



# **Lung Nodules**

$\rightarrow$	nCLE-imaging in small, difficult-to-access lung nodules provides additional real-time feedback on the correct needle positioning with the potential to optimize the sampling location and diagnostic yield.	<ul> <li>Manley, C. et al. Robotic bronchoscopic needle-based confocal laser endomicroscopy to diagnose peripheral lung nodules. Respirology, 2022.</li> <li>20 patients - 14.5mm median lung nodule size. nCLE imaging provided tool- in-lesion confirmation in 19 out of 20 patients, after needle repositioning.</li> </ul>
$\rightarrow$	Bronchoscopic nCLE imaging in peripheral lung cancer is feasible, safe, and allows real-time malignancy detection at the tip of the needle with an accuracy equal to 95%, demonstrating the potential of nCLE imaging as a real-time guidance tool to reduce the	Kramer, T. et al. Bronchoscopic needle-based confocal laser endomicroscopy (nCLE) as a real-time detection tool for peripheral lung cancer. Thorax, 2022. 26 patients, nCLE imaging detected malignancy in 22 out of 23 patients
<u> </u>	bronchoscopic near-miss rate.	with lung cancer. Wijmans, L. et al. Needle-based confocal laser endomicroscopy (nCLE) for real-time diagnosing and staging of lung cancer. European Respiratory
	tumours and metastatic lymph nodes was 90% and 89% respectively.	Journal, 2019. EUS-nCLE-FNA in 22 patients with suspected or proven lung cancer in whom 27 lesions (6 tumours, 21 mediastinal nodes) were evaluated
$\rightarrow$	The diagnostic accuracy for lung cancer using r-EBUS coupled with pCLE imaging of Solid Pattern was 79%. The kappa test for interobserver agreement for the	Hassan, T. et al. Assessing the feasibility of confocal laser endomicroscopy in solitary pulmonary nodules for different part of the lungs, using either 0.6 or 1.4 mm probes. PLoS One, 2017.
	identification of solid pattern is 0.74.	48 patients with solitary peripheral pulmonary nodules (SPN)
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## **5** Other publications

- Diaz-Churion, F. et al. Real-time visualization of lung malignancy with needle-based confocal laser endomicroscopy during shape-sensing robotic-assisted bronchoscopy. Respirol Case Rep, 2023.
- Kramer, T. et al, Advanced bronchoscopic techniques for the diagnosis and treatment of peripheral lung cancer. Lung Cancer, 2021.
- Sawada, T. et al. Diagnosis of visceral pleural invasion using confocal laser endomicroscopy during lung cancer surgery. J Thorac Dis, 2021.
- Wijmans, L. et al. Real-Time Optical Biopsy of Lung Cancer. American Journal of Respiratory and Critical Care Medicine, 2016.
- Wellikoff, A. S., et al. Comparison of in vivo probe-based confocal laser endomicroscopy with histopathology in lung cancer: A move toward optical biopsy. Respirology, 2015.

# Lung Transplant

Significant correlation between pCLE and histopathology for acute cellular rejection using number of blood vessels with perivascular cellularity (PVC).

Highly reproducible criteria with inter-observer reproducibility of 0.77 after agreement for PVC.

Keller, C.A. et al. Diagnosis of Acute Cellular Rejection Using Probe-Based Confocal Laser Endomicroscopy in Lung Transplant Recipients: a Prospective, Multicenter Trial. Transplantation, 2019.

24 patients (30 procedures, 8 cases of acute lung rejections)

### pCLE diagnostic performance for an expert reaches Se of 100% and Sp of 85%.

### **Cellvizio® Image Patterns**





Dark aggregates



Dark clumps Malignant nodule



Enlarged pleomorphic cells



Alveoli with negative perivascular cellularity



Alveoli with perivascular cellularity

1KT-109-

# **Interstitial Lung Diseases (ILD)**

The pCLE criteria of the cellular infiltration of the bronchiolar and alveolar areas, and of the alteration of the acinar elastic network, is reproducible between different observers for patients with ILDs.

pCLE seems to differentiate between 2 key underlying histological patterns: « Cellular » pattern corresponding to interlobular cellular infiltrates and « increased fiber » pattern corresponding to fibrotic tissue areas.

Differentiate between mild and dense fibrotic lung. Make distinction between the pleura and the alveolar airspaces, which accordingly could diminish the complication rate.

Salaün, M. et al. In vivo probe-based confocal laser endomicroscopy in chronic interstitial lung diseases (ILD): Specific descriptors and correlation with chest CT: pCLE in interstitial lung diseases. Respirology, 2019.

21 healthy volunteers (HV) and 59 non-smoking ILD patients

Wijmans, L. et al. Confocal laser endomicroscopy (CLE) for differentiating the underlying cause of CT-ground glass opacities in ILD patients. Abstract, European Respiratory Journal, 2018.

20 non/former smokers with ILD scheduled for lung biopsies

Wijmans, L. et. al. Confocal Laser Endomicroscopy as a Guidance Tool for Transbronchial Lung Cryobiopsies in Interstitial Lung Disorder. Respiration, 2018.

14 patients



### **Other publications**

- Shafiek, H. et al. Usefulness of Bronchoscopic Probe-Based Confocal Laser Endomicroscopy in the Diagnosis of Pneumocystis jirovecii Pneumonia. Respiration, 2016.
- Newton, R.C. et al. Imaging Parenchymal Lung Diseases with Confocal Endomicroscopy. Respiratory Medicine, 2012.

- Salaün, M. et al. In vivo probe-based Confocal Laser Endomicroscopy in Amiodarone-related Pneumonia. European Respiratory Journal, 2013.
- Fuchs, F.S. et al. Fluorescein-aided Confocal Laser Endomicroscopy of the Lung. Respiration, 2011.

## COVID-19

pCLE image shows density of alveolar thickened fibres, disorganization of elastin network, and multiple large drops of intraalveolar secretions.

Vasilev, I. V. et al. Probe-based confocal laser endomicroscopy in COVID-19. Adv Respir Med, 2021.

> pCLE data may prove the impairment of surfactant production and utilization.

Danilevskaya, O. et al. Confocal Laser Endomicroscopy in a Critically Ill COVID-19 Patient. Tuberc Respir Dis, 2022.

# Other Publications of Interest

- Wijmans, L. et al. Confocal laser endomicroscopy (CLE) as a guidance tool for pleural biopsies in malignant pleural mesothelioma. CHEST, 2019.
- Newton, R.C. et al. Imaging Parenchymal Lung Diseases with Confocal Endomicroscopy. Respiratory Medicine, 2012.
- Yick, C.Y. et al. In vivo imaging of the Airway wall in Asthma: Fibered confocal Fluorescence Microscopy in Relation to Histology and Lung Function. Respiratory Research, 2011.
- Bonhomme, O. et al. Probe-based confocal laser endomicroscopy for pleural malignancies diagnosis, 2020.

### **Cellvizio® Image Patterns**



Organized Pneumonia



Cellular structure in alveolar space



Fibrosis (Increased fibers)



Asthma (lamelar pattern)



Alveoli with Emphysema [loss of septal wall]

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