Ultrasound and imaging of the musculoskeletal system

In the interviews published in International Hospital we focus on a particular field of expertise to find out about the current developments. We spoke to Dr Jean-Louis Brasseur, consultant at Pitié-Salpêtrière hospital in Paris, who is an expert on ultrasound of the musculoskeletal system. Dr Brasseur says that each day he is astonished to discover new diagnoses which can be made using ultrasound, and is sure that ultrasound of the musculoskeletal system will be developed further. However, for the inexperienced, learning how to carry out an effective examination and make a diagnosis is the major challenge.

Q. Imaging modalities such as high-field MRI, rapid, low-dose CT, PET / CT, etc., seem to be the must-have technologies nowadays. Is ultrasound lagging behind or being sidelined?

On the contrary, ultrasound continues to develop because the indications and advantages over other techniques are becoming better known. For instance it is clear that a well-conducted ultrasound examination of the Achilles tendon provides more information than MRI because analysis with ultrasound is bilateral and is consistently coupled with Doppler which makes it possible to differentiate between active lesions and sequelae. An MRI of both Achilles tendons together with an injection of Gadolinium would be necessary in order to obtain the same information!

Q. In which clinical applications do you see the biggest growth potential for ultrasound in view of current technological developments?

Probably musculoskeletal ultrasound has the biggest potential for growth, since many medical specialties are only beginning to realise the benefit of the technique.

Q. What are the most current challenges and issues regarding musculoskeletal ultrasound examination?

The biggest challenge is training medical professionals in its use. Musculoskeletal ultrasound is without doubt the application which is most difficult because of the detailed anatomical knowledge required and the large variation in lesions observed, so a lot of experience is necessary before the technique is perfected.

Q. What are the limitations of ultrasound imaging of the musculoskeletal system?

A major limitation is that the bone structure and joint spaces cannot be visualised, and these two elements are almost always essential in musculoskeletal pathology. For this reason the use of ultrasound alone in this area is often dangerous and the combination with a standard radiograph is both required and extremely efficacious.

Q. Based on your experience, what are the most interesting technological improvements currently proposed by the industry?

Currently, ultrasound provides exceptional spatial resolution, but improved contrast resolution will enhance its diagnostic performance still further. In this respect, a very important contribution is provided by the L75 probe equipping the Hitachi Ascendus. Three-dimensional acquisitions will find new indications, especially in relation to the teaching of the technique but it will require being able to obtain a truly isotropic third plane, which is not yet the case with current ultrasound equipment for the musculoskeletal system.

Q. Are doctors in training keeping up the learning curve imposed by evolving technology and vice versa?

As with any medical field, this technique requires systematic, ongoing training; however, because of its inherent difficulty it can only be practised following in-depth training that cannot be provided by a seminar of a few days. In fact, you need to assimilate perfectly all normal images before being able to identify lesions. It is therefore necessary to do a lot of examinations on normal subjects for all the joints and different regions before embarking on the study of patients.

Q. How do you see medical ultrasound in five years’ time?

The technique will continue to grow, especially in the musculoskeletal field. Elastography and contrast injection will have clearer indications but the real progress will come from isotropic 3D acquisition which should greatly facilitate the teaching of this difficult technique, currently the biggest hurdle to its widespread use.

Biography

Dr Brasseur holds a radiology degree from the UCL Louvain faculty in Belgium. Since 1990, he has been a consultant at the Pitié-Salpêtrière hospital in Paris and is also in charge of the musculoskeletal module of the national ultrasound degree. A founder of GEL (Groupement des échographistes de l’appareil locomoteur) as well as past president and member of the board of SIMS (French society of musculoskeletal radiology), Dr Brasseur is a reviewer of radiology journals and the author of eight books and over 100 scientific publications.