EFSUMB Newsletter

European Federation of Societies for Ultrasound in Medicine and Biology

European Course Book (ECB)

Dear ultrasonographer, dear friend,

The 22nd EUROSON Congress hosted by EFSUMB and the Danish Society of Diagnostic Ultrasound to be held in Copenhagen, Denmark 22–25 August 2010 will be coming up soon. This might be a good time to announce that the first chapters of the planned EFSUMB-European Course Book will be published in the beginning of August (just before the EUROSON congress) on the website (www.EFSUMB.org). The respective chapters can be downloaded as PDF-files. In the following paragraphs a short introduction, history and perspectives of EFSUMB are summarised.

On February 11, 1972, the delegates of 13 European societies met in Basel (Switzerland) for the formal foundation of the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB). The Federation's purpose shall be to promote the exchange of scientific knowledge and development in the medical and biological professions as applied to ultrasound. The Federation shall propose standards and give advice concerning criteria for the optimum apparatus and techniques, and concerning presentation and interpretation of results. This aim is to be served by arrangement of congresses and study and development meetings on an international level, as well as the exchange of information both in and outside Europe by the member organisations. EFSUMB has strengthened the interdisciplinary collaboration in the field of diagnostic ultrasound and for safety of ultrasound in medical use.

The European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) has proposed minimal training requirements for the practice of medical ultrasound in Europe (www.efsumb.org). These identify three levels of training and expertise. The boundaries between the three levels are difficult to define precisely and should be regarded as a guide to different levels of competence and experience. There is a demand to incorporate ultrasound experience into clinical courses and accreditation. It is of interest that up to now no EFSUMB dedicated Course Book (ECB) has been considered and published.

Intention

The planned EFSUMB Course Book is intended to supplement and complete the educational purposes of EFSUMB. The editor intends to create a multidisciplinary EFSUMB Course Book which will integrate the whole experience of European driven authors and ultrasound teachers. The course book is devoted to the interdisciplinary approach of the multinational societies of EFSUMB. The ECB will incorporate the minimum training recommendations for the practice of medical ultrasound published by EFSUMB. The book will be published on the website in close collaboration with the EFSUMB Publication and Education committees.

The aim is to distribute the ECB all over Europe and also to standardize and improve examination techniques and to illustrate the EFSUMB course system. All chapters are supposed to be written by three authors. All three authors should be ideally from different European countries.

The first chapters introduced on the website are "Educational Aspects in EFSUMB" (Odd Helge Gilja, Jan Tuma J, Michael Bachmann Nielsen), "Ultrasound of the liver" as part of the hepatobiliary chapter (Christoph F. Dietrich/Germany, Carla Serra/Italy, Maciej Jedreczyk/Poland); "Estimation of liver stiffness using ultrasound waves" (Ioan Sporea/Roumania, Mireen Friedrich-Rust/Germany, Odd Helge Gilja/Norway); "Pancreas" (Mirko D'Onofrio,/Italy, Vullierme Marie-Pierre/France, Válek Vlastimil/Czech Republic); "Transabdominal US of the gastrointestinal tract" (Alois Hollerweger/Austria, Klaus Dirks / Germany, Kazimir Scopinski/Poland); "Chest Sonography" (Gebhard Mathis/Austria, Z. Sparchez/Roumania, G. Volpicelli/Italy); "Nephrology, Transplantation and shunts" (FM Drudi/Italy, F Malpassini/Italy, N Di Leo/Italy).

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Telesonography

Modern Solutions for an old Question.

With the expansion of modern communication technologies, many applications have been proposed in medicine, in order to improve the access of care in situations where direct interaction between patient and health care provider is impossible, or strongly restricted (1). If the initial development of these applications was largely supported by military administrations, common civil interest is actually well recognized (2–4).

Current applications of telemedicine are distributed in all the fields of medicine, from nursing (5) to emergency work (6), from dermatology (7) to medical imaging (8, 9). Nevertheless the common clinical use of telemedicine largely varies from one medical specialty to one other, with different degrees of acceptance from the users (10).

Teleradiology is one of the most mature applications of telemedicine. Its first clinical application, named "telognosis" (for "teleoroentgen diagnosis"), was described in 1950 (11). Indeed, related to the conventional radiological workflow, teleradiology does not significantly modify the current practice modality. For a large part of their activity, imaging specialists are heavily focused on images rather than on face-to-face interaction with the patient. For many imaging technologies the diagnostic accuracy doesn't significantly change if the examination takes place next door or kilometers away (12, 13).

