

## Abdominal ultrasonography by the hepato-gastroenterologist : problems, demands, solutions

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### Abstract

This document analyzes the reasons for organizing an abdominal ultrasound training for Belgian trainees in hepatogastroenterology. The hepatogastroenterology speciality should implement, together with the radiology speciality and the national scientific and professional associations, the minimum training requirements which are proposed by the European Board of Gastroenterology and Hepatology and the European Federation of Societies for Ultrasound in Medicine and Biology. Trainees in hepatogastroenterology should acquire the same theoretical and practical training as radiologists, they should be taught and supervised by competent instructors and have their expertise evaluated. (*Acta gastroenterol. belg.*, 2011, 74, 67-69).

**Key words** : ultrasonography, radiology, clinical practice, gastroenterology training.

### What is the background ?

We are now seventy years after the birth of ultrasound (US) when Jean-Daniel Colladon measured the sound velocity in the water of Lac Lemman in Geneva and got the idea to probe the depth of the seas by US and to establish acoustic signals between ships (1), and 60 years after the discovery of the Doppler effect by Christian Doppler (2). While we are celebrating these anniversaries, it might be possible that we are at the dawn of a new era for US. Traditionally, physical examination depends on inspection, palpation and auscultation. Its shortcomings for the diagnosis of several traumatic, cardiac, rheumatological, urological, hepatobiliary and gastrointestinal diseases are well documented and, since several years, clinicians have been interested by directly seeing the “invisible” part of the pathologies through the use of the “ultrasound stethoscope”, a device having the potential to complete their physical senses. This tool does not replace the physical examination but considerably augments its yield and accuracy at the first contact with the patient. Initially, abdominal US was mainly performed by radiologists. Since the 1980’s, similarly to other medical specialists (cardiologists, gynecologists, intensive care specialists, ophthalmologists, urologists), hepatogastroenterologists (HGE) have also claimed the use of US in their field of expertise (3). The natural reaction of most radiologists to this was one of alarm and this has led to a turf battle between them and clinicians. US is one of the most operator-dependent radiological techniques, requiring

training, skill, and experience for its proper performance and interpretation. Moreover, in departments with limited resources of both medical staff and capital investment in equipment, radiologists, as committed to quality and efficiency as any other group of clinicians, regard it as politically unwise to accept the devolvement of radiological techniques to non-radiologists. Additional arguments for them to consider are the concentration of expertise in US together with that of CT scan and magnetic resonance imaging (MRI), allowing integrated imaging and allowing crossover teaching. It also guarantees the continuous availability of expertise, optimal digital accessibility and clearly assigns the responsibility. Also the lack of self-referral may reduce the costs of medical care.

### What are the demands ?

Abdominal US is primarily a symptom-directed diagnostic tool, which can help in the triage of patients hospitalized or consulting for symptoms and signs suggestive of an hepatobiliary, pancreatic or digestive problem. Subsequently, CT or MRI may be requested, in a more selective fashion according to the clinician’s question. Nowadays, not all radiologists are that much devoted to ultrasound, as they are often involved in more sophisticated imaging techniques where they are helped by high-level technicians. Furthermore, they have to face the outstanding technological evolution with the advent of molecular imaging, optical imaging, nanotechnologies, teleradiology and percutaneous gene therapy (4). While dramatically expanding the diagnostic possibilities down to the subcellular level, these techniques demand new forms of training in radiology and interdisciplinary cooperation (5). On the other hand, there is a demand of HGE to use the transducer as their second stethoscope both in emergency situations or at the outpatient clinic as it can be realized immediately, decrease the waiting list and the workload of radiologists and the

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duration of the work up. HGE are also more concerned and motivated because they know exactly what they are looking for, as they are aware of the clinical context of the patient. It would also be a mean to reduce overuse of CT or MRI at a time where there is more and more tendency to avoid exposure to X rays and concerns on renal and systemic toxicity of X ray contrast media (6,7). There are also new and fascinating tools which are of primary importance for the clinician who is responsible for the care of patients with liver and digestive diseases.

