Dear EFSUMB member,

Ultrasound is unique!

Its uniqueness is reflected in its enormous capacity to do great things for the patients. Not only can ultrasound in the right hands diagnose a vast variety of diseases, but it can also be used for therapy. Not only can ultrasound provide very high temporal and spatial resolution on high–end scanners in hospital departments, but mobile ultrasound can also be applied in the battle field or in the helicopter for point-of-care medicine and telemedicine. Ultrasound is indeed unique. Moreover, its uniqueness outperforms other radiology methods in its versatility and huge span of applications.

Therefore, EFSUMB has an important mission to disseminate information and competence, thus, building a European Ultrasound Community. EFSUMB now has more than 20,000 members and is the biggest ultrasound federation in the world of ultrasound in medicine and biology. In the following, I will point at some good opportunities for you to further build competence in ultrasound.

The 29th Euroson Congress

The EUROSON congress 2017 will be arranged by the Turkish Ultrasound Society (TUDS) and take place 22 – 25 September in Ljubljana, Slovenia. This will be the EFSUMB highlight of the year with an exciting program for science and education in the field of ultrasound. This Euroson congress will be a vibrant, interdisciplinary meeting place for students, doctors, engineers, professors, sonographers, industry and all stakeholders of ultrasound. It will focus on new developments in science and education and renowned speakers from all across Europe will provide state-of-the-art lectures and live demonstrations. There will be an Ultrasound Learning Center (ULC) for hands-on training where students and young doctors can experience supervision and guidance from experts in various fields. A dedicated student program will enhance the training outcome for young students, enabling a good start to their future careers.

Euroson Schools and Endorsed courses

EFSUMB has now conducted over 100 Euroson Schools all over Europe, thus contributing greatly to the advancement of ultrasound knowledge and skills. For 2017 there are 8 Euroson Schools in the pipeline covering aspects like MSK, vascular, rheumatology, CEUS applications, paediatrics, chest and hepatology. In addition, there are 8 EFSUMB-endorsed courses planned for 2017, see more at http://www.efsumb.org.

Ultrasound Learning Centres (ULC) across Europe

EFSUMB Ultrasound Learning Centres (ULC) are established in 7 renowned ultrasound locations around Europe: Timisoara, Neuruppin, Cluj-Napoca, Bergen, Madrid, Pavia and Zurich. At these excellent teaching sites, participants can spend a period of time to learn and to improve their knowledge in various applications of ultrasound. The teaching language is English if participants are from outside the host country. You may apply directly to the ULC Director and this information is located at http://www.efsumb.org/euroson-sch/eul-centres01.asp.

EFSUMB Webinar

Our series of webinars is a flexible and popular way to achieve increased knowledge on various ultrasound topics. The first EFSUMB webinar was on CEUS of the liver, then followed by a webinar on non-liver CEUS, subsequently a webinar on CEUS in the evaluation of treatment procedures, and the previous webinar was on CEUS beyond Europe – The Chinese experience. All these lectures can still be viewed in our Webinar-archive at http://www.efsumb.org/education/ed-webinar-archive.asp along with information about the last webinar on LI-RADS 19. January 1800 CET.

EFSUMB guidelines and clinical recommendations

The world’s first ever guidelines on gastrointestinal ultrasound (GIUS) was released by EFSUMB last year. These clinical recommendations and guidelines on methodology were published online in EJU September 2016 and are soon to appear in print with an editorial by Seitz, Ødegaard and Lutz. An EFSUMB Task Force Group (TFG) with experts from all over Europe is continuously working to make more GIUS guidelines and the next topic will be ultrasound in IBD. Other GIUS guidelines are also in pipeline: Inflammatory conditions, transrectal/peri-neal US, miscellaneous, Upper GI / functional US.

Existing EFSUMB guidelines are continuously being updated. The EFSUMB guidelines
on liver elastography are soon ready for publication in short and long versions. Furthermore, an update on non-liver CEUS guidelines is also planned for release in 2017. The work on non-liver elastography has started and publication is estimated for 2018.

EFSUMB Student Committee

EFSUMB has included students more closely under the EFSUMB umbrella by establishing a student committee. The Student Committee, which at present is an interim committee, will be finally elected in 2017 at the Euroson congress. Some of the main tasks of ESC are to stimulate integration of ultrasound teaching and training in medical education of students and to establish quality standards. Furthermore, ESC shall plan a program for student activities and teaching at the EUROSON congresses in close collaboration with the local organisers.

Finally, I want to extend my dearest appreciation to all EFSUMB officers for their great work to promote ultrasound in Europe. In particular, I want to give my warmest thanks to our General Secretary Lynne Rudd for all her great work for EFSUMB.

