



Point of care ultrasonography as the new “Laennec Sthetoscope”

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Specialty type: Medicine, general and internal

Provenance and peer review: Invited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's scientific quality classification

Grade A (Excellent): 0
Grade B (Very good): 0
Grade C (Good): 0
Grade D (Fair): 0
Grade E (Poor): 0

P-Reviewer: Munasinghe B, Sri Lanka

Received: December 7, 2023

Peer-review started: December 7, 2023

First decision: December 31, 2023

Revised: January 19, 2024

Accepted: February 29, 2024

Article in press: February 29, 2024

Published online: March 25, 2024



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Abstract

Point of care ultrasonography (POCUS) has evolved to become the fifth pillar of the conventional physical examination, and use of POCUS protocols have significantly decreased procedure complications and time to diagnose. However, lack of experience in POCUS by preceptors in medical schools and nephrology residency programs are significant barriers to implement a broader use. In rural and low-income areas POCUS may have a transformative effect on health care management.

Key Words: Point-of care ultrasonography; Central venous catheter; Internal medicine; Obstetric emergencies; Medical training

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Core Tip: Point of care ultrasonography (POCUS) has become an important tool in patient care. POCUS protocols has reduced complications in invasive procedures and improved diagnostic times. In rural and low-income areas POCUS have an important role on health care management.

Citation: Sabath E. Point of care ultrasonography as the new “Laennec Sthetoscope”. *World J Nephrol* 2024; 13(1): 90542

URL: <https://www.wjgnet.com/2220-6124/full/v13/i1/90542.htm>

DOI: <https://dx.doi.org/10.5527/wjn.v13.i1.90542>

INTRODUCTION

Point of care ultrasonography (POCUS) it is defined as a focused ultrasound examination performed by any physician at the patient's bedside, allowing immediate and correct clinical integration[1]. A clinician uses POCUS to guide the evaluation and

diagnosis in conjunction with a traditional medical examination; in fact, POCUS has evolved to become the fifth pillar of the conventional physical examination (inspection, palpation, percussion, auscultation, and ultrasonography)[2].

As was elegantly described by Koratala *et al*[3] in his review about myths, POCUS emerges as a useful tool for any nephrologist, and helps to answer specific clinical questions such as “Does this patient with left side pain have kidney stones?” or “Does this patient with recently diagnosed abnormal creatinine levels have small kidneys?”.

POCUS allows the physician to review and interpret images and make critical decisions at the point of care, and many studies have shown that POCUS protocols significantly reduced diagnostic time[4], decrease procedure complications[5], improves patient safety, increased success rates of invasive bedside procedures[6], and minimize delays in care such as time to obtain antibiotics or time to move into surgery[7].

One of the biggest barrier to the widespread use of POCUS has been the lack of adequate training curricula in undergraduate and specialty courses[8]. Koratala *et al*[3] describe that 73.8% of United States undergraduate medical schools have integrated POCUS into basic science courses; however, even in other developed countries this percentage is lower (in Canada and according to the 2014 census only 50% of the medical schools included it as part of their curricula[9]), and in developing nations the information is almost non-existent.

Even though there is a solid evidence that POCUS implementation improves the traditional examination techniques and that is very clear that POCUS is essential to the nephrology practice, still few nephrology programs in Latin-America (LA) and other regions introduce POCUS as curricular training[10]; the inexperience of preceptors in these courses is an important limitation in these countries[11]. Current training programs are heterogeneous without rigorous quality control; short-term courses are useful to initiate POCUS training but practice and learning curricula should span the entire nephrology residency[12].

Also, the unavailability of ultrasound machines (USM) still precludes its use in low-socioeconomic countries; in one study conducted in intensive care units from Sri Lanka, lack of USM availability delayed 80% of interventions and optimal management[13]. However, the introduction of low-cost and more portable ultrasound models in the health-market will surely diminish this shortage in the near future.

The percentage of nephrologist interested in learning POCUS is high (95% in a recent Brazilian-survey), although most of them think in POCUS as a help for central venous catheters placement and not as a guide to do volume assessment, lung evaluation, *etc*[14].

Lack of time was also considered as one of the most important barriers for POCUS implementation and learning in almost every country[15]; however some studies have shown that even short courses (*i.e.* a 16-h training course) covering topics associated with complications of kidney disease in lung, heart, *etc.* can be helpful to develop POCUS skills in clinical practice[12], but as mentioned before must be completed with further training.

POCUS is becoming a widely useful tool in low- and middle- income countries due to its portable nature, trainable interface and readily available data to guide clinical decision-making, and has been widely demonstrated its utility in rural and remote areas with no access to other diagnostic methods[16].

Studies performed in poorer regions of Mexico have shown that ultrasound changed the management plan in 30% of patients[17]. As expected, most of ultrasounds performed in rural and low-income areas are done as help in gynecologic-obstetric problems and is an important tool to provide adequate imaging in screening for placenta *previa*, fetal malposition, multiple gestations, ectopic pregnancy, *etc*[18]. This experience has been replicated in another low-income countries such as Uganda, Malawi, Tanzania[19], *etc.* As ultrasound machines become more portable and affordable, coupled with increasing capacity to transmit digital images for remote review, the introduction of POCUS may have a transformative effect on health care in resource-limited settings.

Another barrier in many countries (*i.e.* LA countries) is the lack of non-english literature and publications: a recent PUBMED search found less than 30 papers in Spanish about POCUS and less than 10 searching with the terms “POCUS”, “riñón”, “nefrologia”[20].

CONCLUSION

Many efforts has to be done to increase POCUS training in residency programs outside of the United States; availability of pocket ultrasound is not a limitation as they are of good quality and not so expensive. We have to take out the fear that POCUS is going to limit our clinical abilities and to impair the doctor-patient relationship, we have to think in POCUS as the new “Laennec stethoscope”[21] that is going to help us to make more accurate diagnosis and to improve the patient care.

FOOTNOTES

Author contributions: Sabath E collected the literature, analyzed the data, wrote the draft and revised and submitted the manuscript.

Conflict-of-interest statement: The author declares no competing interests.

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S-Editor: Liu JH

L-Editor: A

P-Editor: Zhao S

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