

Use of LungVision Navigational System to Improve Diagnostic Yield of Peripheral Lung Nodule Biopsy

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Abstract

Introduction:

Peripheral lung nodules are a common finding in pulmonary medicine. Cancer screening programs with low dose CT will further increase the number of patients that will require tissue diagnosis. Correct diagnosis of lung cancer or benign lesions is crucial for patient management and can prevent invasive unnecessary medical procedures.

Transbronchial biopsy (TBC) of lung lesions is the safest procedure to acquire tissue for diagnosis of a pulmonary lesion, but its diagnostic yield is low. Navigation tools were developed in recent years to guide the bronchoscopist to the correct location and

improve diagnostic yield. We report here our experience with the LungVision system (Body Vision Medical LTD, Israel). This technology integrates information from pre-procedural CT imaging into augmented fluoroscopic images, presenting real time visualization of the airways and location of the pulmonary lesion during transbronchial navigation and biopsy.

Methods:

We have retrospectively evaluated all procedures of TBC with fluoroscopic transbronchial guidance technology (LungVision™) that were done in Rabin Medical Center in 2017-2019. In all cases moderate sedation was used. Pre-operative CT scan was imported into the LungVision planning software and the physician identified the targeted lesion and selected the preferred navigation pathway. Lesion location was verified with radial probe endobronchial ultrasound (REBUS). Biopsies were collected from the augmented marked area of the lesion as was presented by the LungVision system. In addition to forceps we have also used a cryo probe for tissue sampling. The endpoints for analysis were lesion localization and confirmation of correct probe location, pathological diagnosis and complications during procedure.

Results:

Twenty-seven procedures were done with the LungVision navigation system. Median lesion size was 25 mm (range 13-50) and all lobes were represented. The location of the lesion and probe were confirmed by REBUS in 21 cases. A Cryo probe was used in 22

cases (81%). The overall diagnostic yield was 74% (20/27). None of the patients suffered from pneumothorax or severe bleeding and all were discharged at the same day.

Conclusions:

LungVision is a real-time augmented endobronchial fluoroscopic navigation system. It enables lesion tracking during breathing movement and improves lesion localization and diagnostic yield. Further large-scale studies are indicated to assess the possible role of LungVision as a method for image-guided biopsy of peripheral lung lesions.

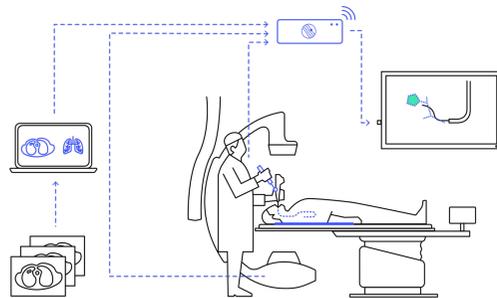
Peripheral nodule biopsy using LungVision™ system – Israeli tertiary center experience in 2 years

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BACKGROUND

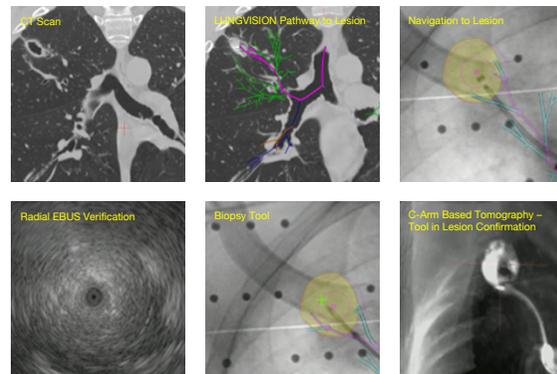
- Pulmonary nodules are often small and challenging to access^{1,2}
- There is constant need for technological improvement for achieving higher diagnostic yield from pulmonary nodule biopsies³
- Bronchoscopies under conscious sedation increase the challenge of reaching the lesion site due to patient breathing motions and movement
- LungVision™ platform is a novel technology based on augmented fluoroscopy and AI that facilitates an accurate endo-bronchial tool positioning for trans-bronchial pulmonary nodule biopsy



REFERENCE

- ¹MacMahon H Guidelines Fleischner Society Radiology 2017
²Callister ME BTS Guidelines Thorax 2015
³Herth FJ Expert Rev Respir Med. 2016

66-year old male, no smoking history, right upper lobe 20 mm cavity nodule (LungVision™ system)



Diagnostic Accuracy* of LungVision™ (%)



Diagnostic accuracy represents diagnostic results after a surgical procedure or a follow up

Patient Parameters and Biopsy Results		LungVision Study
Enrollment period		Jul 2017 – Jul 2019
Number of lesions		34
Age, mean (year SD)		68± 11.7
Male: Female, n (%)		20 (59%) : 14 (41%)
Tobacco users, n (%)		21 (66%)
Size of lesion (mm) (%)	≤ 20	12 (35%)
	> 20	22 (65%)
	Median	25
Location of lesion	RUL	9
	LUL	9
	RLL	6
	RML	4
	Lingula	1
	LLL	5
Lesion confirmation by REBUS		27 (80%)
Total diagnostic accuracy		26 (79%)
Complications	Pneumothorax (%)	2 (5%)
	Severe bleeding (%)	0

STUDY CONCLUSIONS

- LungVision™ has proved to be an efficient platform for trans-bronchial pulmonary nodule biopsy
- Augmented live 3D imaging during navigation provides high lesion localization accuracy
- Real-time confirmation for tool in lesion leads to high accuracy during biopsy