P2.061 EBUS-TBNA for nodal staging prior to stereotactic body radiation therapy in early-stage NSCLC: a prospective comparison with PET-CT

Kenta Nakahashi[1], Takahiro Nakajima[1,2], Nicholas Bernards[1], Tyler Nguyen[1], Hana Kosoy[1], Andrew Hope[3], Andrea Bezjak[3], Kasia Czarnecka-Kujawa[1,4], Kazuhiro Yasufuku[1]

(1) Division of Thoracic Surgery, Toronto General Hospital, University Health Network, Toronto, Ontario, Canada, (2) Department of General Thoracic Surgery, Dokkyo Medical University, Mibu, Shimotsuga, Tochigi, Japan
(3) Department of Radiation Oncology, Princess Margaret Cancer Centre, University of Toronto, Canada, (4) Division of Respirology, Department of Medicine, Toronto General Hospital, University Health Network, Toronto, Ontario, Canada
Correspondence: Kazuhiro.Yasufuku@uhn.ca

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Background and Objective

- In medically inoperable early-stage non-small cell lung cancer (NSCLC), stereotactic body radiation therapy (SBRT) is an effective treatment
- Accurate lymph node (LN) staging is critical to avoid inappropriate treatment of patients with occult nodal disease
- **This study evaluated the clinical value of incorporating EBUS-TBNA into pre-SBRT nodal staging**
- Positron emission tomography-computed tomography (PET-CT) is commonly used but may yield false-positive findings
- Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) offers minimally invasive pathologic confirmation

Methods

Study design and pre EBUS-TBNA evaluation

- Single-institutional prospective study
- All patients were medically inoperable or declined surgery

Patients flow

Patients who underwent EBUS-TBNA with radiologically confirmand or suspected early-stage (T1-T2) NSCLC, considered for SBRT at Toronto General Hospital (Apr. 2013-Dec. 2022) **n = 104**

Excluded:
(1) Pre EBUS-TBNA CT / F-18 fluorodeoxyglucose (FDG) - PET/CT were not available **n = 2**
(2) No CT follow up for more than 6 months after the procedure **n = 71**

Analyzed patients **n = 31**

Pre EBUS-TBNA imaging evaluation

- Pre EBUS-TBNA staging based on the 8th edition of the TNM classification was determined using CT and PET-CT
- Clinical N positive was defined as LN short axis diameter >10 mm on pre EBUS-TBNA CT
- Staging included, chest CT, PET-CT, brain imaging, and EBUS-TBNA. PET-CT nodal positivity was defined as a maximum standardized uptake value (SUV) greater than 2.5 that could not be explained by benign conditions

EBUS-TBNA procedures and post EBUS-TBNA diagnosis

EBUS-TBNA procedures

- EBUS-TBNA procedures were done under moderate (conscious) sedation using midazolam and fentanyl without intubation
- In general, nodal staging was performed systematically
- EBUS-TBNA targeted mediastinal stations (4R, 4L, 7), ipsilateral hilar nodes (10R/11R or 10L/11L), and any suspicious LNs

Definition of EBUS-TBNA diagnosis correctness

EBUS N diagnosis	Surgical N diagnosis	CT N diagnosis (6 months post EBUS)	Final N diagnosis	Correct or Incorrect
Positive			Positive	Correct
Negative	Positive		Positive	Incorrect
Negative	Negative		Negative	Correct
Negative		Positive	Positive	Incorrect
Negative		Negative	Negative	Correct

Statistical analysis

Calculated parameters	sensitivity, specificity, positive predictive value, negative predictive value, and accuracy
Comparisons of continuous variables	the Mann-Whitney U test
Comparisons of categorical variables	the chi-square test or Fisher's exact test

Accuracy = the number of patients whose final N stage was accurately diagnosed using EBUS-TBNA / all patients

- Compared the diagnostic outcome of EBUS-TBNA and PET-CT, with a detailed investigation into false-positive and false-negative PET-CT cases

