

Simulator and Web-Based TEE Training

The Problem

Lack of Adequate TEE Training

- TEE is a valuable monitoring modality in the perioperative period and is a best practice for diagnosing hemodynamic instability.
- The number of individuals with appropriate training is limited.
- Obstacles to training include difficulty integrating knowledge and technical skills and finding safe opportunities for learners to practice.
- Patients would benefit from increased availability of qualified echocardiographers to aid in diagnostic dilemmas and improve patient monitoring, as this would enhance both the timeliness and quality of care.

Aim/Goal

Our goal is to provide Basic TEE training for all 2nd and 3rd year anesthesia residents within a 6-month period using advanced simulators (Figure 1) and web-based teaching modules (Figure 2). Measures of training quality are to improve speed and accuracy of obtaining images and written test performance.

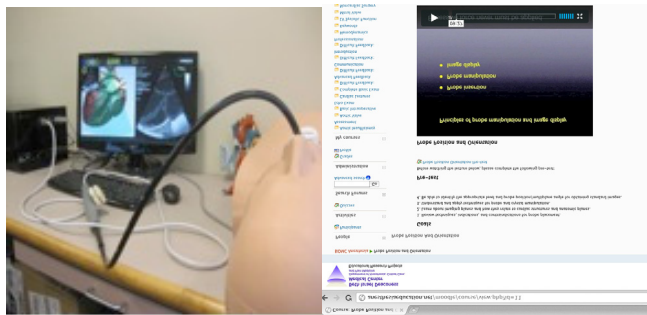


Figure 1: TEE Simulator

Figure 2: Online Learning Module

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The Interventions

- A one-month intensive course was developed with both simulator and web-based components.
- The course was tested on volunteer residents and feedback solicited.

The Results/Progress to Date

- Training has been completed for 2/3 of all eligible; remaining residents scheduled.
- Knowledge scores increased significantly ($p = 0.023$, Figure 3)
- Image acquisition speed and accuracy also improved significantly (Table 1)

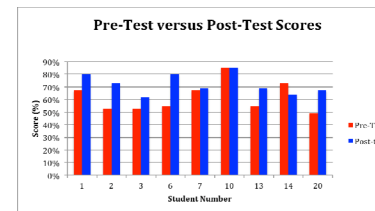


Figure 3: Test Results

Measure	First Session	Final Session	P-Value	Expert Comparison
Plateau	16 (10 – 23)	6 (3 – 9)	<0.001*	3 (3 – 10)
Variability	0.07 (0.05 – 0.11)	0.10 (0.07 – 0.12)	0.28	0.15 (0.10 – 0.15)
Time	259 (174 – 380)	180 (118 – 231)	0.02*	145 (86 – 151)
Distance	19.1 (14.6 – 29.0)	18.5 (12.1 – 23.1)	0.51	17.9 (10.9 – 21.8)
Accuracy	4.32 (1.0 – 6.66)	3.95 (1.39 – 5.62)	0.42	2.44 (1.21 – 5.33)

for information. * significant difference ($p < 0.05$).

Table 1: Comparison of first and final session performance in acquiring the Trans-Gastric short axis view. Comparison was performed using Mann-Whitney test between the first and final sessions. Data is presented as median (25% - 75% Inter-Quartile Range). The expert performance is included

Table 1: Simulation Results

Lessons Learned

- Scheduling could be improved by making it part of the second-year cardiac rotation and eliminating call conflicts.
- The teaching modules are being refined based on resident feedback
- Residents find all elements of the course very useful (Figure 4)

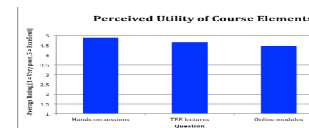


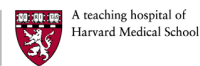
Figure 4: Resident Perceptions of Course

Next Steps

- Complete 2nd and 3rd year resident training/testing, prepare for basic exam.
- Plan for Advanced Echocardiography course for residents and staff.



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