

A novel navigation tool, part of the AI-driven LungVision platform, improves accessibility to pulmonary lesions during bronchoscopy

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Introduction: Lung cancer is the most common cause of cancer-related death worldwide. The lack of early detection and accurate localization of suspicious pulmonary lesions (SPLs) for tissue acquisition remains one of the biggest challenges in lung cancer management. Peripheral SPLs are hard to reach due to the complex structure of the endobronchial tree and the difficult turns that the navigational tool has to make in order to reach specific locations in the periphery. In addition, bronchoscopy is a dynamic procedure in which the lesion is moving due to respiratory motions and other intraprocedural factors that increase the complexity of navigation.

The novel LungVision Tool, part of the LungVision Platform (Body Vision Medical Ltd, Israel), was designed to naturally integrate with AI-driven LungVision Imaging system to provide 3-dimensional position and orientation within the lung during bronchoscopy in order to upgrade spatial tool localization to SPLs. This study presents the first procedures performed with the LungVision Tool to assess its performance.

Methods: Patients with SPLs referred for bronchoscopy were offered to participate in the study. CT scans were imported into the LungVision planning software, where the physicians identified the SPL and selected the desired pathway. The LungVision Tool, which includes a sheath and a wire, was assembled on the bronchoscope and the LungVision system was used to guide the physician in real-time to the location of the lesion. When the real time LungVision fused imaging display showed that the lesion had been reached, lesion location verification was performed either by radial EBUS (REBUS) or cone beam CT (CBCT). Finally, the standard biopsy instruments were inserted through the sheath to the locked location of the SPL and tissue samples were taken under LungVision augmented guidance.

Results: 26 patients were enrolled to the study. The median lesion size was 21mm (range 7-80mm). Nineteen of the SPLs were located in the upper lobes, six were located in the lower lobes and one was located in the middle lobe. The LungVision Tool was used in all cases for navigation to the SPLs. Lesion localization was verified by either REBUS or CBCT in 96% of the cases. The diagnostic yield calculated at the day of the procedure based on the pathology report, without a follow-up period, was 77%.

Conclusions: Procedures performed with the LungVision Tool showed a high localization capability to SPLs. The ability to visualize the accurate location of the lesion in real-time during bronchoscopy, to compensate for lesion motion and to localize the tip of the navigation tool to the SPLs can increase the accuracy of bronchoscopy and improve tool in lesion capabilities. High localization rates to SPLs are associated with increased diagnostic yield. Further studies are required to further evaluate the LungVision Tool performance as part of the LungVision platform.