies (7,19).

In a study by Sharafkhaneh and his colleagues, TBNA had an overall yield of 60% (20). The relatively high yield in their center could be attributed in part to the presence of a proper "set-up" for the processing of aspirations. These include technicians properly trained for handling of samples (21), use of chest CT-scan in most cases prior to the procedures (7), use of the 19-gauge FNA needle (5), and presence of an experienced cytopathologist at the time of procedure (available or requested in the majority of cases) for rapid on-site evaluation (22).

TBNA is a sensitive, highly specific, and minimally invasive technique in the diagnosis and staging of bronchogenic carcinoma (23). Some studies have shown overall yield of TBNA to be between 20-80% in diagnosis and staging of bronchogenic carcinoma (24, 25).

In a study by Cetinkaya et al. diagnostic material was obtained from 100% of patients with carcinoma (15 out of 15 patients). Two of 3 patients with lymphoma provided adequate but nondiagnostic material (15). Despite the small size of under-study population, our study showed high TBNA yield in the diagnosis of malignant lesions and in a patient with lymphoma.

Among benign lesions, sarcoidosis has the highest TBNA yield (20). Wang et al. reported a 90% diagnostic TBNA yield with an 18-gauge needle in 20 patients with sarcoidosis (26). Trisolini et al. confirmed diagnostic value of flexible TBNA in stage I sarcoidosis by showing an overall rate of 72% sensitivity, using 19-guage histologic needle (27). In

a study by Cetinkaya et al. 76% of patients with sarcoidosis were successfully diagnosed by TBNA with a 22-gauge needle. They suggested that, also in patients with sarcoidosis, TBNA with 22-gauge needle is an accurate diagnostic tool in the evaluation of intrathoracic lymph nodes (15). Morales et al. reported TBNA yield of 51% in the diagnosis of sarcoidosis (28). The lower diagnostic TBNA yield in sarcoidosis in our study and differences among other studies may be due to the different number of patients, stage of disease, severity of granulomatous inflammation, and experience of bronchoscopist and cytopatholgist.

In conclusion, TBNA is a minimally invasive technique in diagnosis of intrathoracic lymphadenopathy. Although the procedure has a high diagnostic yield in malignant lesions involving intrathoracic lymph nodes, the diagnostic yield of 22-gauge cytologic needle for diagnosing sarcoidosis is low, but this adjunct procedure can be used as a safe diagnostic tool in patients with sarcoidosis.

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