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#ECR2015: Technical, Clinical Challenges Slow Down Integration of Imaging Biomarkers

In a session at ECR which runs from 4-8 March in Vienna, renowned researchers will talk about the integration of imaging biomarkers in Europe and the major issues that need to be overcome to derive the full potential of quantitative imaging.

Quantitative imaging enables clinicians to identify disease early and can go a long way in improving treatment monitoring. For example, in healthy tissue, researchers use quantitative imaging to study the functional properties of this tissue so that they can get the most important meaning for biologists or physicists in a non-invasive way. Biomarkers can thus be developed based on this information which can help to study the disease and its history and to use the data to predict outcome. Most importantly, this information can help determine the responsiveness of individual person to therapy and can also enable clinicians to assess its efficacy.

There are several applications for imaging biomarkers including the detection and treatment of cardiovascular diseases, neurological diseases, musculoskeletal disorders, metabolic diseases, autoimmune pathologies and inflammation. Biomarkers also play a key role in the development of new drugs. However, there are certain bottlenecks that have prevented quantitative imaging from fully benefiting healthcare. One major issue is that biomarkers have to be both technically and clinically validated and be robust and reproducible. This can be a long process. In addition, imaging biomarkers are not included in the landscape of European biobanks which further makes it difficult.

“There is a great and urgent need to include biomarkers in European biobanks, since imaging repositories are dealing with big data, and have specific technical requirements in terms of codification, standards and interoperability,” said Guy Frija, consultant radiologist at the Imaging Department at Hôpital Européen Georges Pompidou in Paris. Frija, who is Past-President of the European Society of Radiology, pushed for the society’s establishment of a European Biomarkers Task Force, creating synergies with RSNA’s Quantitative Imaging Biomarkers Alliance and tackling clinical validation of biomarkers at a European level.

There are other technical difficulties that also must be overcome. MR offers a variety of techniques – diffusion imaging, dynamic contrast enhanced MR and spectroscopy – to measure tissue and obtain biochemical information on the tissue of interest. However, MR examinations are not reproducible and this is a major obstacle for quantification.as highlighted by Siegfried Trattnig, Professor and Head of the Centre of Excellence for High Field MR, Department of Biomedical Imaging and Image-guided Therapy at Vienna General Hospital,

Finally, performing quantitative imaging takes time as compared with regular scans. Patients must lie still for longer in the scanner for multiparametric data to be obtained, so they are more likely to move and this can hamper data quality. “What we really need is a fast technique and the best would be if we could acquire multiple parameters simultaneously,” he said. This may change with recently developed sequences, in which researchers can acquire T1 and T2 relaxation times of a certain tissue or region with the same sequence. But the biggest advance may yet come from MR Fingerprinting (MRF), which completely changes data acquisition, post-processing and visualisation.

Following are the sessions on the topic:

Thursday, March 5, 16:00–17:30, Room F1

- PC 8a Integration of imaging biomarker activities on a European level » Chairman’s introduction G. Frija; Paris/FR
- From qualitative to quantitative imaging: a paradigm shift in radiology S. Trattnig; Vienna/AT
- Experience of the Quantitative Imaging Alliance (QIBA) of the RSNA R. Boellaard; Amsterdam/NL
- Introduction to the Quantitative Imaging European Task Force H.-U. Kauczor; Heidelberg/DE

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- Clinical validation of imaging biomarkers and their role in European Medicine Agency (EMA) applications O. Clément; Paris/FR
- The role of imaging biomarkers in the EORTC clinical trials N.M. deSouza; Sutton/UK
- Panel discussion: How to strengthen the role of imaging biomarkers in clinical trials

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