US contrast media are more and more used for characterization of liver tumours, including in case of renal dysfunction where CT and MRI are contra-indicated (8), for evaluating liver dysfunction (9) and response of liver tumours after radiofrequency ablation or chemotherapy, in particular anti-angiogenic therapy (10). Noninvasive evaluation of hepatic steatosis (11) and liver fibrosis using US elastography, whether mechanical (Fibroscan®) or ultrasonical through Acoustic Radiation Force Impulses or multiwave imaging (12,13,14), has gained more and more place in the diagnosis of significant/advanced liver fibrosis, the assessment of prognosis of the liver disease and the response to treatment, in terms of fibrosis/cirrhosis progression, stabilization or worsening. US is also more used in the field of IBD for diagnostic and therapeutic morphological endpoints (10). In situations where an overview of the inflammatory lesions is desirable, such as initial or emergency patient assessment, transabdominal US is a valuable, widely available, and inexpensive tool to judge site and extent of inflammation and possible complications (15). Microcomputer technology has led to the construction of small and powerful portable and hand-held ultrasound systems (16). This is a logical development. Indeed, the history of medical devices indicates that there is always a trend to miniaturisation and suggests that the high-end systems will become smaller and smaller in the future and, hopefully, less costly.

Trainees in gastroenterology are now claiming more and more a theoretical and practical teaching program in abdominal US. Besides the reasons mentioned here above, it will increase their knowledge of anatomy and help them for the performance of bedside procedures like paracentesis, puncture of collections with drain placement, with significant time gain, and avoiding blind procedures like percutaneous liver biopsy (17). In addition, US training may be necessary for optimal performance of endoscopic US and will help in the interpretation of all other imaging modalities. Since 15 years, the European Union of Medical Specialties (EUMS), through the European Board of Gastroenterology & Hepatology (EBGH) has decreed that training in ultrasound should be included to acquire the European Diploma in Gastroenterology. The diploma is necessary for gastroenterologists who wish to practice elsewhere in the European Union, outside their country of origin. The EBGH has even defined the number of procedures required : 300 abdominal ultrasound examinations (18).

The EBGH is unanimous that training in ultrasound techniques is highly desirable for specialists in gastroenterology. The board, however, recognizes that there may be centres in some countries where this training is not available for gastroenterologists. Cooperation with the radiologists is thus necessary. Training in abdominal ultrasound is also part of the training in endoscopic ultrasound (19).

### What are the solutions ?

It is undeniable that there is growing interest in abdominal US training among HGE and trainees in hepatogastroenterology. As trainees programs adopt ultrasound training, medical school faculties should consider incorporating ultrasound education into their curriculum (20). Teaching US could start during medical school at the time of the anatomical courses. Through the use of phantoms, students may reconstruct images in real-time, eliminating the need for finding normal and abnormal models, while providing an objective method of both teaching and testing (21). The use of a simulator is a convenient and objective method of introducing US to students and trainees, adding to the experience gained with traditional hands-on patient models.

For all the reasons explained here above it appears necessary to include abdominal US education during the HGE training program including theory, practice and competence. The US education provided to trainees should be structured and probably divided into two levels of competence as advocated by the European Federation of Societies for US in Medicine and Biology guidelines (22). A task force to evaluate this training in abdominal US for HGE should be created in Belgium. The basic level should comprise a knowledge of the examination of the whole upper and lower abdomen, and not limited to the examination of one or a few organs, as several organs are often involved in case of gastrointestinal pathology. In case of chronic liver disease, for example, spleen, abdominal vessels and the lower abdomen should be investigated to look for portal hypertension and ascites. Pancreatic tumors may give rise to dilated bile ducts, liver metastases or malignant ascites. Doppler ultrasound, use of ultrasound contrast media or US guided biopsy could be reserved for a second level. The training should consist of theoretical courses, hands-on sessions with volunteers and phantoms, and ample training with patients under guidance of experienced and competent instructors. The training criteria should be similar for radiologists and non-radiologists. Recognition of courses and training centres should be established and evaluation procedures should be elaborated, leading to certificates for those candidates who passed the evaluation. A post-graduate specialist training program with CME accreditation is also necessary. Ideally, for evident economic and scientific reasons the collaboration between radiologists and HGE should be encouraged, both for the organization of the training

program and for the daily working activities, in the same suites, with the same equipment.

### In conclusion

The advantages of ultrasonography performed by the clinician himself who is in charge of the patient are obvious : immediate and repeatable look – bedside, in elective routine or in emergencies as an extension of physical patient examination, leading to a safe, cheap, efficient and rapid diagnostic and therapeutic decision making. This may shorten the work-up and hospitalization duration, patient's immobilisation, thereby facilitating the initial evaluation. The major challenge of clinicians is to understand the characteristics of new ultrasound imaging modalities, to integrate them in an intelligent and cost-effective way into the clinical decision-making process and to extract from them the maximum objective information. The prerequisite is now a define a partnership with our radiologist colleagues in order to set up a US training program for HGE trainees, which should be organized, audited and funded optimally, all of this, for the best benefits of the patient. Without any doubt, we are at the dawn of a new era and revolutionary changes are ahead.

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