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## Guidelines for Elastography

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Elastography is a technique that uses an intrinsic tissue property, the elasticity – the capacity to deform and to return to the initial shape when a stress is applied. In order to obtain an elastographic assessment the tissue is mechanically stressed and this induces a displacement that can be measured, allowing an estimation of the tissue stiffness. It is a non-invasive method, well accepted by the patients.

Most elastographic techniques available today are ultrasound based. Strain elastography was first developed, some years ago, for breast nodules’ evaluation, with good results in differentiating benign from malignant breast nodules. Later, thyroid and liver became new fields for elastographic evaluation.

After strain elastography (in which manual pressure was used to apply stress to the tissue), shear wave elastography was developed. It uses a new modality for tissue excitation (an impulse generated by the ultrasound probe), and is implemented in many ultrasound machines. The FibroScan device, performing Transient Elastography, was especially constructed for liver stiffness evaluation, later one, “point” shear wave methods (Siemens, Phillips) and real time shear waves elastography (SuperSonic Imaging - SSI) were developed for the elastographic evaluation of several organs. Most of these techniques are add-on modules incorporated in standard ultrasound devices, an advantage as compared to transient elastography, the only one where a new unit must be purchased.

But as time passed and the method was increasingly used, the number of papers published on this topic increased also, proving the method’s value. Thus Guidelines became necessary for the clinical application of elastography. In some fields (such as liver stiffness or breast elastography), these elastographic methods were implemented in clinical practice in many countries, while in other fields (such as musculo-skeletal elastography, or the elastography of the digestive tube), research is still at the beginning. For these reasons, recommendations are needed for daily activities.

Some time ago, the EFSUMB (European Federation of Societies for Ultrasound in Medicine and Biology) decided to start working on Guidelines for the clinical use of elastography. This work is now concluded and a two parts Guideline (the first on the physics of elastography and the second on the clinical use of the method) is ready for publication in *Ultraschall in der Medizin*. More recently, WFUMB (World Federation for Ultrasound in Medicine and Biology) started the work on Elastography Guidelines; the first version will be presented next May in Sao Paolo, during the World Congress of Ultrasound.

Thus, very soon, we shall have at least two important Guidelines on the clinical use of elastography, in which the indications and the value of this method will be described for some organs and pathologies. It is an important fact because in this moment, quite all modern ultrasound systems have elastography modules installed and the clinicians must know how and when elastography should be used.

Both Guidelines cover especially liver elastography in diffuse chronic diseases, for which many publications showed good results. Transient Elastography is the oldest elastographic method used for the evaluation of chronic hepatopathies (with hundreds of published papers), and ARFI (Acoustic Radiation Force Impulse) Elastography is also covered by many good articles. Regarding Strain

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Received Accepted

Med Ultrason

2013, Vol. 15, No 1, 83-84

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elastography and Real Time Shear Wave Elastography (SSI) the number of papers is increasing, some of them showing good results.

Thus by following these Guidelines, the clinical value of this method will increase. For other organs, as well as for liver tumors evaluation, in which only few papers

have been published, more research is needed, and if the results are still positive, their elastographic evaluation can be introduced in clinical practice.

Elastography is still an open field with important perspectives for medical practice and probably the future will establish also other indications and applications.