

## Transthoracic Echocardiography—Simulator-Based Training versus Training Using Human Models

Transthoracic echocardiography (TTE) has moved out from the realms of cardiology into the arena of anesthesia and intensive care. It is adopted as a diagnostic and screening aid besides monitoring tool. Several learning methodologies and models are available to achieve competence in the field of echocardiography. Simulation-based training is set forth as surrogate to real-time-based patient learning. It enables imaging the virtual heart using a mannequin rather than a patient. The use of simulation aids in the acquisition of psychomotor skills.<sup>[1]</sup> To all appearances, transesophageal echocardiography (TEE) has greater utility and impact of simulation-based learning<sup>[2]</sup> as compared to TTE simulation.

TTE is a point-of-care tool and a complex technical skill requiring training. Focused cardiovascular ultrasound alters perioperative management<sup>[3]</sup> and is promising for evolving application during anesthesia management. The benefits that string along with application of TTE can be experienced by anesthesiologist as they confront variety of emergent situations. Conversely, they fall short of know-how to TTE.

This commentary is in response to “Impact of simulation based training on acquisition of transthoracic echocardiography skills in medical students.”<sup>[4]</sup> Well, the abovementioned article is insightful and covers both simulation and TTE on human volunteers. However, abstract concludes that both teaching methods are effective; the discussion section deliberates more in favor of simulation-based learning modality. The authors did not pen much regarding usefulness and impact of training in human volunteers. The manuscript lacks conclusion at the end of the article. This commentary highlights few more facts akin to TTE learning with simulation as well as on the human volunteers.

TTE can be learnt using simulation technology on the virtual three-dimensional heart model; however, it may not teach exemplary machine handling. Perhaps, training on human volunteers ought to be cumbersome at times, causing pain or tenderness related to probe handling and repeated image acquisition. Contrarily, simulation-based training can be effectual as it can be done as many times as possible. It helps trainees to acquire proficiency in the nuances of quality image acquisition.<sup>[5]</sup> Students edified by

simulation amass better skills in accession of images and anatomy identification on human volunteers.<sup>[6]</sup> It helps in rapid skill achievement<sup>[2]</sup> and lessens the number of TTE examinations entailed to reach competency.<sup>[7]</sup> Simulators agreeably provide secure environment; thereupon, errors are permissible on part of amateurs and can get adequate practice time without negative consequences on patient safety. As mentioned aptly by authors, it is indeed a costly affair with major expenses involved in procurement, setup, and maintenance of the simulator machines.

Although simulation increases the competency in TTE, eventually after learning on simulator, one may experience apprehension while performing TTE actually on the patient as a beginner. Learning directly on human volunteers may give actual feel of probe handling and manipulations, which may boost up the confidence of the learner. Though the philosophy may appear similar in both scenarios, students are likely to gain more satisfaction and confidence in human volunteer group as per our observation.

Thus, the TTE training on human volunteers can be done handily with great deal of outcome and economic reasoning. Although the modus operandi with simulation technology can help technical operation of ultrasound probe, image acquisition and can undeniably offset the learning in TTE.

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**Submitted:** 30-Jun-2019 **Revised:** 23-Jul-2019

**Accepted:** 25-Aug-2019 **Published:** 18-Oct-2021

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Access this article online	
<b>Quick Response Code:</b>	<b>Website:</b> www.annals.in
	<b>DOI:</b> 10.4103/aca.ACA_102_19

**How to cite this article:** Nagre AS. Transthoracic echocardiography—simulator-based training versus training using human models. *Ann Card Anaesth* 2021;24:503-4.