

Conventional TBNA with 19 G TBNA Needle in Diagnosis of Mediastinal Lymph Nodes – Diagnostic Yield and Safety with 19G TBNA Needle

Umang C Shah¹, Unni R Baby², Arpan C Shah³, Chandrakant M Shah⁴, Palak U Shah⁵

ABSTRACT

Introduction: As the practice of TBNA becomes more widely accepted, it has also revived a longstanding question on the optimum size of needle and whether larger needle with core biopsy is of any additional benefit. In routine practice 19G needle is rarely used even in large nodes as it is perceived to be technically difficult and likely to give a poor yield of representative tissue. We report our experience with yield and safety using 19G needle for Conventional TBNA.

Material and methods: Eighteen patients with large mediastinal nodes (short axis > 25 mm) underwent 19G Conventional TBNA and station 4R and/or stations 7 were punctured respectively.

Results: Out of Eighteen patients, core biopsy material was inadequate or unrepresentative in 14 / 18 cases and cytology material was unrepresentative in 2 patients. A diagnosis was reached in 16 of 18 patients by smear cytology and in 14 cases by histology. Out of eighteen patients, 12 patients had Granulomatous etiology, 2 had poorly differentiated adenocarcinoma, 1 had Malignant Round Cell Tumor, and one patient had reactive lymphadenitis.

Conclusion: The 19G TBNA procedure is effective and safe, and can be a cost-saving alternative to surgical mediastinal exploration. It should be performed after careful case selection during initial diagnostic bronchoscopy and familiarization with the technique should not be neglected in training programmes and workshops.

Keywords: Conventional TBNA, 19 G Needle, Mediastinal Nodes, Histopathology, Cytopathology

15 / 20 mm in short axis). Both techniques were guided by ROSE. We performed retrospective review of all patients having 19 G TBNA over 2 year period from January 2018 to December 2019. The 19G needle used in performing TBNA was the Smooth Shot Olympus 19 G very similar in design to Wang MW319 (Conmed).

Only Station 4R and 7 were punctured as we considered this to be safer site for 19 G TBNA needle procedure and less likely to be contaminated by blood. 18 patients (11 Female, 7 Male) had been undergone for core biopsy based on node size (usually larger than 20 – 25 mm short axis) on CT and operator perception that core biopsy may be more valuable in that particular case and also depending on needle availability in department. The aspiration biopsy was taken with the inner 21G needle retracted into the 19G needle – Smooth Shot NA 601D – 1519, the exposed 19G needle was then used to obtain a “core” specimen for surgical pathology. After passing the needle through the tracheal wall, the inner 21-gauge needle was withdrawn and continuous suction was applied to the catheter by an assistant via the syringe. When the absence of blood return was confirmed, the needle was moved briskly back and forth through the tracheal wall during suctioning, thus permitting the target tissue to be aspirated within the “empty” lumen of the outer 19-gauge needle.

Usually multiple needle passes were performed at each nodal

INTRODUCTION

As the practice of TBNA becomes more widely accepted, it has also revived a longstanding question on the optimum size of needle and whether larger needle with core biopsy is of any additional benefit. In routine practice 19G needle is rarely used even in large nodes as it is perceived to be technically difficult and likely to give a poor yield of representative tissue. With this background we aimed to see the yield and safety using 19G needles for Conventional / Blind TBNA using Rapid Onsite Evaluation (ROSE).

MATERIAL AND METHODS

Patients with mediastinal or hilar lymphadenopathy were sampled in our unit for diagnostic purposes by Single Experienced operator using conventional blind technique with 21 / 19 G needle in larger nodes and EBUS guided technique with 21 / 22 G needle for smaller nodes (less than

¹Interventional Pulmonologist & Head of Bronchology, Department of Interventional Pulmonology, Pranayam Lung and Heart Institute, Vadodara, Gujarat, ²Assistant Professor, Department - Department of Pulmonary Medicine, Jubilee Mission Medical College, Thrissur, Kerala, ³Consultant Pulmonologist, Department of Interventional Pulmonology, Pranayam Lung and Heart Institute, Vadodara, Gujarat, ⁴Senior Pulmonologist, Department of Interventional Pulmonology, Pranayam Lung and Heart Institute, Vadodara, Gujarat, ⁵Cardio Respiratory Physiotherapist & Research Assistant, Department of Interventional Pulmonology, Pranayam Lung and Heart Institute, Vadodara, Gujarat, India

Corresponding author: Dr Unni Baby, Assistant Professor, Department of Pulmonary Medicine, Jubilee Mission Medical College, Thrissur, Kerala, India

How to cite this article: Umang C Shah, Unni R Baby, Arpan C Shah, Chandrakant M Shah, Palak U Shah. Conventional TBNA with 19 G TBNA needle in diagnosis of mediastinal lymph nodes – diagnostic yield and safety with 19G TBNA needle. International Journal of Contemporary Medical Research 2020;7(2):B13-B16.

