National Jewish Health
Breathing Science is Life.

JOURNAL CLUB

Article Summary by: Rebecca Keith, MD and Lida Hariri, MD, PhD

ARTICLE

Diagnostic Accuracy of Endobronchial Optical Coherence Tomography for the Microscopic Diagnosis of Usual Interstitial Pneumonia. Am J Respir Crit Care Med. 2021 Nov 15;204(10):1164-1179. PMID: 34375171

CLINICAL QUESTION

Can endobronchial optical coherence tomography (EB-OCT) be used as a minimally invasive microscopic assessment tool to aid in the diagnosis of ILD?

SUMMARY

Accurate diagnosis of interstitial lung disease (ILD) informs prognosis and therapeutic approach. High-resolution computed tomography has limited resolution, while surgical lung biopsy (SLB) carries risks of morbidity and mortality. Endobronchial optical coherence tomography (EB-OCT) is a low-risk, bronchoscope-compatible modality that images large lung volumes in vivo with microscopic resolution of approximately 10 microns and penetration depth of up to 3mm.

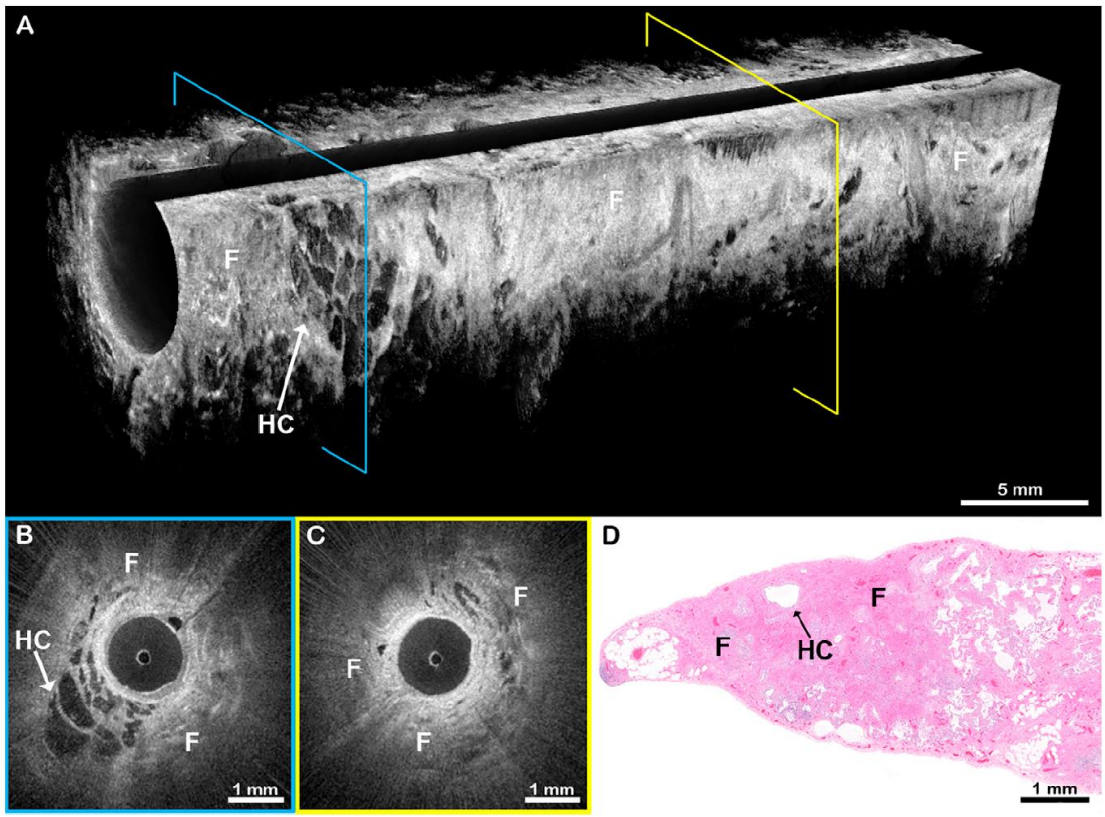
In this study EB-OCT was performed immediately before SLB in ILD patients with low confidence clinical-radiologic diagnosis. The resulting EB-OCT images and histopathology were interpreted by blinded, independent pathologists. Clinical diagnosis was obtained from the treating pulmonologists after SLB, blinded to EB-OCT. Primary endpoints were EB-OCT sensitivity/specificity for diagnosis of the histopathologic pattern of usual interstitial pneumonia (UIP) and clinical IPF. The secondary endpoint was agreement between EB-OCT and SLB for diagnosis of the ILD fibrosis pattern. Twenty-seven patients were included in the analysis (16 men, average age: 65.0 yr): 12 were diagnosed with UIP and 15 with non-UIP ILD on histopathology. Sensitivity and specificity of EB-OCT was 100% (95% confidence interval, 75.8–100.0%) and 100% (79.6–100%), respectively, for both histopathologic UIP and clinical diagnosis of IPF. There was high agreement between EB-OCT and histopathology for diagnosis of ILD fibrosis pattern (weighted κ: 0.87, (0.72-1.0)). The study also demonstrated that EB-OCT procedural and interpretation skills can easily be acquired by physicians who are unfamiliar with EB-OCT with minimal training.

