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Reply to Wijmans *et al*.

From the Authors:

We read with interest the comments by Wijmans and colleagues on our recently published paper (1), and we appreciate their interest in our work and their own interest in the technique of optical coherence tomography (OCT) (2). Our aim was to determine whether endobronchial OCT could serve as a method for the assessment and diagnosis of interstitial lung disease (ILD), specifically usual interstitial pneumonia/idiopathic pulmonary fibrosis (UIP/IPF). Our approach to investigate this issue has been to enroll all-comer patients with ILD who are undergoing surgical lung biopsy for diagnosis. We are strategically focusing on the most clinically relevant diagnostic distinction: UIP/IPF versus non-UIP/IPF ILD. This is driven by the clinical impact on prognosis and therapeutic decision-making, as well as the known limitations of current diagnostic guidelines in making this

distinction. However, we certainly agree with Wijmans and colleagues that OCT has potential as a technique for diagnosing and assessing non-UIP ILDs. Enrollment in our studies is ongoing, and we have subsequently imaged additional patients with ILD ($n = 12$), including additional patients with non-UIP/IPF ILD. We have demonstrated that OCT features of non-UIP ILDs also closely parallel the histologic features seen on corresponding surgical lung biopsies (3, 4).

Wijmans and colleagues have questions regarding our selection and analysis of OCT images, and how specific OCT criteria were applied to assess pathologic features, which we address below.

OCT Imaging Criteria

OCT is a microscopic imaging technique, and therefore we developed OCT imaging criteria to diagnose UIP/IPF that closely parallel established histologic criteria. The criteria used to assess OCT in this study, as described in the article, are based on data from our ongoing *ex vivo* OCT studies in ILD lung specimens (3–6). Because OCT is a form of *in vivo* microscopy, interpretation of OCT images requires in-depth knowledge of the microscopic features of UIP/IPF and other ILDs. Therefore, we included a panel of five pathologists with ILD expertise in our study.

OCT Analysis

We conducted OCT interpretation by applying the OCT imaging criteria to an entire volumetric stack of cross-sectional images obtained in four to six distinct lung locations for each patient. As demonstrated in our presented cases, and noted by Wijmans and colleagues, this uniquely allows for a three-dimensional assessment of various features, such as cystic traction bronchiectasis and honeycomb change, and has the potential to overcome some of the limitations that challenge both high-resolution computed tomography and standard two-dimensional histologic interpretation.

Interobserver Variability

We absolutely agree that assessments of interobserver variability, as well as sensitivity and specificity, will be essential to determine the true clinical impact of endobronchial OCT as larger numbers of cases evaluated with this modality are accrued.

We thank Wijmans and colleagues again for their interest in our research, and congratulate them on their own efforts in applying OCT for ILD assessment. It is through concerted, rigorous, and collegial efforts from multiple groups that we will be able to determine the true clinical impact of OCT on ILD diagnosis. ■

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Home-based Approach Noninferior to Hospital-based Approach in Managing Patients with Suspected Obstructive Sleep Apnea Syndrome

To the Editor:

Attended polysomnography (PSG) is the conventional approach for managing patients with suspected obstructive sleep apnea syndrome (OSA), but the waiting time is lengthy for this labor-intensive

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procedure (1). We congratulate Corral and colleagues for their nice, multicenter randomized, noninferiority study showing that level 3 respiratory polygraphy protocol was noninferior to the PSG protocol based on the Epworth sleepiness scale as the primary endpoint, with a lower cost of €416.7 per patient over the course of 6 months, whereas other endpoints such as quality of life, blood pressure, and PSG were similar between the two protocols (2). In a similar study comparing an ambulatory approach versus the hospital-based approach in managing new referrals with suspected OSA at the Prince of Wales Hospital in Hong Kong, we have shown no difference in Epworth sleepiness scale (primary endpoint), but greater improvement in sleep apnea quality-of-life index (difference, 0.3; 95% confidence interval, 0.02–0.6; $P = 0.033$) at 3 months in the ambulatory group. The mean (SD) costs for patients in the ambulatory group and hospital-based group were HK\$8,479 (HK\$989) and HK\$22,248 (HK\$2,407), respectively. The mean difference between the two groups was HK\$13,769 (US\$1,770 or €1,525 equivalent) per patient (95% confidence interval, –HK\$14,324 to –HK\$13,213; $P < 0.001$) in favor of the ambulatory approach. The waiting time of patients with moderate to severe OSA (apnea-hypopnea index $\geq 15/h$) who were started on continuous positive airway pressure (CPAP) treatment from the first clinic consultation to the diagnostic sleep test, auto-CPAP titration, and CPAP treatment was 189.6, 148.8, and 145.0 days shorter in home-based than hospital-based approach, respectively (3). Another multicenter randomized noninferiority study that mimicked limited-channel studies by extracting data from laboratory PSG has shown that manually scored level 3 testing was noninferior to laboratory-based PSG in outcome measures including Functional Outcome of Sleep Questionnaire score, Epworth sleepiness scale, CPAP usage, and physician's decision-making (4).

The American Academy of Sleep Medicine has recently endorsed home sleep apnea testing with a technically adequate device as an alternative to PSG. The ambulatory approach must be ordered and interpreted by a board-certified physician to diagnose OSA or evaluate treatment efficacy in uncomplicated and symptomatic adult patients that indicate an increased risk for moderate to severe OSA (5, 6). The data from Corral and colleagues (2) and ourselves (3) have clearly shown that the ambulatory approach for diagnosis and treatment is noninferior to the conventional hospital-based approach in managing patients with suspected OSA in terms of improvement of symptoms and CPAP usage, with the added advantages of much shorter waiting time (3), and substantial cost savings (2, 3). Such an alternative approach is particularly important in densely populated countries with limited healthcare resources to meet the growing demand for more rapid access to sleep testing. ■

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