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Researchers propose noninvasive method to detect bone marrow cancer

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For the first time, researchers have shown that using Magnetic Resonance Imaging (MRI) can effectively identify bone marrow cancer (myelofibrosis) in an experimental model.

The findings, published in the journal *Blood Cancer*, may change the way this disease is diagnosed which is now through invasive bone marrow biopsies.

Myelofibrosis is a slow evolving condition hallmarked by increased myeloid cells and in the case of primary myelofibrosis, with an excessive number of large bone marrow cells called megakaryocytes. The pathology also is characterized by structural abnormality of the bone marrow matrix, which at end-stage manifests in excessive deposition of reticulin fibers and cross-linked collagen in the bone marrow, suppression of normal blood cell development and bone marrow failure. Currently the diagnosis is made via an invasive bone marrow biopsy and histophatology to assess cellularity and reticulin deposition in the marrow.

Researchers at Boston University School of Medicine (BUSM) led by Katya Ravid, PhD, designed and tested whether a T2-weighted MRI could detect bone marrow fibrosis in an experimental model. The group was able to show that an MRI could detect a pre-fibrotic state of the disease with a clear bright signal, as well as progressive myelofibrosis. The investigators proposed that the abundance of large megakaryocytes contribute to the signal, since in T2-weighted MR-images, increased

water/proton content, as in increased cellularity, yield high (bright) MR-signal intensity.

This is the first study to evaluate a T2-weighted MRI in an experimental model of myelofibrosis with examination of potential sources of the MRI signal, researchers said. "Our study provides proof-of-concept that this non-invasive modality can detect pre-fibrotic stages of the disease," said Ravid, professor of medicine and biochemistry at BUSM. "It is intriguing to speculate that future pre-biopsy MRI of the human pathology might guide in some cases decisions on if and where to biopsy," she added.

More information: S Matsuura et al, In vivo magnetic resonance imaging of a mouse model of myelofibrosis, *Blood Cancer Journal* (2016). DOI: 10.1038/bcj.2016.97

Provided by Boston University Medical Center

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