DOI: <http://dx.doi.org/10.21276/ijcmr.2020.7.2.49>



station (4R and 7) and sampling was stopped when 2 – 3 adequate core biopsies were obtained and when ROSE was representative. Suction was applied for 10 to 15 s, and then the syringe was disconnected and the needle was withdrawn into the metal hub.

After withdrawal of the needle, its contents were blown onto a slide (dry technique) or directly expelled into small volume of saline and cylindrical or fragmented core was searched. The visible tissue fragments on the slide was then collected and transferred into separate containers. The remnant material on slide was smeared and air dried and sent for ROSE / CYTOLOGY.

RESULTS

Out of 19 patients, the needle was successfully used in 18 patients. In 1 patient case no. 18 – successful penetration was not possible and catheter got kinked / damaged and procedure was converted to 21 G needle and ROSE cytology revealed granulomatous disease. Out of 18 patients, 33 samples of core biopsy material were obtained after total of 76 no of punctures (Station 4R – 51 samples, Station 7 – 25 samples) (table-1, fig-1).

Cytology

Representative tissue was obtained by ROSE – Cytology in

16/18 (89%) patients. Of this, 15/18 (83%) patients had a definite diagnosis and 1 patient had reactive lymphadenitis. The remaining 2 patients had non representative tissue on cytology and later their core biopsy reports also revealed non representative tissue composed of blood clot, fibrin and cartilage. 12/18 (66%) cases were showing granulomatous inflammation (1 with significant necrosis and 11 without necrosis). ZN stain for AFB was negative in all 12 patients. 3/18 (17%) cases were showing atypical cells with specific diagnosis of poorly differentiated carcinoma in 2 patients and round cells tumor in 1 patient (fig-2).

Histology

Representative tissue was obtained by Core biopsy Histology in 14/18 (78%) patients whereas adequate tissue fragments was not obtained in 4 patients. Cell block preparation was attempted in some of these cases. Diagnostic yield was obtained in 10/18 (55%). Non representative tissue was obtained in 3 patients and reactive lymphadenitis in 1 patient. 9/14 (64%) cases were showing granulomatous inflammation. 1/14 (7%) patient showed small malignant round cell tumor (fig-3).

Cell block

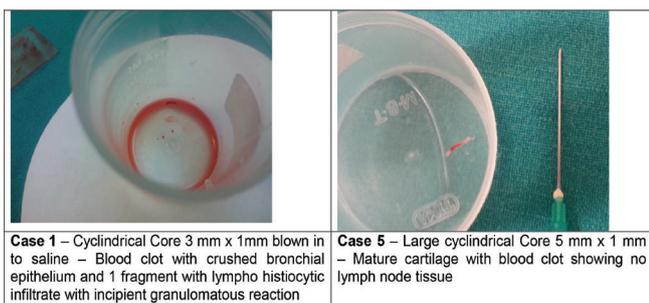
In 2/18 (11.11%) patients where core biopsy was not

21 / 22 G	19 G
Vizi Shot 22 G Olympus	Wang MW319
Olympus Smooth Shot NA 601 D – 1321	Olympus Smoot Shot NA 601 D – 1519
Endoflex	Excelon – Boston Scientific
Excelon – Boston Scientific	
Echo TIP Ultra HD EBUS (Cook)	
Echo TIP Pro Core EBUS (Cook)	

Table-1: Different types of Needles

Diagnosis	Rose / Cytology	Histology – Core Biopsy
Malignant / Atypical cells	3 / 18 (17%)	1 / 18 (06%)
Metastatic poorly differentiated carcinoma	2	
Neuroendocrine Tumor / round cell tumor	1	1
Granulomatous inflammation	12 / 18 (67%)	9/18 (50%)
Necrotizing	1	
Non Necrotizing	11	
Reactive lymphadenitis	1 / 18 (06%)	1 / 18 (06%)
Non Representative	2 / 18 (11%)	3 / 18 (17%)
Total	18	14

Table-2: Results



Size doesn't matter – our experience!

