

## Chemical Shift MRI in Diagnosis of Pulmonary Hamartoma

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### Abstract

Pulmonary hamartomas are relatively common benign lesions containing variable amounts of various mesenchymal tissues. When containing macroscopic fat or coarse calcifications, their confident diagnosis is straightforward based on CT imaging. However, when the above features are absent, their diagnosis can be problematic and require a biopsy. Here we report a case of chemical shift MRI imaging aiding in diagnosis of a pulmonary hamartoma with nonspecific CT appearance.

**Keywords:** pulmonary hamartoma; Chemical-shift MRI imaging

### Case Presentation

An 84-year old woman was referred to our department for imaging of an incidentally discovered 2.6 cm × 2.1 cm nodule in the right lower lobe. Initial non-contrast CT chest showed a well-defined, solid nodule in the posterior aspect of the right lower lobe (Figure 1). Its radio-density ranged between -10 and +13 Hounsfield Units (HU). As confident detection of fat on CT requires radiodensities of -40 HU or less, the nodule was reported as indeterminate, and the patient was followed by chest CT at 3 and 6 months after the original scan. At the time of the 2<sup>nd</sup> follow-up CT the patient had also undergone abdominal MRI for characterization of liver hypodensities. The right lower lobe nodule was visible on all sequences of the abdominal MRI, including the chemical shift imaging of the liver with the settings of TR 110 ms TE 4.404 ms for in-phase, and TR 110 ms TE 2.156 ms for out-phase sequences (Figure 2). The pulmonary nodule showed high signal intensity on T2 and T1 in-phase sequences. The T1 out-of-phase sequence showed definite signal drop-out of the lesion (33% signal intensity decrease), with thus confirming presence of intralesional fat and making diagnosis of hamartoma near certain.

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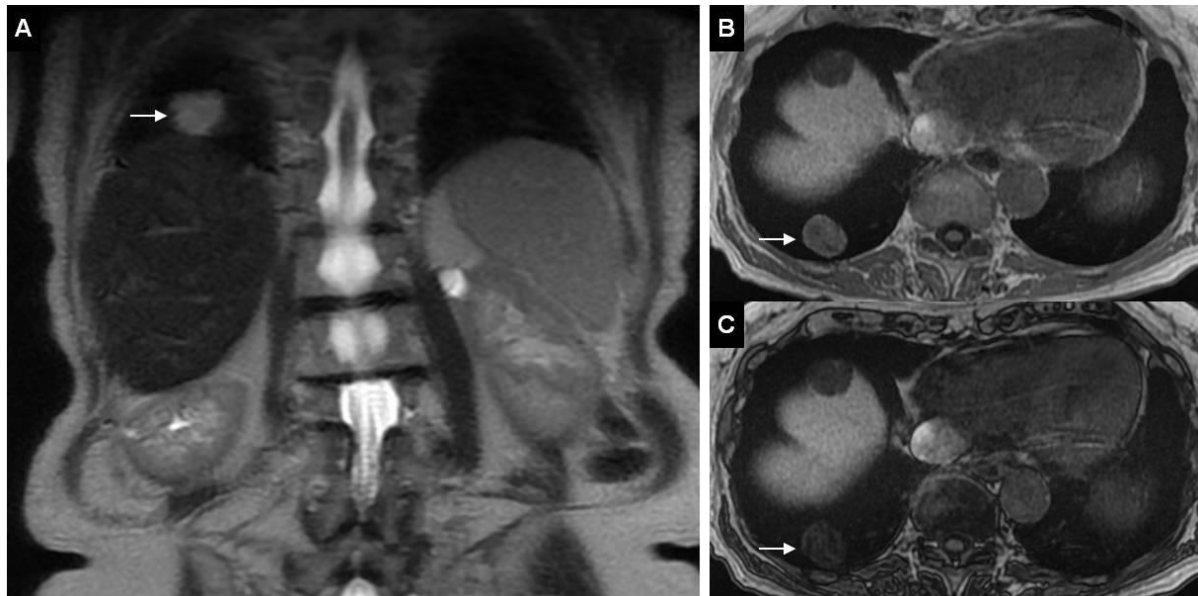
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**Figure 1:** CT chest without intravenous contrast in lung and mediastinal windows in an 84-year old woman shows a well-defined solid nodule with no obvious fat in the posterior right lower lobe.



**Figure 2:** Abdominal MRI performed 6 months following original CT chest, shows a well-defined solid nodule in the posterior right lower lobe (arrows). (A) It has high signal on T2 coronal image, (B) Intermediate signal on axial T1 in-phase image and (C) Marked signal drop-out on T1 out-of-phase image.

## Discussion

Identification of fat in pulmonary nodules is of great diagnostic importance, as it usually indicates benignity of the lesion. Pulmonary hamartomas which account for an important number of incidental solitary pulmonary nodules, are one such example.[1] Their recognition is important, since these benign lesions require no further investigation. However not all pulmonary hamartomas contain enough fat to be confidently identified by CT. Chemical shift MRI imaging, on the other hand, is a well-established method for detecting microscopic fat in lesion on imaging. It is widely used in abdominal imaging for characterization of lipomas and adrenal adenomas. [2] In thorax imaging, chemical shift MRI imaging is a recognized modality for differentiation of thymic hyperplasia (fat containing entity) from thymic neoplasia.[3] However, in spite of several reports of usefulness of chemical shift MRI for diagnosis of pulmonary hamartomas have been published,[4,5] it has not yet become a widely applied technique. Our case report illustrates the usefulness and convenience of chemical shift MRI imaging in evaluation of lipid-poor pulmonary hamartomas.

## References

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