Rev Clin Esp. 2014;214(3):131–136

Revista Clínica Española

www.elsevier.es/rce

BRIEF ORIGINAL

Abdominal Ultrasound and Medical Education☆

G. García de Casasola Sánchez[a,*], J. Torres Macho[a], J.M. Casas Rojo[a], P. Cubo Romano[a], J.M. Antón Santos[a], V. Villena Garrido[b], R. Diez Lobato[c], Working Group SEMI Clinical Ultrasound

[a] Servicio de Medicina Interna, Hospital Universitario Infanta Cristina, Parla, Madrid, Spain
[b] Servicio de Neumología, Hospital Universitario 12 de Octubre, Madrid, Spain
[c] Servicio de Neurocirugía, Hospital Universitario 12 de Octubre, Madrid, Spain

Available online 13 November 2013

KEYWORDS
Ultrasonography;
Undergraduate medical education;
Physical examination

Abstract
Introduction: Ultrasound is a very versatile diagnostic modality that permits real-time visualization of multiple internal organs. It is of invaluable help for the physical examination of the patients.
Aim: To assess if ultrasound can be incorporated into medical education and if the students can perform a basic abdominal ultrasound examination without the necessity of a long period of training.
Methodology: Twelve medical students were trained in basic abdominal ultrasound during a 15-h training program including a 5-h theoretical and practical course and supervised practice in 20 selected patients. Subsequently, we conducted an evaluation test that assessed the ability of students to obtain the ultrasound views and to detect various pathologies in five different patients.
Results: The students were able to correctly identify the abdominal views more than 90% of the times. This percentage was only lower (80%) in the right subcostal view to locate the gallbladder. The accuracy or global efficiency of the ultrasound for the diagnosis of relevant pathological findings of the patients was greater than 90% (91.1% gallstones, abdominal aortic aneurysm 100%; splenomegaly 98.3%, ascites 100%; dilated inferior vena cava 100%; acute urinary retention 100%).
Conclusion: The ultrasound may be a feasible learning tool in medical education. Ultrasound can help students to improve the physical examination.

PALABRAS CLAVE
Ecografía;
Educación médica en pregrado;
Exploración física

Ecografía clínica abdominal y educación médica

Resumen
Introducción: La ecografía es una técnica muy versátil, que permite en tiempo real visualizar múltiples órganos internos y es de inestimable ayuda para la exploración física de los pacientes.

☆ Please cite this article as: García de Casasola Sánchez G, Torres Macho J, Casas Rojo JM, Cubo Romano P, Antón Santos JM, Villena Garrido V, et al. Ecografía clínica abdominal y educación médica. Rev Clin Esp. 2013;214:131–136.

* Corresponding author.
E-mail address: ggcasasolaster@gmail.com (G. García de Casasola Sánchez).

2254-8874/$ - see front matter

Objetivo: Evaluar si la ecografía puede incorporarse en la enseñanza de la medicina y si los alumnos pueden realizar una exploración ecográfica abdominal básica sin un largo periodo de formación.
Metodología: Doce estudiantes de medicina recibieron formación en ecografía abdominal básica durante un programa formativo de 15 h de duración, que incluía un curso teórico-práctico de 5 h y prácticas supervisadas en 20 pacientes seleccionados. Posteriormente realizamos una prueba de evaluación objetiva en la que valoramos la capacidad de los alumnos para obtener los planos ecográficos y detectar diversas enfermedades en 5 pacientes distintos.
Resultados: Los estudiantes fueron capaces de identificar correctamente los planos abdominales en más del 90% de las ocasiones. Solo en el corte subcostal derecho para localizar la vesícula este porcentaje fue inferior (80%). La precisión o eficiencia global de la ecografía para el diagnóstico de los hallazgos patológicos relevantes de los enfermos fue superior al 90% (colelitiasis 91,1%; aneurisma de aorta abdominal 100%; esplenomegalia 98,3%; ascitis 100%; vena cava inferior dilatada 100%, y retención aguda de orina 100%).
Conclusión: La ecografía puede ser una herramienta formativa en la enseñanza de la medicina y puede ayudar a los alumnos a mejorar la exploración física.

Background

In the medical diagnostic and decision-making process, the first step, and probably the most important, is the performance of an adequate anamnesis (medical history) and physical examination of a patient. However, due to significant technological advances, the interest and expertise of professionals in physical examination has declined substantially in recent decades.

A hundred years ago the diagnosis of most diseases was based on the detection of specific signs and symptoms without any additional test. Currently, the diagnosis of numerous processes rests on analytical and imaging tests (ultrasound, CAT, magnetic resonance). Due to the greater availability and accessibility of these tests, physical examination has been relegated to a second tier. However, in the hands of experts, inspection, palpation, percussion and auscultation can be essential for a proper diagnostic approach.[1] In fact, there are diseases (cellulitis, psoriasis, herpes zoster, amyotrophic lateral sclerosis, Parkinson's disease, Bell's palsy, etc.) whose diagnosis rests exclusively on the physical examination.[2]

Despite the importance of physical examination, we must be aware of its limitations. Thus, for example, the detection of small quantities of ascites or pleural effusion; the size assessment of the spleen, liver and aorta; and the interpretation of a heart murmur can be difficult when using traditional physical examination techniques, especially for less experienced students or doctors.

High-quality ultrasound scanners have been developed relatively recently and are relatively affordable. Many of them are portable, thereby enabling bedside examinations. This type of equipment (stethoscope, ophthalmoscope, otoscope and reflex hammer) can be used by any physician and is a perfect complement for improving the cost-effectiveness of physical examinations. Ultrasound helps visualize and objectively measure organs and their potential disorders, which can be difficult to determine in a traditional physical examination.

Undergraduate ultrasound training is progressively being implemented in various medical schools, especially in the United States.[3–11] Ultrasound facilitates the learning of anatomy, helps in understanding the physiology and pathophysiology of numerous organs and systems (especially cardiovascular), improves the performance and reliability of physical examinations and facilitates the diagnosis of numerous diseases.[5] Ultrasound does not attempt to substitute or replace physical examination; it supplements it perfectly and can even help improve our skills in this field.

After several years dedicated to the teaching of basic ultrasound to residents and internal medicine specialists, we have become aware of the enormous potential that this technology can have for medical students as a complement to physical examination and the diagnostic approach to patients. We have selected specific aspects of abdominal ultrasound that, based on our experience, are relatively simple to perform and do not involve a steep learning curve. The aim of this pilot study is to attempt to demonstrate that, in a short training period, medical students can adequately perform a basic ultrasound-guided abdominal examination.

Methodology

Students

We recruited 12 students in their 4th year of medical school, all of whom participated voluntarily in the study. All students were attending the course on clinical practice at the University Hospital Infanta Cristina (Parla, Madrid) at the time of their recruitment. Nine of the students belonged to the Faculty of Medicine of the University Complutense (Madrid) and 3 belonged to the School of Medicine of the University San Pablo CEU (Madrid). None of the students had previous experience with ultrasound.

Ultrasound Training Phase

In small groups of at most 5 participants per team and teacher, the students initially completed a 5-h theoretical and practical training course. The course was taught by two