

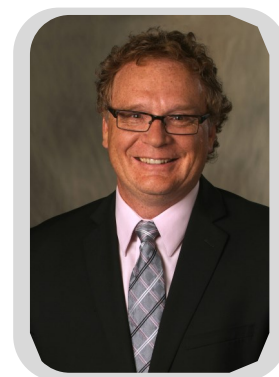
Medical Physics Seminar

Monday, October 26th, 2015

1345 HSLC ~ 4:00 P.M.

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The Longitudinal Assessment of Chronic Obstructive Pulmonary Disease Using Quantitative Imaging

Forced expiratory volume in 1 second (FEV1), measured using spirometry, provides a straightforward, widely-available and inexpensive global measurement of airflow limitation and lung function. For decades, FEV1 has remained the main intermediate endpoint used in research studies and for the development of new COPD therapies. Not surprisingly, therapies that acutely improve FEV1, dominate as COPD therapies. However, in COPD patients, the relationship of FEV1 with symptoms and outcomes such as exacerbations and mortality is weak, and importantly, FEV1 does not take into account the heterogeneity of COPD nor its different phenotypes. Thoracic imaging provides a way to quantify airway remodeling, emphysematous destruction, regional ventilation abnormalities (ventilation defects) and gas trapping in ex-smokers in whom FEV1 may be normal and in COPD patients with very modest lung function deterioration. In individual patients and in COPD cohort studies, thoracic imaging using x-ray computed tomography (CT), and magnetic resonance imaging (MRI) (conventional 1H as well as hyperpolarized noble gases such as ^{129}Xe , ^3He) and optical coherence tomography can be used to directly visualize the structural and functional consequences of COPD and thus provide a clearer picture of COPD mechanisms, disease progression and response to therapy. We briefly describe pulmonary imaging methods that provide a way to visualize and quantify with high spatial and temporal resolution, regional ventilation abnormalities, gas trapping, emphysema and airway remodeling in COPD. Finally we discuss the implications of recent imaging findings and their impact on future biomarker and therapy research aimed at improving COPD outcomes.

UW– Madison School of Medicine and Public Health

1345 HEALTH SCIENCES LEARNING CENTER - 4:00 to 5:00 P.M.