Bergen, January 2017,
Odd Helge Gilja

Odd Helge Gilja

Winners of the EFSUMB Young Investigator Award 2016

Patient-Specific Mechanical Characterization Of Abdominal Aortic Aneurysms Using 4 D Ultrasound

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ABSTRACT

Introduction

Abdominal aortic aneurysms (AAA) are silent killers and the 13th cause of death in Western society. In this study, methods for wall stress analysis (WSA) and elastography (EL) were developed using 4D ultrasound (US) to determine patient-specific wall stresses and material properties. These techniques were introduced in the clinic and tested in a subgroup of patients in an ongoing study with 300 patients in follow-up.

Methods

In forty patients (AAA diameter 27 – 52 mm), 4D-US data were measured using a Philips iU22 (X6 – 1 transducer). The brachial blood pressure was measured using an arm cuff. The US data were manually segmented. The patient-specific geometry was tracked over time to estimate its displacement field using 3D speckle tracking. Subsequently the diastolic geometry was converted into a finite element model. WSA was performed assuming a neo-Hookean material model. The model was optimized by iteratively adapting the material properties until the model output matched the 3D displacements. For seven patients, computed tomography (CT) data were available and used to compare the US-based geometries and wall stresses.

Results

The 4D-US based 99th percentile wall stress ranged between 198 to 390 kPa, and the patient-specific material property (Ge) had a median of 1.1 MPa (IQR: 0.7 – 1.4 MPa). Geometry based on US data showed good similarity indices (0.90 – 0.96) with CT, and the 25th to 95th percentile wall stresses were in good agreement. Small aneurysms revealed stresses similar to those in large AAAs. Furthermore, the arterial stiffness increased with respect to AAA diameter.

Conclusion

This study shows that 4D US-based WSA and EL of AAAs is feasible and has the potential to aid in AAA rupture risk assessment by identifying patients at risk, and to monitor patients over time by detecting changes in wall stress and material properties. Ongoing work includes a novel automatic segmentation and registration algorithm and long-term follow-up.

Emiel M.J. van Disseldorp received his M.Sc. degree in Medical Engineering from the Eindhoven University of Technology (Eindhoven, the Netherlands) in 2014. During his Masters, he was an Intern at the University of Canterbury, Christchurch, New Zealand where he worked on a mathematical model for neurovascular coupling, which resulted in one co-authored publication. During his master thesis he worked on novel ultrasound methods to perform elastographic measurements in aneurysms in the thoracic ascending aorta in collaboration with the University Hospital of Brussels, Belgium.

He soon afterwards started his PhD, entitled “Quantitative monitoring of abdominal aortic aneurysms using 3D ultrasound” at the PULS/e group of the Eindhoven University of Technology, and the department of Vascular Surgery of the Catharina Hospital Eindhoven. In this project, a method was developed to perform wall stress analysis and mechanical characterization of abdominal aortic aneurysms using 4D ultrasound data, which is currently validated in a large group of patients. In his relatively short career, Emiel has (co-)authored five publications and has
won the young investigator award at the annual conferences of both the European Society of Biomechanics and the EFSUMB, both in 2016.

In vitro quantification of tissue elasticity using three shear wave elastography platforms on liver fibrosis phantoms

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ABSTRACT

Introduction

To assess and validate the reproducibility of quantitative elastography measurements, using shear-wave methods on four individual tissue-mimicking liver fibrosis phantoms with known Young’s modulus.

Methods

We used three different shear wave elastography platforms: GE Logiq E9 SWE, Philips iu22 XM ARFI and Samsung RS80A. Both linear (high frequency) and curvilinear (low-frequency) probes were applied. The objects were four individual tissue mimicking liver fibrosis phantoms with different Young’s modulus within the range of soft biological tissue (2.7kPa, 11.5kPa, 24.8kPa, 46.3kPa). Two individual investigators performed all measurements in parallel. Each investigator made ten non-continued measurements of each phantom. The platforms were evaluated for inter- and intraobserver variability, coefficient of variation, ICC and Bland-Altman using the median value. Statistical analysis was performed with SPSS.

Results

All three elastography platforms showed excellent intra-and interobserver agreement (interclass correlation 0.981 – 1.000 and intraclass correlation 0.987 – 1.000). All four liver fibrosis phantoms could be differentiated by quantitative elastography, by all platforms (p < 0.001). In the Bland-Altman analysis the differences in measurements were larger for the phantoms with higher Young’s modulus. All platforms had a coefficient of variation in the range 0.00 – 0.21 for all four phantoms, equivalent to low variance and high reproducibility.

Conclusion

All systems used in this study provided a high reproducibility in quantitative measurements in a liver fibrosis phantom and excellent inter- and intraclass correlations. The GE Logiq E9 SWE had the best inter- and intraclass correlation, whilst Philips iu22XM ARFI and Samsung R08A provided elasticity measurements closest to the elasticity values provided by the manufacturer of the phantom.

Anesa Mulabecirovic studied medicine at the University of Lubeck, Germany having spent a practical year in Bergen, Norway and was schooled in the USA. She is now working at the University of Bergen Hospital in her main interest which is elastography. Apart from English, German and Norwegian Anesa also speaks Bosnian, Serbian and Croatian.
Next EUROSON Congress

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