New Method for Imaging Ventilation and Perfusion in the Lung Using MRI

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BACKGROUND

Virtually all lung disease is characterized to some extent by disruption of alveolar ventilation (VA) and perfusion (Q) (VA/Q) matching, resulting in gas exchange inefficiency. The only fully quantitative technique considered to be the “gold-standard” at the moment is MIGET (multiple inert gas elimination technique), which quantifies the overall distribution of ventilation or perfusion as a function of VA/Q ratio. However, MIGET is technically very demanding, highly invasive, and does not provide spatial information.

TECHNOLOGY DESCRIPTION

UC San Diego researchers have developed a fully quantitative non-contrast proton MRI technique to measure alveolar ventilation (VA) and perfusion (Q) and VA/Q matching in the lung. The technology provides the ability to measure spatial VA/Q on a voxel by voxel basis on a standard 1.5 T clinical scanner. Furthermore, concerns about contrast injection and/or radiation hazard are completely eliminated, which would be especially important where repeated evaluation would be desirable.

APPLICATIONS

This novel technology provides unprecedented abilities to evaluate mechanisms of lung disease, injury, response to treatment and repair, and to screen populations of patients at risk of developing lung disease, and to monitor response to treatment in those already afflicted.

STATE OF DEVELOPMENT

To date researchers have studied fourteen subjects and have analyzed data from three of them. Efforts to develop the metrics for describing the data are ongoing.

RELATED MATERIALS

- Henderson AC, Sá RC, Theilmann RJ, Buxton RB, Prisk GK, Hopkins SR. The gravitational distribution of ventilation-perfusion ratio is more uniform in prone than supine posture in the normal human lung. J Appl Physiol. 2013 Apr 25. [Epub ahead of print] - 04/25/2013

IP STATUS

Patent pending.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,750,427	09/05/2017	2010-320

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OTHER INFORMATION

KEYWORDS

MRI, pulmonary function, alveolar ventilation, perfusion, VA/Q ratio, specific ventilation imaging, SVC, lung disease

CATEGORIZED AS

- **Medical**
  - Disease: Respiratory and Pulmonary System

RELATED CASES

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