

Magnetic resonance imaging in rheumatoid arthritis

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The replacement of plain radiography by magnetic resonance imaging (MRI) to support the early diagnosis of rheumatoid arthritis (RA) has gradually become a reality in the Brazilian setting. Recognizing that radiographies are not enough for the early identification of the synovial abnormalities of RA is not new – studies on that topic have been published for more than one decade.¹ In daily practice, however, the use of MRI in clinical routine had to overcome inertia, and I believe that was due rather to the high costs and relative difficulty in having access to the exam than to the lack of information, at least at most Brazilian centers. Over the past years, the use of the MRI technique has spread due to several reasons, with a greater number of devices made available in both the major centers and several inner state cities in Brazil. The increasing use of disease-modifying antirheumatic drugs has required early diagnosis, because modern drug therapy is aimed at preventing the disease from reaching its erosive and debilitating chronic form. This fact added to the increasing availability of MRI has enabled greater access to the early investigation of RA.

However, there is a considerable number of questions to be answered regarding the role played by MRI and other imaging diagnosis means in the early diagnosis and monitoring of RA activity. Ultrasonography (US) and MRI can detect the formation of rheumatoid *pannus* earlier and more efficiently than plain radiographies. Each of those imaging methods has weak and strong points,² but a definitive consensus on which technique should be preferentially used in clinical practice still lacks. The strong points of MRI are the following: capacity to directly assess bone tissue, considering that bone edema is one of the good predictors of future bone erosions; a more complete assessment of joint surfaces; greater reproducibility and greater potential for synovial quantitative measurements. Ultrasonography does not allow the assessment of the inner part of the bone in joint margins, and poses difficulty in accessing some parts of certain joints due to the acoustic shadow originated in the bone cortex. On the other hand, US provides

a less expensive and more available real-time study, enabling the assessment of a greater number of joints in a certain period of time. Magnetic resonance imaging cannot be performed in all patients, being contraindicated in individuals with cardiac pacemakers; for a non-negligible number of claustrophobic patients; the additional costs and potential morbidity of sedation should also be considered. It is worth noting the majoritarian tendency to consider the learning curve for US interpretation longer than that for MRI interpretation; although that might be true, that is a controversial issue, or at least it seems to be overcome by training the professionals involved. However, I agree that, once having documented the static US and MR images, the greater visual field and the easiness for assessing the anatomical relations of the structures on MRI provide an “again” assessment that is more reproducible by other examiners, who might have been absent at the time of the original exam. To conclude the question regarding the comparison between US and MRI for the major role in the early assessment of synovitis, I have to say that I have a good experience in using US to study patients with idiopathic juvenile arthritis, since at very young ages the patient’s collaboration for performing MRI is less likely to occur, and thus a strong potential for using anesthesia for the assessment exists.

Another question worth noting is the role played by quantitative techniques, such as volumetry of the synovial tissue and dynamic contrast-enhanced MRI for synovial measurement. Some studies have shown that at least synovial volumetry can be accurate and reproducible and have suggested it can be a better marker of disease activity than the score proposed by the OMERACT group.^{3,4} The synovial fluid volume can also be measured in a reproducible form in the case of the knee joint, and has proved to be a good marker of disease activity after treatment, but it is not clear whether measuring the effusion volume offers any advantage over measuring the synovitis volume.⁵ The above-cited quantitative techniques and the Rheumatoid Arthritis Magnetic Resonance Imaging Score (RAMRIS) proposed by the OMERACT group are important

tools for clinical research, but they require examiners with very specific training and are very time-consuming. The time required for assessing a patient with RAMRIS can reach 5 to 20 minutes;⁶ on the other hand, the time required for quantifying the synovial tissue volume can reach one to two hours when using the manual delimitation of the synovium, although that time can drop to 15 minutes when using the semi-automated technique.⁵ Such techniques, however, at least for now, seem to be of lower applicability on a daily clinical routine basis.

Other new techniques have been used on a preliminary basis, and new imaging techniques will certainly be tested for RA. Thus, the knowledge in that field of diagnosis should continue to grow in the current decade. It is worth emphasizing diffusion MR as a promising technique, because it can replace or complement the assessment of synovial disease activity, currently based on intravenous contrast medium injection. Studies with images based on contrast medium with cell markers may also be developed, such as ultrasmall superparamagnetic iron

oxide-enhanced MRI (USPIO-enhanced MRI), which uses nanoparticles that have the potential for labeling macrophages.

This volume of *Revista Brasileira de Reumatologia* presents an interesting review on the use of MRI in RA,⁷ providing a general view of the importance and role of this imaging technique for rheumatologists. The images of the September 2011 issue cover of the *American Journal of Roentgenology* were extracted from another review article about the comparison between US and MRI for assessing RA.² In conclusion, that is a very hot topic because of the importance of the early diagnosis of RA and the questions yet to be clarified. Several interesting reviews have been published, evidencing that some maturity about the subject has already been achieved, although some controversy persists. Luckily, one of such reviews is available in this issue.

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