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Clinical Ultrasound. Essential tool for healthcare

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Abstract

A brief description of the clinical iltrasound is presented; its definition; main indications; advantages as well as its weaknesses. The POCUS learning curve is pointed out for personnel without prior knowledge of it.

Keywords: *Point of Care Ultrasound; Echography; Sonography;*

Introduction

In the concluding decade clinical ultrasound has evolved rapidly, decreasingly affordable, compact and inexpensive ultrasound outfit has arisen that has made it possible to carry out sonographic examinations next to the patient bed [1].

On an occasion when other professionals outside of imaging commenced in the study of ultrasound, detractors protracted in the main Medical Colleges of Imaging, they esteemed at that moment that its use by personnel not specialized in the matter of ultrasound wasn't correct [2].

Eventually, it was shown that clinical ultrasound can be part of the clinical system in non-ultrasound technical hands.

Ultrasound is no longer an exclusive method for imaging specialists, its use has been extended by professionals from various specialties that have taken it as an integral part of the clinical examination and has desisted to be a "complementary exploration" and need to be systematically integrated into the decision-making process in internal medicine [3]. It's extremely used to arrive at an early opinion, and has indeed exceeded the sensitivity and specificity to diagnose some conditions compared to radiographic studies carried out on must patients [4].

Cardiologists, gynecologists, vascular surgeons, ophthalmologists, and emergency physicians use ultrasound as part of the examination of patients, and programs for the obtainment of ultrasound qualifications and skills are included in the curriculum of these residencies. Several medical schools have introduced ultrasonography as a system of studying human anatomy in initial courses of the medical career, with excellent results; the living organ is observed, its shape, movement, connections with other organs [5].

The acquisition of stated knowledge in anatomy and physiology lasts for a longer time and that ultrasound information can be used more fluently for the resolution of clinical practices.

What's clinical ultrasound?

Also known as bedside ultrasound; scanning ultrasound; point of care ultrasound; 21st century stethoscope; echoscope; third eye of the anesthesiologist [6], is the echographic or ultrasonographic study carried out by the attending physician, at the patient bedside with the end of giving concrete answers to specific questions, similar as [7]:

- Is there a pneumothorax?
- Is there a pleural effusion?
- Could it be considered a pericardial effusion or cardiac tamponade?
- How is the hemodynamic function?
- Is there confirmation of dilation or hypertrophy of cardiac chambers?
- Are there abnormalities in the heart valves?
- Is there evidence of abdominal aorta aneurism?
- Are there valvular vegetations?
- Are intracavitary thrombi observed?
- What would be the possible cause of the cardiac arrest?

• Are there intra-abdominal masses?

• What are the possible causes of abdominal pain?

• Is there a pregnancy?

• Could the opinion of pneumoperitoneum be considered?

• Is there free fluid in the abdominal recession?

• Could there be deep vein thrombosis?

• Is there validation of intracranial hypertension?

In addition, guided by ultrasound, the main invasive procedures needed by patients are performed more reliably and fleetly with the conceived reduction in complications.

At no time does clinical ultrasound replace conventional ultrasound performed by sonographers in the ultrasound department, the ultimate offers information that the family doctor generally does not "see" and yet it would be necessary to detail to arrive at accurate judgments.

Why should the attending physician perform clinical ultrasound?

In the first place, to offer prompt responses to concrete questions during the evaluation of patients, to evaluate complications in clinical practice, in post operatory status [8] or with the aim to carrying out the needed invasive procedures.

It's also known that a sonographer isn't always available at the time his help is asked, this could bring delays with occasionally serious consequences for patients.

Clinical Ultrasound opportunities [9]:

• No need to transfer cases to another department;

• Is performed at the patient's bedside by their attending doctor;

• The results of the information attained are immediate;

• Normal examination whenever necessary;

• Doesn't cause risks to patients or care staff;

• No exposure to radiation;

• It doesn't produce added charges to the costs of health care (only the original expenditure of the ultrasound machine and the necessary articles like ultrasound gel and printer paper).

Weaknesses of clinical ultrasound [9]:

• It is a dependent driver examination. Its results are in relation to experience, skill and performance of the personnel carrying out the ultrasound;

• Former training is obligatory to make it, and that's in correspondence with the complexity of the ultrasound studies that are intended to be achieved;

• This weakness is strengthened by participation in continuing education courses.

Clinical ultrasound learning curve.

The conformation of skills to adequately obtainment of optimal images and their interpretation have been estimated through learning curves. For the must of studies types, a range of 50 to 75 examinations resulted in both excellent interpretation and good image quality [10].

Conclusion

Clinical ultrasound is an essential tool for the practice of medicine in all scenarios as it facilitates the learning of anatomy, the exercise of diagnosis, differential diagnosis and for the performance of invasive procedures.

It does not replace studies performed by sonographers.

Finally, the learning curve for performing basic ultrasound studies is short.

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