Echo Emergencies

Vera H. Rigolin, MD, FASE, FACC, FAHA
Professor of Medicine
Northwestern University Feinberg School of Medicine
Medical Director, Echocardiography Laboratory
Northwestern Memorial Hospital
Chicago, Illinois
President, American Society of Echocardiography

No disclosures
Introduction

- *Echo is the optimal modality to evaluate critically ill patients*
  - Real-time
  - Portable
  - Noninvasive
- *Where are these echos performed?*
  - Emergency room
  - ICU
  - Wards
  - Interventional lab/OR

Echo in the ER

- *Full echo performed by cardiology-run echo lab for complex studies*
- *Focused echo performed by ER personnel*
  - First guidelines published by ACEP in 2001
  - Guidelines revised by ACEP in 2008
- *ER US not confined to the heart*
- *US training now incorporated into ER residency and fellowship training programs.*
Scope of Practice

• Goal-directed, focused US exam that answers brief and important clinical questions
• Evaluation of emergency medical conditions, resuscitation of acutely ill or injured pts
• Applied to any emergency medical condition in any setting with limitations of time, personnel or patient condition
• US performed, interpreted, and integrated in an immediate and rapid manner

Goals of Focused Cardiac US in the ER

• Assessment for presence of pericardial effusion
• Assessment of global cardiac function
• Identification of RV and LV enlargement
• Intravascular volume assessment
• Guidance or pericardiocentesis
• Confirmation of pacing wire placement

J Am Soc Echocardiogr 2010
• **44 year old female NSCLC, pulmonary blastomycosis** presents with weakness and poor po intake.

• **Vomiting, dyspneic and somnolent in ED.**

• **Intubated and resuscitated, abx for sepsis. Poor BP response despite IVF.**
• 40 yr old female with scleroderma complicated by interstitial lung disease.
• C/o worsening dyspnea and tachycardia
• Echo lab sonographer called to do echo
Echo in the ICU

• Complications of MI
• Shock

History

• 66 yr old female, 1ppd smoker
• Noted URI symptoms 5 days prior to admission
• One day prior to admission, she developed chest discomfort that became severe the following day
• She presented to the ER for evaluation
OR TEE
Papillary Muscle Rupture

- About 1% of all MI’s
- Sudden development of apical systolic murmur and CHF/shock
- Bimodal peak: Within 24 hrs and 3-5 days (Range 1-14 days)
- Posteromedial papillary muscle most often involved
- Infarct usually involves the RCA or LCX

History

- 58 yr old male presented with chest pain to an outside hospital
- Diagnosed with a large AW STEMI
- LAD stent was placed
- IABP pump placed for hemodynamic instability
- Transferred to NMH
Initial TTE

Hospital Course

- CT surgery consulted. No valvular disease or coronary disease needing intervention. Transcatheter device closure recommended
- He was taken to the cath lab where the VSD was successfully closed with an Amplatzer device
- Hemodynamics improved. IABP weaned
- 3 days later, he developed worsening heart failure
Ventricular Septal Defect

- 1-3% in patients with reperfusion therapy
- Bimodal peak: Within 24 hrs and 3-5 days (Range 1-14 days)
- Equal frequency between IWMI, AWMI
- Seen commonly in elderly women without previous MI (single vessel CAD).
- New systolic murmur with abrupt and progressive hemodynamic deterioration.
Echo Emergencies on the Wards

- 65 yr old female who presented with RUQ and right lower chest pain associated with belching
- Normal ECG, labs, troponins
- Admitted to the medicine service
- Patient became acutely SOB shortly after admission
• 65 yr old male with history of HTN, CKD, prior Afib ablation and recent DVT
• C/o acute onset facial pain, nausea, vomiting and blurred vision
• Admitted to medicine unit
• Pt noted to be hypotensive
What would you do next?

A. No further testing. Hold BP meds and monitor
B. Another TTE in the AM
C. TEE
D. CT
E. MRI
Echo Emergencies in the Interventional Lab/OR

Case Example

- 90 yr old male with severe AS
- Complains of dyspnea when walking around his house
- s/p CABG 2000, DM, kidney disease, COPD
- STS score=26
- TAVR recommended
Post TAVR

Post TAVR: AR Due to Frozen Leaflet
Second Valve
Post AVR
Valve Migration


Valve in Valve

Summary

- Echo is usually the first imaging modality ordered to evaluate critically ill patients
- Echos are now performed by cardiologists and non-cardiologists in a variety of hospital settings
- Thorough knowledge about cardiac causes of acute clinical decompensation necessary for rapid diagnosis and treatment

Thank You