

Commentary

Transesophageal echocardiography: A new era for the critical care physician

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Medical ultrasound is a ground breaking frontier of medicine, particularly in regard to point of care investigation and intervention. It has revolutionised many areas of critical care including vascular access [1], the trauma survey [2] and point of care diagnostic imaging [3]. Transthoracic echocardiography (TTE) is currently the preferred method in assessing cardiac function and haemodynamic status despite its well-known limitations [4]. For this reason a number of studies have investigated the feasibility and applications of transesophageal echocardiography (TEE) in the critical care setting [4-6].

In 2013, Charron *et al.*, performed a study investigating the minimum training requirements of non-cardiologists to perform an advanced point of care TEE [5]. In this study, each participant was an intensive care trainee with little or no experience with echocardiography. These trainees were then trained in advanced TEE and assessed at one, three and six months. This study found that the performance of at least 31 examinations over six months were required to reach competence in advanced TEE.

In 2015, Arntfield, *et al.*, expanded on the use of TEE as an additional form of basic point of care ultrasound in the emergency department [6]. This study trained a small group of emergency physicians experienced in TTE to perform a basic four view TEE [6]. During a four hour simulation session these physicians were taught to obtain and interpret the mid oesophageal four chamber, mid-esophageal long axis, transgastric short axis and bicaval view. Six weeks later each physician was asked to obtain and interpret these same views. Eight of twelve participants felt confident in performing this task. Despite the lack of perceived confidence, all twelve were able acceptably obtain and assess mid-esophageal four chamber and mid-esophageal long axis views. Eleven of the twelve were able to demonstrate adequate transgastric short axis and bicaval views. The pathological conditions simulated were identified by 100% of participants.

These diagnostic findings in simulated TEEs were then replicated in a further study by Arntfield *et al.*, (2016) [4]. This was a retrospective review of 54 TEE examinations performed by 12 ED physicians. In this study the indications included intra cardiac arrest, post cardiac arrest and undifferentiated hypotension. The TEE studies performed the following four views; mid oesophageal four chamber (96%), mid-esophageal long axis (78%), transgastric short axis (80%) and bicaval (46%) view. Fifty-three of the 54 studies were determinate making it a reliable tool. Furthermore, 78% of the studies had diagnostic influence

and impacted therapeutic decisions in 67% of TEEs.

These studies demonstrate a much faster training curve [5,6] and greater clinical utility [4] than expected. Commonly, incorporation of TEE meets a great deal of resistance due to the cost of the TEE probe (estimated at \$40,000 USD [4]), interdepartmental politics and lack of established training models [4]. Despite this resistance, the above studies provide evidence of the potential benefit that could be provided by routine use of TEE in the critical care setting.

References

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