

## Elastography- everywhere, but not just in any way

The European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) is currently comprised of 19223 members and yet only a fraction of them use new, more advanced echography techniques such as contrast enhanced ultrasound, elastography or the hybrid technique. For this reason, the program of the 26th EUROSOUND Congress consisted of parallel presentation sessions focused on standard ultrasound, as well advanced ultrasound techniques.

One of these sessions, the EFSUMB Joint Session, entitled "All you need to know about elastography in 90 Minutes", provided an elastography marathon for practitioners, for those who plan on applying it in their clinical practice or just for those who wish to be informed regarding the latest techniques. Due to the increasing

need of Guidelines in medical practice, Vito Cantisani – Chairman of the Education Committee of EFSUMB – presented „The EFSUMB Guidelines and Recommendations on the Clinical Use of Ultrasound Elastography”, which was also published last year in 2 parts in the European Journal of Ultrasound. The first. part of the guideline - Basic Principles and Technology -



Ass Prof Vito Cantisani with 'patient' Dr Maija Radzina

describes in detail the technical principles of elastography [1]. The second. part of the guideline - Clinical Applications – focuses on the practical applications of elastography, which are divided into 2 main categories: strain elastography (SE) and shear wave elastography (SWE) [2]. In strain elastography (SE), tissue deformation is generated by applying external pressure using the probe or by endogenous stress such as cardiovascular movements. SWE is based on shear waves, which are produced by ultrasound systems, and includes transient elastography (TE), acoustic radiation force impulse (ARFI), point SWE (pSWE) and 2D-SWE.

The presentation of the EFSUMB Guidelines was followed by a live demonstration. Andreas Schuler from Germany performed strain elastography on a patient/colleague with multiple thyroid nodules. This pathology was chosen due to the high frequency of thyroid nodules discovered in clinical practice and due to the difficulties in establishing their benign or malignant nature through standard ultrasound. Elas-

tography presented a higher sensitivity and specificity when compared to all the features of conventional ultrasound. The presentation began with the examination technique and was followed by elastography skills and pitfalls. Consequently, during an interactive discussion, the issue of benign or malignant characteristics of thyroid nodules was addressed. The examiner used both qualitative as well as quantitative elastographical analyses (strain values and ratios) to determine thyroid nodule stiffness. Frequent interventions by Vito Cantisani added practical as well as scientific data from the numerous studies published by his team to the discussion.

The next topic was in the field of the breast pathology. A well-known fact is that most cancers present high stiffness compared to both normal breast tissue and benign lesions. Therefore, strain elastography has a very high accuracy in characterisation of the breast nodules. Moreover, strain elastography was the first type of elastography introduced into clinical practice providing its best diagnostic performance in mammary gland pathology.

Following this presentation, another author of the EFSUMB elastography guidelines, Professor Adrian Saftoiu, presented

the clinical applications of elastography in his field of expertise, Gastroenterology, focusing on liver and pancreatic pathology. Elastography is mainly used in hepatic pathology for the assessment of fibrosis in chronic liver disease, which is very important for prognosis and patient management. All the elastographic techniques up to date have been evaluated for their performance in determining hepatic fibrosis. Unfortunately, it is very likely that the results provided by these methods are not equivalent because cut-off values are system-specific and cannot readily be compared across machines. Until now, transient elastography has been the most studied elastography technique, while other methods are awaiting further results. In the field of endoscopic ultrasound (EUS) only strain elastography is currently available, Professor Saftoiu's team having published numerous studies regarding the applications of EUS elastography in the characterization of focal pancreatic lesions or lymph nodes.

The elastography marathon concluded with Christian Kollmann's presentation on safety guidelines. It has showed that strain elastography and shear wave elastography have identical ultrasound safety considerations compared to conventional ultrasound imaging modes, whereas ARFI

is similar to Doppler mode regarding patient safety.

The potential medical uses for elastography do not end here. Elastography techniques are constantly being developed and their applications are more and more diverse. Consequently, elastography is currently being evaluated for use in various pathologies involving the brain (intraoperative), the uterine cervix (for the prediction of premature delivery), as well as in testicular tumors, anal incontinence, rectal and anal carcinomas, arterial stiffness, atherosclerosis and many others. Studies on new applications and new technologies will surely be available by next year's congress. So, see you at EUROSON 2015, Athens, Greece.

*Adrian Saftoiu and Larisa Sandulescu*

#### References

- 1 Bamber J, Cosgrove D, Dietrich CF, et al. EFSUMB guidelines and recommendations on the clinical use of ultrasound elastography. Part 1: Basic principles and technology. *Ultraschall Med.* 2013; 34:169-184.
- 2 Cosgrove D, Piscaglia F, Bamber J, et al. EFSUMB Guidelines Recommendations on the Clinical Use of Ultrasound Elastography. Part 2: Clinical Applications. *Ultraschall in Med* 2013; 34: 238-253