



POCUS

in Singapore EDs

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This story began 20 years ago.

Supported by Mr Tan Tee How, then-CEO of the National Healthcare Group (NHG), three emergency department (ED) heads (A/Prof Peter Manning, A/Prof Eillyne Seow and A/Prof Francis Lee) from the cluster went down under to Australia on a study trip to learn how to use ultrasound to manage trauma patients. Point-of-care ultrasound (POCUS) was about to cause a paradigm shift in emergency medicine (EM), and there were two reasons for this.

Firstly, almost out of the blue, there was this new bedside tool that could help improve diagnostic accuracy and increase safety and success of many emergency procedures. Secondly, the nature and practice of EM revolves around one central construct: time. Because the physician who orders, performs, interprets and acts on the scan is one and the same, emergency ultrasound (EUS) could dramatically shorten the entire clinical decision-making process, saving precious time, manpower resources and possibly even lives.

Returning from the trip, the trio never looked back.

Laying the foundation

The first chapter was a difficult one to write. Back in year 2000, EUS was a complete non-entity in Singapore; there were no machines, trainers, curriculum, credentialing mechanism or quality assurance. There were doubts regarding its utility in the real world and serious concerns regarding the start-up resources and uncertain medico-legal implications. The sentiments were best summed up by Dr John Forbes' remark made two centuries earlier in his preface to the translation of René Laënnec's treatise on the newly invented stethoscope, "that it will ever come into general use, notwithstanding its value, I am extremely doubtful; because its beneficial application requires much time, and gives a good deal of trouble both to the patient and the practitioner".

To begin, the EUS pioneers in both Singapore Health Services and NHG took small but significant steps in quick succession. Anchoring on the two most widely accepted applications in literature at that time – focused assessment with sonography in trauma (FAST) and focused assessment for abdominal aortic aneurysm (AAA) – key stakeholders

within and outside the EDs were engaged to achieve their buy-in.

Conversations with the departments of radiology and general surgery started. Working together, the three departments in Tan Tock Seng Hospital organised the first POCUS course in Singapore in 2005. A partnership like this helped promote its acceptance within the institution. Hospital administrators were engaged to secure funding for smaller, lighter and cheaper units tailored for point-of-care use. To create a platform for the local community to learn from overseas experts, international courses such as the ultrasound life support course from the World Interactive Network Focused on Critical UltraSound were introduced. Nationally, POCUS was incorporated in the emergency medicine's seamless curriculum. And to grow a critical mass of subject matter experts, consultants were sent overseas to take up emergency ultrasound fellowships. All these laid the foundation for subsequent chapters to be written.

What it is, and is not

Soon, it became clear that one of the greatest stumbling blocks to the development of POCUS was the understanding of POCUS itself – the popular and prevailing notion that POCUS was an extension of a physical examination. Rather, it should be seen as a procedural skill, yielding the fruits of a point-of-care test like the ECG, portable X-ray and glucose meter.

The difference may seem subtle, but the implications are not. Take a patient with abdominal pain for instance. While one can learn how to and perform a thorough physical examination of the abdomen and arrive at a reasonable and defensible assessment, no emergency physician would have the proverbial 10,000 hours needed to gain mastery in performing abdominal sonography or clock a couple more thousands to interpret them like a radiologist. In the dynamic and hectic environment, there is also no time or space for a comprehensive radiological abdominal scan to be performed inside the ED.

Instead, before performing POCUS, one needs to be clear that there is a focused question that POCUS can



answer, usually in a distinct or binary “yes/no” fashion, like “is the aorta less than 3 cm?”, and then using the findings to inform the clinical impression. One should not scan around the abdomen “hunting” for the cause of the patient’s abdominal pain. In this way, the utility of POCUS is maximised, and misuse minimised. Having the POCUS assessment targeted and outcome focused also translates to a training programme that can be rigorously structured, with a high standard of competency attainable.

Last but not least, as it is not an extension, it should not be used as a replacement of physical examination.

Changing practice through education

The transition to residency in the early 2010s opened a new window of opportunity for the development of EUS. In April 2013, with POCUS listed as one of the 23 milestones in EM training, a group of physicians, including A/Prof Francis Lee, Dr Ang Shiang Hu, Dr Chan Kim Poh and Dr Gene Chan, was tasked to develop the EUS curriculum for EM residency.

The curriculum would eventually be organised in two parts: resuscitation and focused organ-specific ultrasound. Key domains of competency were articulated, along with the number and types of scans that go into credentialing competency. Dedicated ultrasound scanning shifts, simulation training and the use of institutional quality audit as a teaching tool were proposed. On 11 July 2013, the EUS curriculum was endorsed by the EM Residency Advisory

Committee and incorporated into the EM core curriculum. This marked a crucial milestone. From then on, succeeding generations of EM residents would be formally trained in and credentialed to perform EUS. Defined in the

curriculum, POCUS became a standard of care across all EDs in Singapore.

Scope of practice

Moving beyond FAST and AAA scans, the scope of EUS expanded considerably on both diagnostic and therapeutic fronts, such as the focused assessment of the heart, lung and inferior vena cava, as well as performing central line insertion, femoral nerve block and thoracocentesis. The increased proficiency in these applications is accompanied by a parallel capability in performing organ-specific scans within the POCUS framework, such as evaluating the gallbladder and kidney. With each application as a building block, a variety of ultrasound-integrated approaches and algorithms emerged, addressing common presentations such as chest pain, abdominal pain, dyspnoea and hypotension. This expansion is underpinned by a growing body of research supporting and directing the use of POCUS.

A wider appeal

The interest in POCUS is clearly not restricted to EM in Singapore. Many specialties have also adopted it in various settings, from intensive units to specialist outpatient clinics. Accompanying this is a strong and growing demand for training. For example, within five years of its founding by A/Prof Francis Lee, the Alexandra Academy for Clinical and Emergency Sonography at Khoo Teck Puat Hospital registered more than 1,000 participants from over 20 countries, with most participants practising outside the ED. POCUS is also gradually being incorporated into both graduate and

undergraduate medical education. With more providers being trained in and performing POCUS, one might argue that it is also starting to shape the way healthcare is delivered here in Singapore.

Conclusion

Certainly, this story does not end here.

There are still many chapters and sections waiting to be written, which could include the creation of a local EUS fellowship, evolution of programmatic assessment in the curriculum, integration of POCUS findings into electronic medical records, research collaboration, engagement and partnership with other fraternities, and many more.

Reflecting on what and how the pioneers and fraternity have achieved over the last 20 years in developing POCUS in our EDs, I am hopeful that we shall be able to read more about them in the not-too-distant future. ♦

Acknowledgements

The author thanks A/Prof Eillyne Seow and A/Prof Francis Lee for sharing the historical perspectives mentioned in the article, and A/Prof Seow for kindly assisting in the review of the manuscript.

Legend

1. Dr Paul Wan (left) as a Year 4 medical student in 2011, learning to perform the FAST scan during his ultrasound elective from Dr Jerwin Pasco. Having completed his EM residency, Paul is currently a member of the EUS subcommittee

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