

Use of Augmented Fluoroscopic Navigation and Guidance Technology with Transbronchial Cryo Biopsy to Acquire Tissue from Peripheral Lung Nodules

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Introduction: Transbronchial biopsy of peripheral nodules is the common procedure to acquire tissue for diagnosis, usually done with fluoroscopic guidance. However, fluoroscopy is only two dimensional, hence, during procedure the operator can only assume the biopsy was taken from the correct location. Augmented Fluoroscopic transbronchial guidance technology (LungVison, Body Vision Medical LTD, Israel) enables accurate real-time navigation and lesion localization during bronchoscopic biopsy procedures. Transbronchial cryobiopsy (TBC) obtains large, high quality lung tissue samples with higher probability of correct and conclusive diagnosis. In order to further improve the diagnostic yield of transbronchial biopsy we have implemented the use of TBC with the LungVision system.

Methods: We have retrospectively evaluated all procedures of TBC with LungVision that were done in Rabin Medical Center in 2016-2017. In all cases moderate sedation was used. Flexible bronchoscope with a Cryo catheter was guided to the lesion by augmented pathway and target (figure 1), highlighted on the fluoroscopic image. We confirmed the location of the probe with radial endobronchial ultrasound and the fluoroscopic guidance technology at the c-arm 0 (AP) and 30 degrees angles. The endpoints for analysis were lesion localization and confirmation of correct probe location, pathological diagnosis and complications during procedure.

Results: Out of 15 procedures that were done with the LungVision navigation system, TBC was used in six. All lung lobes were accessed, 4 lesions were located in the right upper lobe, one in the left upper lobe and 1 lesion was located in the lingula. The average lesion size was 23 mm (range 18-47). The location of the nodule and probe were confirmed in all cases, in each case we preformed 1-2 TBCs, 4-6 Trans-bronchial biopsies with forceps and a brush biopsy. None of the patients suffered from post procedural complication and all were discharged at the same day. A pathological diagnosis was confirmed in 5 of 6 cases (83%) with TBC.

Conclusion: TBC and Augmented Fluoroscopic transbronchial guidance technology can be utilized together to improve both the precision and the quality of lung tissue from peripheral nodule biopsy. The use of TBC was found to be safe and did not extend procedure time.

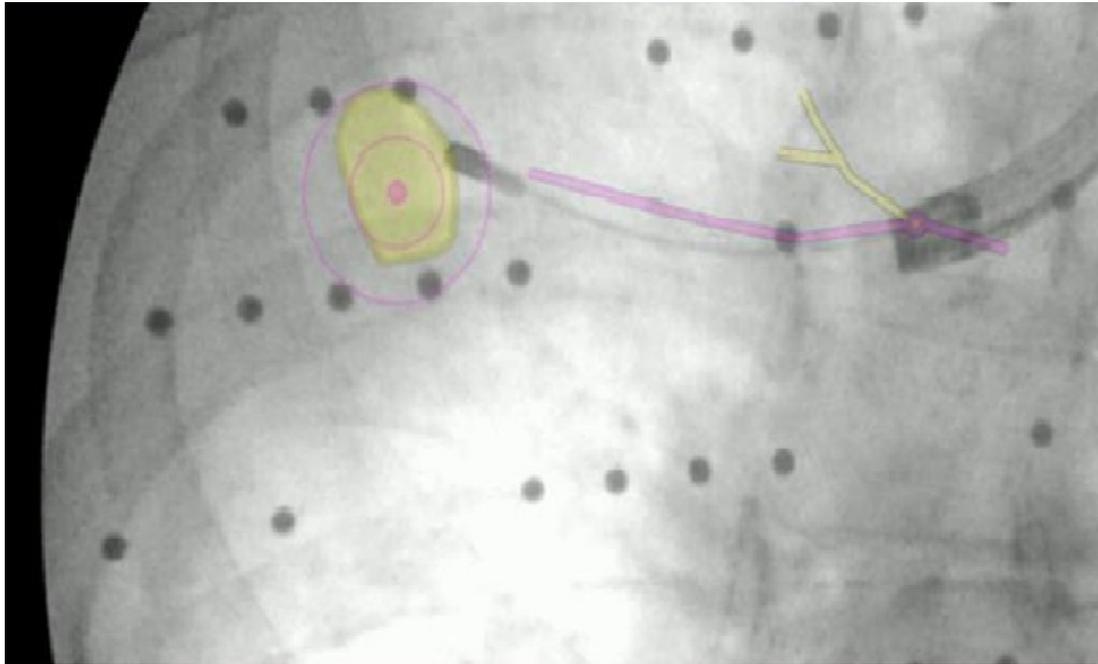


Figure 1. Electronically highlighted pathway and target with a cryo-catheter at the lesion's location