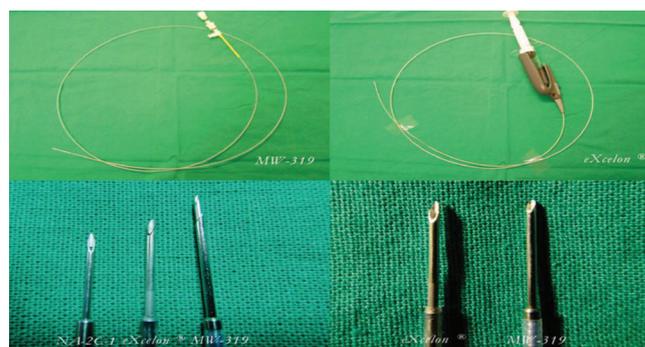
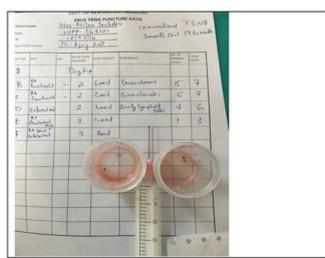
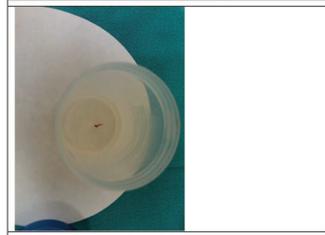


Figure-1: Needle Images

	<p>CASE 17</p> <ul style="list-style-type: none"> • Fragments 1 – 2 mm size • Container A – Histology showing Fragmented clot dominated tissue with low volume non organized granulomatous elements • Container B – AFB Culture, Gene expert
	<p>CASE 2 – Non Caseating Epithelioid Granuloma</p>
	<p>CASE 8 – Granulomatous inflammation without caseating necrosis. ZN stain for AFB – Negative</p>
	<p>CASE 9 – If core biopsy was unsuccessful or adequate tissue fragments could not be retrieved then attempt was made to send cell block from TBNA aspirates. Result was showing blood clot with possibility of Small cell Carcinoma</p>

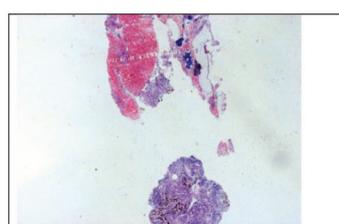
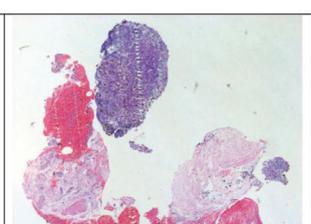
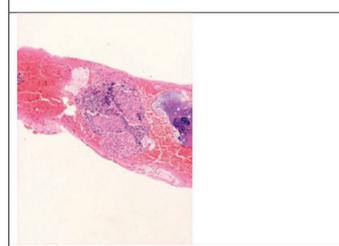
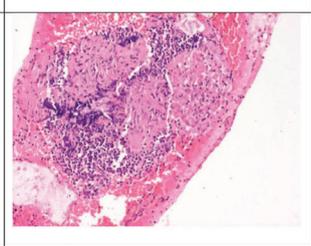
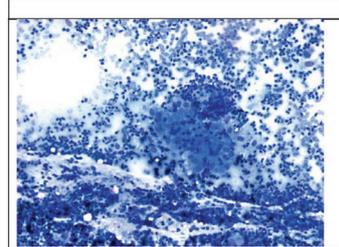
	
<p>CASE 3 – Low power Lymph node tissue and anthracosis</p>	<p>CASE 3 – High power Reactive lymph node tissue</p>
	
<p>CASE 2 – Low power Granuloma and bronchial cartilage</p>	<p>CASE 2 – High Power Granuloma, non necrotic</p>
	
<p>CASE 2 – Granuloma (On Cytology)</p>	

Figure-3: Histology images

Figure-2: Sample Documentation of Puncture / Needle Passes with simultaneous ROSE to help decide when to stop sampling. Sampling was stopped when 2 – 3 adequate core biopsies were obtained and when ROSE was representative. Usually multiple needle passes were performed at each nodal station (4R and 7)

obtained, Cell block preparation was done from TBNA sample and diagnostic yield was obtained in 1/ 2 patients as small cell carcinoma. Non representative tissue was obtained in other 1 patient (fig-4).