On account of medical specialists' shortage, teleradiology becomes more and more frequently used in small or medium size hospitals for image interpretation, for routine daily work or for emergency (14–16). The 1999 survey from the American College of Radiology demonstrated that the most common use of teleradiology (76–99 % of radiology practices with teleradiology systems) was for preliminary on-call findings in emergency settings (17). If remote image interpretation doesn't give rise to problems with plain films, computed tomography (CT) or magnetic resonance imaging (MRI) exams (18), no satisfactory and universally recognized solution exists at this time for ultrasound (US) (19). This is certainly related to one fundamental difference of sonography in comparison with other imaging modalities, the same one that makes sonography particularly operator dependant: the need of direct interaction of an experienced sonologist with the patient to obtain clinically useful information.

Different technical solutions to the dilemma of how to generate meaningful ultrasound images when an experienced sonologist is away have been proposed. These solutions either need specific competences on site or very specific expensive material, or both. They may be subdivided into three groups (20).

The first group is closely related to the paradigm of direct and active involvement of the physician in real time (21). In order to assure the remote control of the probe positioned on the patient, some authors have advocated the use of a robot (22, 23). With the robot, the remote expert performs the examination more or less as if he/she was himself by the side of the patient. This concept needs dedicated materials for remote control and videoconference facilities, in order to communicate with the local operator driving the robot at the patient site. The local operator has to be instructed for robot manipulations, but not for sonography.

A second group use communication facilities to send conventional images acquired on site by people with brief sonography training to a skilled physician located at the remote site. These may be stored images with asynchronous interpretation (24–26) or real-time interactive video systems for telementoring of less experienced colleagues on site through videoconference systems (27–31). This design may be used with commonly available ultrasound systems and simple communication facilities for store and forward systems, but requires broad-bandwidth network for simultaneous transmission of voice and video of the participants, ultrasound images of the patient (still images or real-time video), written information among the participants and data for the coordination between the different computers if telementoring is taken up.

The third group promotes the acquisition of tridimensional ultrasound data set by relatively unskilled operators on site with remote interpretation of volume data by an experienced sonologist. This interpretation may be performed off-line (32, 33) or online with dedicated soft and hardware (34, 35).

Synchronous online interpretation needs to have an expert available during the performance of remote examination in order to interpret the ultrasound images or films and guide the operator proceeding to the examination on site. This model may only be successful in sufficiently large structures, which may have a sufficient number of sonologists, in order to have continuously available experts for remote examination supervision (16, 36).

Asynchronous off-line interpretation means that a time delay appears between the images acquisition, the transmission to the expert and his interpretation and answer to the remote location (37). This kind of process is not appropriate for absolute emergency examinations, such as focused abdominal sonography for trauma (FAST) or if the local operator is unable to independently provide interpretable image data sets.

Nowadays even with a very short delay between acquisition and remote interpretation, asynchronous reading represents actually the larger way of using teleradiology, particularly for CT and MRI interpretation (38). Asynchronous processes permits the insertion of remote workload in the local workflow with minimal interferences. In order to use telesonography in the same way, it is absolutely necessary to release it from the local operator dependency. Remote control of a robot is one solution, but needs the local collaboration of a technologist trained for robot manipulations. Volume ultrasound is another solution that only needs the help of a local coworker who put the volumetric probe on predetermined points on the patient, in order to record the volumetric data sets. No particular training is required in that case.

Radiologists are getting used to manipulate and interpret large amounts of images from the multidetector CT (MDCT) or MRI (39, 40). Retrieved US images from volume data are equivalent to these large images sets, but dedicated workstations are actually lacking. When available, reconstruction of diagnostic US images from tridimensional acquisition will be accessible to adequately trained sonologists. Further developments are needed to obtain these user friendly efficient sonographic workstations.

In conclusion, as volume US acquisition seems to be rather independent to the skill of the local operator, asynchronous remote interpretation of reconstructed images from volume data sets appears to be a well appropriate technical solution

for telesonography, providing that suitable workstations for post-processing will be available.