Results

Table 1 Clinicopathological characteristics of patients

Variables	Median value (Interquartile range) or n (%)
Age (years)	77 (71-84)
Tumor location [RU / RM / RL / LU / LL]	16 (52) / 0 / 7 (22) / 5 (16) / 3 (10)
Tumor size (cm)	2.0 (1.3-3.0)
PET N [0 / 1 / 2 / 3]	19 (61) / 4 (13) / 1 (3) / 7 (23)
EBUS N [0 / 1 / 2 / 3]	28 (90) / 3 (10) / 0 / 0
Final N [0 / 1 / 2 / 3]	24 (77) / 4 (13) / 2 (7) / 1 (3)
Sampled lymph node stations	4
Pathological subtype [Ad / Sq / NSCLC / Other malignancy]	15 (48) / 5 (16) / 3 (10) / 8 (26)

RU = right upper lobe; RM = right middle lobe; RL = right lower lobe; LU = left upper lobe; LL = left lower lobe;
PET = Positron emission tomography; EBUS = Endobronchial ultrasound; Ad = adenocarcinoma; Sq = squamous cell carcinoma;
NSCLC = non-small cell lung cancer

Table 2 Diagnostic outcome for all LNs using PET-CT

Variables	%
Sensitivity	14.3
Specificity	54.2
Positive predictive value	8.3
Negative predictive value	68.4
Accuracy	45.2

Table 3 Diagnostic outcome for all LNs using EBUS-TBNA

Variables	%
Sensitivity	42.9
Specificity	100
Positive predictive value	100
Negative predictive value	85.7
Accuracy	87.1

Figure 1 Diagnostic outcome of EBUS-TBNA vs. PET-CT

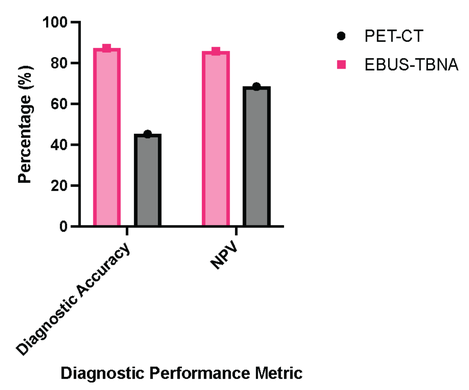
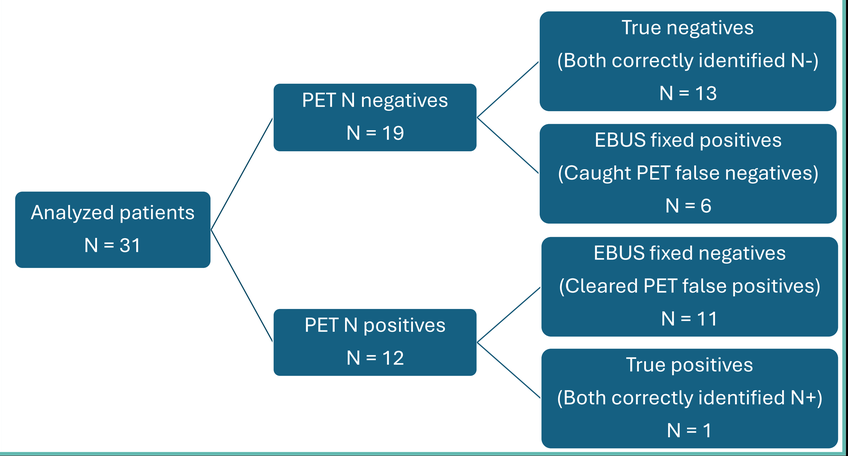


Figure 2 Flowchart of PET-CT and EBUS-TBNA diagnostic outcomes



Conclusions

- In patients with early-stage NSCLC considered for SBRT, EBUS-TBNA demonstrates higher diagnostic accuracy than PET-CT for nodal staging and identifies a substantial proportion of PET-false positive findings
- Incorporating EBUS-TBNA into pre-SBRT evaluation may improve accuracy and support appropriate selection of curative-intent therapy
- Increased case numbers will further elucidate the significance of pre-SBRT EBUS-TBNA evaluation

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