

**Critical Review Form
Cohort Study**

[Arntfield R, Pace J, Hewak M, Thompson D. Focused Transesophageal Echocardiography by Emergency Physicians is Feasible and Clinically Influential: Observational Results from a Novel Ultrasound Program. J Emerg Med. 2016 Feb;50\(2\):286-94.](#)

Objectives: "to describe the feasibility, findings, and clinical impact of TEE [transesophageal echocardiography] in the ED [emergency department] from the first 2 years of a novel ED TEE program." (p. 286)

Methods: This retrospective chart review evaluated all TEEs performed in two academic EDs in London, Ontario, Canada between February 1, 2013 and January 30, 2015. Prior to the study period, a group of 14 emergency physicians underwent training on the use of both transthoracic echocardiography (TTE) and TEE, that included 2 hours of didactics and 2 hours of simulation-based training. Following this training, all TEE studies performed by these emergency physicians were reviewed for quality assurance by the ED TEE curriculum director.

For patients identified as having undergone TEE during the study period, examination details were retrieved from the Qpath archives and relevant data were extracted by a single author and populated into a preformed data abstraction tool. Additionally, the electronic medical record of each patient was reviewed for any evidence of aerodigestive complications.

During the study period, 54 TEE examinations were performed by 12 unique emergency physicians, of whom 10 were attendings and 2 were senior residents. The mean age was 60.1 years and 76% were male. The indication for TEE was cardiac arrest in 69% of cases (intra-arrest in 43% and post-arrest in 26%). All but 1 of the remaining cases were performed for evaluation of hypotension. All patients undergoing TEE were intubated.

Critical Review Form: Cohort Study	
Guide	Comments
Are the results valid?	
Did experimental and control groups being the study with a similar prognosis?	
Did the study address a clearly focused issue?	No. The authors sought to evaluate the "feasibility, findings, and clinical impact" of TEE in the ED, but did not ask any specific questions or identify any outcomes of interest. As a result, the study is at high risk of data mining in order to justify the use of TEE in the ED.
Did the authors use an appropriate method to answer their question? - Is a cohort study a good way of answering the question under the circumstances?	No. Given the decision to look rather broadly at the feasibility and clinical findings/impact of TEE in the ED, the use of an observational cohort study was a reasonable means of making this assessment. Unfortunately, the authors performed a retrospective study, which is at high risk of missing data and subjective interpretation of the effects of TEE on management.
Was the cohort recruited in an acceptable way? - Was the cohort representative of a defined population?	Yes. The authors included all patients who underwent a TEE in the ED during a specified time frame, identified by completion of documentation in the medical record and Qpath. While the authors did not pre-specify a particular indication

<p>- Was there something special about the cohort? - Was everybody included who should have been included?</p>	<p>for the TEE, just over one third were performed for cardiac arrest and all of the remaining but one were performed for hypotension.</p>
<p>Was the exposure accurately measured to minimize bias? - Did they use subjective or objective measurements? - Do the measures truly reflect what you want them to (have they been validated)? - Were all the subjects classified into exposure groups using the same procedure?</p>	<p>Yes. The "exposure" in this study was performance of a TEE in the ED, which was easily identified in the medical record.</p>
<p>Was the outcome accurately measured to minimize bias? - Did they use subjective or objective measurements? - Do the measures truly reflect what you want them to (have they been validated)? - Has a reliable system been established for detecting all the cases (for measuring disease occurrence)? - Were the measurement methods similar in the different groups? - Were the subjects and/or the outcome assessor blinded to exposure (does this matter)?</p>	<p>N/A</p>
<p>Have the authors identified all important confounding factors and have they taken account of the confounding factors in the design (i.e. modelling, regression, propensity analysis, or sensitivity analysis to correct, control or adjust for confounding factors)?</p>	<p>N/A</p>
<p>Was the follow up of subjects complete and was the follow up of subjects long enough?</p>	<p>Yes. The authors were looking solely at the feasibility of TEE in the ED and the potential diagnostic and therapeutic impact on clinical care in the ED. Long-term outcomes were not being assessed and hence care beyond the ED was not included in this study.</p>
<p>What are the results?</p>	
<p>What are the results of this study?</p>	<ul style="list-style-type: none"> ● Probe insertion was successful in all 54 cases (100%): <ul style="list-style-type: none"> ○ First pass success occurred in 45 (83%) of cases. ○ Insertion occurred after more than one attempt in 6 (11%) cases. ○ Laryngoscopy was required for insertion in 3 (6%) cases. ● There was no documentation suggestive of aerodigestive injury in any of the 39 patients who survived to discharge or in any of the autopsies performed on the 15 patients who died. ● 53 (98%) examinations produced images interpretable by the operator. ● Operators' reported that TEE was diagnostically influential in 78% of cases. <ul style="list-style-type: none"> ○ The most common influence was exclusion of a cardiac cause of cardiac arrest in 56% of cases. ○ Other influences included identification of depressed left ventricular function (15%), hypovolemia (13%), regional wall motion abnormality (6%), and aortic dissection (4%). ● A therapeutic impact was deemed to be present in 67% of cases. <ul style="list-style-type: none"> ○ The most common therapeutic impact was change in quality, timing, or location of CPR in 43% of cases. ○ Additional therapeutic impacts included cessation of resuscitation (30%), guidance of hemodynamic support through volume (18%) or vasoactive drugs (8%).

How precise are the results? (i.e. what 95% CIs were associated with the results?)	The authors did not assess outcomes, and hence did not provide any measurements of precision (i.e. confidence intervals).
Do you believe the results?	Yes. The authors were looking solely at the feasibility of TEE in the ED and the potential impact on diagnostic and therapeutic impact in the ED. Long-term outcomes were not being assessed and hence care beyond the ED was not included in this study. The authors also did not compare the impact of TEE when compared to TTE.
Will the Results Help Me Locally?	
Were the study patients similar to my patient?	Yes, somewhat. This study was conducted was conducted in 2 North American academic emergency departments associated with an emergency medicine residency program. These EDs were located in large, urban centers. I would suspect that the patient population and the clinicians involved would be similar to those seen in our institution. It should be noted that emergency physicians underwent a 4-hour training session involving didactics and simulation, and replication of these results in our institution would require similar training endeavors.
Do the results of this study fit with other available evidence?	Yes. This was a fairly descriptive study without clear-cut outcomes with similar results to other studies being reviewed for this journal club. While the authors did attempt to assess the impact of TEE on changes in management, they did not make any attempt to discern whether these changes impacted outcomes. Further research to assess the impact in terms of patient-centered outcomes will be necessary to change practice.

Limitations:

1. **The authors did not ask any specific questions or identify any outcomes of interest. As a result, the study is at high risk of [data mining](#) in order to justify the use of TEE in the ED.**
1. **As only certain emergency physicians were trained in TEE, this was a [convenience sample](#) of patients by design.**
2. **This was a retrospective chart review and hence at high risk of missing data and subjective interpretation of the effects of TEE on management.**
3. **This study fails to compare the impact of TEE to use of TTE, which is less invasive and arguably easier to perform.**
4. **While this descriptive analysis of the effect of TEE on management of ED patients, the authors did not attempt to evaluate any [patient-important outcomes](#).**

Bottom Line:

This retrospective, observational study found that the use of TEE in ED resulted in diagnostic and therapeutic changes in management in the majority of patients. The authors did not address potential impacts on patient-centered outcomes and the study likely would have been underpowered to detect any significance changes in these outcomes.