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Report to Newsletter from chairman of EPSC

The Education and Professional Standards Committee has as one of its major roles to promote more post-graduate courses and particularly Euroson Schools to be arranged throughout Europe. Last year we had a record of 8 Euroson Schools in one year and for 2010 it looks as if at least 9 Euroson Schools will be taking place. Furthermore, as Europe is a leading force in clinical applications of CEUS, we have this year 4 Euroson Schools dedicated to the subject of CEUS. We have made a dedicated "start package", that can be downloaded from our website, to help new organisers of Euroson Schools.

At this moment of writing (primo July), the most recent Euroson School was held in Bergen, Norway: Abdominal ultrasound – Focus on CEUS and EUS. Altogether this post-graduate course gathered over 100 participants including industrial representatives and local committee.

State-of-the-art lectures were given by a wide range of internationally renowned

Fig. 1 President-elect in EFSUMB Dr. Fabio Piscaglia in front of the World-Heritage site Bryggen in Bergen, where the Euroson School took place.

Fig. 2 Prof. Christoph F. Dietrich, here overlooking Bergen from Mount Fløyen, gave some excellent talks on various subjects.

Fig. 3 Prof. Michiel Postema from Holland and appointed Professor in Bergen gave an enthusiastic lecture on sonoporation and basics of CEUS.

speakers in the fields of liver, pancreas and bowel scanning, CEUS, Doppler, endosonography, elastography, and CEUS targeted therapy. The participants gave a very good evaluation of the course: Overall judgement: 8.54 on a scale from 1 (bad) to 10 (extremely good).

Some of the lectures from Bergen will be published on the web, so stay tuned on the EFSUMB website (www.efsumb.org) to enjoy.

The different guidelines and recommendations can be viewed online at the EFSUMB website. The Minimum Training requirements on CEUS, including TIPS AND TRICKS to improve your scanning technique is to be published in this Newsletter.

EFSUMB continuously works to expand our website with educational material. We are soon going to launch our new effort on the web: The educational web portal. This will be a co-site to our existing EFSUMB site and be loaded with high quality material for educational purposes.

See you at EUROSON in Copenhagen!

Bergen, Primo July 2010

Prof. Odd Helge Gilja
Chairman EPSC

Clinical Ultrasonography – under utilized

A personal position put up for other perspectives

Only an estimated 20–25% of the global population has access to ultrasonography (US). The others must do without – for their lifetime, in whatsoever disease and condition, even in a childbearing period. This non-access undoubtedly is an under use of US, this magnificent tool, with all its unique properties. No irradiation, easy to apply, quite easy to learn, superb local resolution, real time, innovative (e.g. contrast enhanced US –CEUS), portable and affordable, and relatively inexpensive. US makes (very) much of computed tomography (CT) examinations simply superfluous, and this not only in abdominal indications. Making clinical US available for all citizens of the global village, performed by well trained medical doctors – this is a rewarding aim, e.g. for global healthcare organizations.

Considering this all – and in my opinion –, an "under use" of clinical US is obvious. And a true need for improvement is evident.

Let me remain a bit more with the happy few of 20–25%. Organization of US services varies considerably from country to country, due to differently defined attendant circumstances. I do not really want to emphasize that in some countries radiologists consider US to be their natural property, sometimes leaving it to technicians, simultaneously advancing a view that US is too difficult a matter to be carried out by e.g. surgeons or gastroenterologists. This is – again in my perception – an old fashioned approach. Clinical US is a self-evident important component in many (sub-) speciality performed applications, as in gynaecology and obstetrics, in cardiology (echocardiography), and in urology. Here, it is self evident for the doctors in charge to have a look themselves at the heart cavities in resting and in exercise, or at all parts of the urinary tract, or at the female pelvis. It all started in clinical US with gynaecology – the great teacher for all subsequent applications. This interdisciplinary exchange of know-how, of technologies, and of new fields of application has made US – parallel and in competition

with computed tomography (CT) – an instrument of paradigmatic changes in nearly all diagnostic steps, in nearly all medical (sub-) fields. As just one example, it is no longer the surgeon postoperatively telling what was wrong e.g. in the abdomen – he will be told before where and when to cut, or not to cut. Nevertheless, the number of surgeons performing clinical US on their own preoperatively is still limited – an interesting phenomenon. Obviously, the fine art of cutting without a knife – by sectional real time clinical US – is here not yet really popular or understood. This attitude probably has a number of reasons, again including more psychologically orientated, and including age related learning (non-) capability and willingness.