DISCUSSION

To the best of our knowledge, the diagnostic yield gained by the histology examination of core tissue biopsy specimens obtained with the 19-gauge TBNA needle has not been clearly reported before in our country and it is unclear as to what size and shape of tissue is possible to be retrieved.

In a large series of 473 TBNA at an academic center of excellence in North India, 21 G TBNA needle was used in all cases.¹ It appears that 19 G TBNA needle is unpopular and under used. We found 19 G TBNA needle safe and did not experience complications of bleeding, mediastinal hematoma or pneumothorax. Our complications were related to sub optimal operator technique as shown in figure. However we selected larger mediastinal nodes as compared to other investigators.²

19 G needle allowed simultaneous collection of adequate representative material for cytology in 16 of 18 cases (89%) and diagnosis could be achieved even if core biopsy was not

retrieved as in 4 / 18 (22%) patients. We did not experience a learning curve as we obtained adequate core tissue in all of our first 4 patients.

Using a 19G TBNA needle to obtain larger specimens may be helpful in circumstances requiring histologic diagnosis as in lymphoma or molecular testing in adenocarcinoma. This can be a cost - saving alternative to surgical mediastinal exploration or the more expensive EBUS TBNA cell block preparations which could be reserved for sampling smaller nodes. It should be performed after careful case selection and familiarization with the technique should not be neglected in training programmes and workshops, especially in our country where cost is major issue.

Other studies have tried to determine the diagnostic contribution of a histology specimen examination added to cytology smear examination. In our study, the core biopsy did not improve or change the diagnosis. This could be because of our patient population which was primarily of granulomatous disease. If we had larger case mix of tumor patients (including lymphoma) this study might have shown a significant advantage of 19 G needle use.⁴

In future we may send part of core tissue fragment for AFB culture and it remains to be seen if this improves the accuracy of diagnosis in suspected TB and sarcoidosis. We may also try to adapt our 19 G needle as shown by Wang in his HYBRID EBUS TBNA study published in 2015.⁵ It also remains to be seen if core histology is really able to give consistent and better results than cell block preparations

made by either 21 G / 19 G needles.

We were unable to establish a correlation between tissue fragment size and adequacy for histopathology result as shown by Oki M, Saka H in their study of 2005 where smaller specimens less than 1 mm sq. were more likely to contain non-specific tissue with non-specific diagnosis of blood clot, fibrin, cartilage or lymphoid aggregates and larger specimens were more likely to contain diagnostic tissue as shown in table below.³ However, size of fragments could be misleading.

CONCLUSION

Conventional 19 G TBNA is feasible and safe in larger mediastinal nodes and can yield acceptable histopathological results in experienced hands. Using a 19G TBNA needle to obtain larger specimens may be helpful in circumstances requiring histologic diagnosis as in lymphoma or molecular testing in adenocarcinoma. The 19G TBNA procedure can be a cost-saving alternative to surgical mediastinal exploration. It should be performed after careful case selection during initial diagnostic bronchoscopy and familiarization with the technique should not be neglected in training programmes and workshops.

REFERENCES

1. Ajmal Khan, Ritesh Agarwal, Ashutosh N. Aggarwal, Nalini Gupta, Amanjit Bal, Navneet Singh, Dheeraj Gupta. Blind transbronchial needle aspiration without an on-site cytopathologist: Experience of 473 procedures. *The National Medical Journal of India* 2011;24:23-29.
2. Grigorios Stratakis, Ilias Porfyridis. Exclusive diagnostic contribution of the histology specimens obtained by 19-gauge transbronchial aspiration needle in suspected malignant intrathoracic lymphadenopathy. *Chest* 2008;133:131–136
3. Masahide Oki, Hideo Saka. The size and quality of the histology specimens obtained with transbronchial needle aspiration. *J Bronchol* 2005;12:71–75.
4. Li- Han Hsu, Chia-Chuan Liu, Jen-Sheng Ko, An-Chen Feng, Nei-Min Chu. Comparison of 19-gauge eXcelon and WANG MW-319 transbronchial aspiration needles. *Thoracic Cancer* 2016;7:264–270.
5. Suqin Ben, Jason Akulian, Ko-Pen Wang. Endobronchial ultrasound transbronchial needle aspiration: a hybrid method - *J Thorac Dis* 2015;7:S287-S291

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 09-01-2020; **Accepted:** 11-02-2020; **Published:** 29-02-2020