

Evaluating a new method for doctors to measure lung function

In Missouri, 7.6 % of citizens have been diagnosed with Emphysema or Chronic Obstructive Pulmonary Disease (COPD), a prevalence higher than other states. Annual costs towards this disease in our state total \$666 million. The current method doctors use to visualize lung diseases is nuclear medicine (NM) imaging using an inhaled, radioactive tracer. A different approach to imaging lungs is to use an inert tracer (Xenon) and a MRI procedure. This method uses no radiation and provides higher resolution images within a single 10-15 second breathhold. To propel the Xenon MRI method towards regulatory approval by the FDA, we have used computerized methods to compare Xenon MRI and NM lung imaging of the same patients.

59 Subjects (14 healthy, 23 with Asthma, and 22 with COPD) underwent both NM imaging and Xenon MRI generating 59 pairs of images. Images were spatially matched and compared based on percentage of overall lung ventilation and individual pixel agreement. We found a correlation between pixel values in spatially matched images and in overall lung ventilation. In addition, Xenon MRI was able to differentiate between healthy, COPD, and Asthmatic lung images. These results indicated that Xenon MRI provides at least equivalent information to NM imaging. Since it can do this without exposing the patient to radiation, has a shorter imaging time, and produces higher resolution images, we believe Xenon MRI will be a valuable tool in lung imaging. The University of Missouri is one of a handful of locations worldwide with the equipment required for Xenon MRI, positioning Missouri to be a leader in lung imaging research and pulmonary medicine.