Organisation of US services depends from local doctors expertise, the systems of insurance, the distribution of money related to clinical US, the numbers of US machines available, to list the more important variables only. Exact information on the present status of many of these details is sparse, and some of topics named are quite delicate and sensitive, as e.g. the financial aspects. Most probably, CT here is more efficacious in many areas of the globe. It moreover has neither to be performed (work) nor to be accounted (responsibility) by the clinician in charge. In my opinion and of course, there is a lot of psychology involved with the acceptance or denial of clinical US. This certainly plays a yet to be defined role in the longstanding substantial lack of clinical US in Anglo-Saxon dominated medicine, as it is apparently practiced and published.

Considering all this – and in my opinion -, an "under use", an unbalanced utilisation of clinical US even with the happy few is reality, and enough place for improvements can be considered.

US examination can be practiced as a matter for the waiting list, for simple imaging only. However, US immediately related to all other clinical data in a given patient – history, physical findings, laboratory values, etc. – and performed in combination with initial physical examination: this is the probably more efficacious usage of US, both in routine, and in any emergency or intensive care setting.

Clinical US is more than real time imaging only – it is an integrative part in sort of a total work of art – a gesamtkunstwerk – in an individualized patient service. This has proven to be truly helpful – and markedly CT saving – both in routine and in emergency patient services in any field of application of clinical ultrasonography.

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An EUROSON School in Berlin – on Interventional Ultrasonography

Following our EFSUMB regulations, a successful three day EUROSON School was held May 27–29 2010 in the centre of Berlin. Covering all aspects in diagnostic and therapeutic interventional ultrasonography, it was organized primarily by the DEGUM Section of Interventional Ultrasound and the Berlin-Brandenburg Society of Ultrasound. ISCUS (The International School of Clinical Ultrasonography) cooperated, as well.

Fifty participating trainees from Europe (including Austria, Benelux countries, Czech Republic, England, Lithuania, Romania, and Germany) and from the Near East (Israel, Libya) were present.

The EUROSON School was opened with a media conference with a good attendance from press, radio, and TV, to achieve adequate public attention to ultrasound interventions as an important part of modern medicine. Meanwhile, a good number of printed publications and other reports on the EUROSON School have been edited.

All lectures, demonstrations, and discussions were carried out by an international team of experts – our special thanks are given to Franca Meloni (Milano/Italy), Ioan Sporea (Timisoara/ Romania), Frantisek Zatura (Praha/Czech Republic), Torben Lorentzen (Copenhagen/Denmark), and all others, including the specialists from Germany.

Day one started with impressive demonstrations and lectures on general aspects such as preconditions and indications in interventions, and the spectre of potential complications. Some of the demonstrations had a specific historical background in that they were carried out by their initiators – unrepeatable moments.

Day two covered aspects in microbiology and hygienics, imaging modalities, puncturing techniques, instrumentation, and new techniques in development. Hands on practical training on aspic aquarium models was met with enthusiasm, including exercises both in diagnostics – hit the target! –, and in therapeutics with drainage intervention techniques. Endoscopic ultrasonography (EUS) and contrast enhanced ultrasonography (CEUS) and their impact on interventions were presented and discussed intensively.

Day three gave an opportunity to discuss these modern technologies in even more depth, including unusual EUS draining accesses to the biliary tree, and of the main pancreatic duct, as well as complex interventions in symptomatic pancreatic pseudocysts. A specialized industry exhibition offered further information on machines and materials.

A well organized social program – to share some of the events in the capitals gastronomical and cultural life – favourably completed these days, which left a prime impression in the evaluation questionnaires, and which gives rise for planning for a 2011 EUROSON School.

Thanks again to all participants, teachers, and coworkers!

Lucas Greiner, MD, FRCP
Dieter Nürnberg, MD
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Minimum Training Requirements for the Practice of Medical Ultrasound in Europe

Appendix 14: (CEUS) Contrast Enhanced Ultrasound

This curriculum is intended for physicians who perform CEUS scans in a clinical setting.
The curriculum includes standards for theoretical and practical skills. Standard skills are graded into 3 levels based on experience and difficulty of the scan or procedure.