The use of Transbronchial Cryo Biopsy with Fluoroscopic Navigation Technology for Peripheral Lung Nodules



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INTRODUCTION

Fluoroscopic transbronchial guidance technology enables accurate real-time navigation and lesion localization during bronchoscopic procedures. Transbronchial cryobiopsy (TBC) obtains large, high quality lung tissue samples with higher probability of correct and conclusive diagnosis. In order to further improve the diagnostic yield of transbronchial biopsy we have implemented the use of TBC with the fluoroscopic navigation system.

METHODS

We have retrospectively evaluated all procedures of TBC with fluoroscopic transbronchial guidance technology (LungVision[®]) that were done in Rabin Medical Center in 2016-2018. Flexible bronchoscope with a Cryo catheter was guided to the lesion by an electronically highlighted pathway and target. We confirmed the location of the probe with radial endobronchial ultrasound and the fluoroscopic guidance technology at plains 0 and 30 degrees. The endpoints for analysis were lesion localization and confirmation of correct probe location, pathological diagnosis and complications.

RESULTS

Twenty three procedures were performed using the LungVision navigation system. In 15 of these 23 procedures, TBC was used. The mean age was 66.54. The average lesion size was 25.9 mm (range 10-50). The location of the nodule was confirmed with radial EBUS in 12 of 16 procedures (radial EBUS was not available at our facility during the first 7 cases). A pathological diagnosis was confirmed in 17 of 23 (73.9%) cases for the entire cohort and 11 of 15 (73.3%) cases with TBC. None of the patients suffered from pneumothorax or severe bleeding and all were discharged at the same day.

DISCUSSION

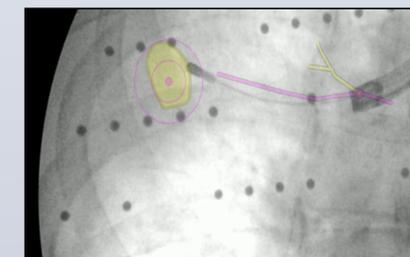
In this study we have demonstrated that the integration of TBC with Fluoroscopic guidance technology can be safely performed. The diagnostic yield did not change in comparison to biopsies done with forceps only. However, the integration of these methods requires a learning curve and our cohort size is not powered to evaluate diagnostic yield. Fifteen procedures were done with both TBC and forceps, from those 11 biopsies were diagnostic (73.3%). Further analysis of all pathological slides showed 2 cases in which the cryo biopsy was diagnostic for malignancy while the biopsies taken with forceps were negative . Finally , Pneumothorax and severe bleeding did not occur even in cases with relatively proximal nodules.

CONCLUSIONS

The use of transbronchial cryo-biopsy with fluoroscopic guidance technology (LungVision, Body Vision Medical, Israel) is feasible and safe. The integration of these methods requires a learning curve and further experience may improve diagnostic yield.

		All procedures	Forceps TBB	Forceps & Cryo TBB
N		23	8	15
Mean age (SD)		66.54 (11.4)	70.5 (13.5)	64.2 (9.8)
Lesion size in mm (SD)		25.9 (11.7)	27.6 (12.2)	24.9 (11.8)
Nodule location	RUL	7	1	6
	RML	3	2	1
	RLL	4	3	1
	LUL	5	1	4
	Lingula	1	0	1
	LLL	3	1	2
Diagnostic yield (%)		17/23 (73.9)	6/8 (75)	11/15 (73.3)
Nodule Confirmation by radial EBUS ¹		12/16 (75.0)	3/5 (60%)	9/11 (81.8%)
Pneumothorax		0	0	0
Severe bleeding		0	0	0

¹Radial EBUS became available at our facility after the first 7 procedures



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