SPECIALTY: Clinical Imaging for Scientists and Engineers – Liver Disease

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HIGHLIGHTS:

- Liver fat and iron quantitative imaging has successfully been translated into clinical practice
- Keys to their successful translation were:
  - Development of disease biomarkers based on magnetic tissue properties
  - Extensive analytical and clinical validation data
  - Consensus technical standardization
  - Industry efforts in providing commercial solutions
- Following similar path may help future quantitative MR biomarker development

TALK TITLE: Clinical Quantitative Imaging of the Liver – Fat and Iron

TARGET AUDIENCE: Scientists and engineers working in quantitative imaging of the liver, and related clinical application research, development and support

OBJECTIVES:

- Analyze the recent success of quantitative imaging for liver fat and iron overload diseases, and their widespread translation into clinical practice.
- Learn why and how they became successful, and develop a generalizable model for future technical development.

SYNOPSIS: In the last several years, the clinical translation of quantitative imaging techniques for the evaluation of diffuse liver disease has been a tremendous success. These quantification techniques include those that measure liver fat fraction for fatty liver disease, T2/T2* for iron overload disease, and mechanical stiffness for fibrosis of advanced stage disease. Quantitative imaging allows measurement of "quantitative imaging biomarkers" that drive clinical decision-making. It is changing the radiology practice towards more objective, precise, and standardized evaluation of diffuse liver diseases.

We will analyze the recent history of liver fat and iron quantification as model cases of quantitative imaging technical development. We will discuss the common key features that led to their success: (1) development of disease biomarkers based on magnetic tissue properties, (2) extensive analytical and clinical validation studies, (3) consensus technical standardization, and (4) increasingly available commercial solutions from scanner manufacturers and 3rd party vendors. We will develop a generalizable model of quantitative imaging-biomarker technical development and discuss future research and development opportunities.