Level 1 Training and Practice

In accordance with EFSUMB's Minimal US Training Recommendations, there are three levels of practice of conventional US. Minimum level 2 is recommended before beginning to learn the practice of CEUS. Minimum level 3 is recommended before teaching the practice of CEUS.
Whilst it would be unrealistic to expect every speciality group in every European country to agree upon the precise definitions of the levels of practice, it is hoped that certain principles concerning CEUS examination and documentation techniques may be accepted. Recommendations for the minimum training requirements for CEUS can then be based on these principles.

Level 2 Knowledge Base

The training requisite to this level of practice would be gained during a period of sub-speciality training lead by a level 3 capable CEUS examiner, eventually at an especially appointed CEUS training centre, including bedside practical supervision and off-line screen diagnostic discussions

Practice of CEUS at this level requires the following abilities:

- basic knowledge about contrast agents available in Europe
- In-depth knowledge and understanding of the technology of ultrasound equipment for contrast imaging
- Indications and contraindications for the use of CA
- Artifacts linked to the use of CA
- to be prepared for the rare advent of an allergoid reaction caused by the CA
- to understand the effect on the CA used by exposure to ultrasound
- knowledge about different ways for application of CA
- to understand the degradation of the CA over time following injection
- to acquire cine clips of the target area in a systematic manner, instantly adjusted to findings in all diagnostic relevant phases
- to assess the technical quality and dependability of the exam
- to recognize and correctly diagnose most pathology of the target lesion or area
- to recognize when the clinical situation or technical conditions of instrumentation require a more experienced practitioner and/or technically superior environment
- to recognize when you have insufficient knowledge and a referral to a more experienced practitioner is required
- knowledge of the composition of pharmacological dynamics, pharmacological kinetics and dynamics in Europe

After proper education the trainee is able tois:

- perform a thorough ultrasound CEUS examination of the liver and/or kidney according to the present EFSUMB Minimum Requirements including documentation of appropriate cine loop storage during all relevant contrast phases
- recognise focal lesions and vascular disorders and be proficient in identifying appropriately the conditions for CEUS investigation.
- recognise effect of treatment by CEUS
- write an appropriate report
- critically compare CEUS findings to other imaging modalities (CT, MRI, PET).

Level 3 Training and Practice

This is an advanced level of practice and it is desirable:

- to give off-line second opinions on exams by level 2 CEUS practitioners
- to perform technically difficult CEUS exams referred by level 2 examiners
- to perform specialized CEUS examinations
- to perform advanced CEUS-guided invasive procedures
- to conduct substantial research in CEUS
- to teach CEUS at all levels
- to be aware of and to pursue developents in CEUS

General recommendations

For each level of ultrasound practice, national and/or European speciality groups should formulate a detailed syllabus with comprehensive recommendations for necessary amounts of practical experience (target numbers) including cine documentation. The documentation of systematically acquired cine clips facilitates off-line assessment of the trainee's practical and diagnostic qualifications, with adjustment of the required training period in the individual case

- Examinations should encompass the full range of pathological conditions of the liver and/or kidney
- Trainees should attend an appropriate theoretical course before starting practical work. Training phase at the clinical site of level 3 CEUS centre
- Training at level 2 should be supervised by a CEUS experienced practitioner over a time that should be defined by the national societies.
- A log book listing of the types of examinations undertaken should be kept.
- During the course of training the competency assessment sheet (see CEUS Recommendation Appendix 1) should be completed as this will determine in which area(s) the trainee can practice independently
- Appropriate documentation of cine loops. Documented cine loops with pathological findings including a written report should be sent to a level 3 site for re-evaluation.

For a more detailed outline of CEUS technique, tips and tricks look at CEUS Recommendation Appendix 2

Maintenance of skills

Having been assessed as competent to practice there will be a need for continued medical education (CME) and continued professional development (CPD) and maintenance of practical skills. Practitioners should:

- After the practical training period it is recommended to get a second opinion on a CEUS examination by communicating with a level 3 site on the basis of stored cine loops for example via internet.
- include CEUS in their ongoing continued medical education (CME)
- participate in multidisciplinary meetings
- keep up to date with relevant literature

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Whilst every attempt has been made to provide accurate and useful information, neither EFSUMB nor members of EFSUMB nor other persons or institutions contributing to the formation of these guidelines make any warranty, express or implied, with regard to accuracy, omissions and usefulness of the information herein. Furthermore, the same parties do not assume liability with respect to the use, or subsequent damages resulting from the use of the information contained in these guidelines'.

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