This study supports EB-OCT as a low-risk, minimally invasive method for the microscopic diagnosis of ILD, as an adjunct to high-resolution computed tomography and an alternative to SLB. Future, multicenter studies are needed to further validate the findings of this study.

National Jewish Health
Breathing Science is Life.

JOURNAL CLUB

Article Summary by: Rebecca Keith, MD and Lida Hariri, MD, PhD



Article Summary by: Rebecca Keith, MD and Lida Hariri, MD, PhD

EB-OCT Diagnosis	Histopathology Diagnosis	Clinical Follow-up Diagnosis
UIP	UIP	IPF
Mixed NSIP + ACF	Mixed NSIP and ACF	Likely FHP, but no antigen source identified
UIP	UIP	IPF (limited scleroderma likely unrelated to UIP)
UIP	UIP	IPF
UIP	UIP	IPF
UIP	UIP	IPF
UIP	UIP	IPF
Mixed ACF + NSIP	Mixed ACF + NSIP	FHP
Mixed ACF + NSIP	Mixed ACF + NSIP	CTD-ILD (myositis)
Mixed NSIP + ACF	NSIP + ACF	Likely FHP, but no antigen source identified
UIP	UIP	IPF
Mixed ACF + NSIP	Mixed ACF + NSIP	Likely FHP, but no antigen source identified
Mixed ACF + NSIP + UIP	Mixed ACF + NSIP + UIP	Fibrotic ILD of unclear etiology, possibly from inhalational exposure. Not IPF
UIP	UIP	IPF
Mixed NSIP + ACF + UIP	NSIP	FHP (bird exposure)
UIP	UIP	IPF
UIP	UIP	IPF
NSIP	NSIP	Idiopathic fibrotic NSIP
UIP	UIP	IPF
Mixed ACF + NSIP + UIP	Mixed ACF + NSIP + UIP	Likely FHP, but no antigen source identified
Mixed ACF + NSIP	NSIP	CTD-ILD (SLE)
Mixed ACF + NSIP + UIP	Mixed ACF + NSIP +UIP	Fibrotic ILD of unclear etiology, possibly from inhalational exposure. Not IPF
ACF	ACF	Fibrotic ILD of unclear etiology, possibly from inhalational exposure. Not IPF
Mixed ACF + NSIP	Mixed ACF + NSIP	Autoimmune-related ILD (IBD)
Mild ACF + NSIP; small mass lesion in LLL	Other (DIPNECH with carcinoid tumorlets)	DIPNECH
UIP	UIP	IPF
Mixed ACF + NSIP	Mixed ACF + NSIP	CTD-ILD (myositis)

Definition of abbreviations: ACF = airway-centered fibrosis; CTD-ILD = connective tissue disease–related interstitial lung disease; DIPNECH = diffuse idiopathic pulmonary neuroendocrine cell hyperplasia; EB-OCT = endobronchial optical coherence tomography; FHP = fibrotic hypersensitivity pneumonitis; IBD = inflammatory bowel disease; IPF = idiopathic pulmonary fibrosis; LLL = left lower lobe; NSIP = nonspecific interstitial pneumonia; SLE = systemic lupus erythematosus; UIP = usual interstitial pneumonia.

GROUP OPINION

EB-OCT is a safe, minimally invasive technique to diagnose histopathologic UIP with high sensitivity and specificity. EB-OCT procedural and interpretation skills can easily be acquired with minimal training. EB-OCT is a very promising complement to HRCT and potential surrogate for surgical lung biopsy. A larger sample size may help to determine diagnostic accuracy for non UIP ILD. A large multicenter trial is currently planned to validate these findings.

On behalf of the National Jewish Health ILD Program Providers:
Matthew Koslow, MD, Evans Fernandez, MD, MS, Tristan J. Huie, MD, Rebecca Keith, MD, Michael P. Mohning, MD, Katherine Rosen, NP, Joshua J. Solomon, MD, Zulma X. Yunt, MD, Stephen K. Frankel, MD, Kevin K. Brown, MD, Gregory P. Downey, MD