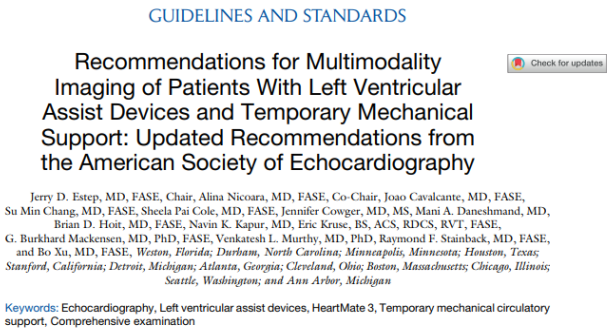
#ASEchoJC Journal Chat
Tuesday, February 25, 2025 – 8 PM ET

- **Recommendations for Multimodality Imaging of Patients With Left Ventricular Assist Devices and Temporary Mechanical Support (JASE, September 2024)**


GUIDELINES AND STANDARDS

Recommendations for Multimodality Imaging of Patients With Left Ventricular Assist Devices and Temporary Mechanical Support: Updated Recommendations from the American Society of Echocardiography

Check for updates

Jerry D. Estep, MD, FASE, Chair, Alina Nicoara, MD, FASE, Co-Chair, Joao Cavalcante, MD, FASE, Su Min Chang, MD, FASE, Sheela Pai Cole, MD, FASE, Jennifer Cowger, MD, MS, Mani A. Daneshmand, MD, Brian D. Hoit, MD, FASE, Navin K. Kapur, MD, Eric Kruse, BS, ACS, RDCS, RVT, FASE, G. Burkhard Mackensen, MD, PhD, FASE, Venkatesh L. Murthy, MD, PhD, Raymond F. Stainback, MD, FASE, and Bo Xu, MD, FASE, *Weston, Florida; Durham, North Carolina; Minneapolis, Minnesota; Houston, Texas; Stanford, California; Detroit, Michigan; Atlanta, Georgia; Cleveland, Ohio; Boston, Massachusetts; Chicago, Illinois; Seattle, Washington; and Ann Arbor, Michigan*

Keywords: Echocardiography, Left ventricular assist devices, HeartMate 3, Temporary mechanical circulatory support, Comprehensive examination

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- Alina Nicoara, MD, FASE (@nicoa002)
- Bo Xu, MD, FASE (@BoXuMD)

Moderators:

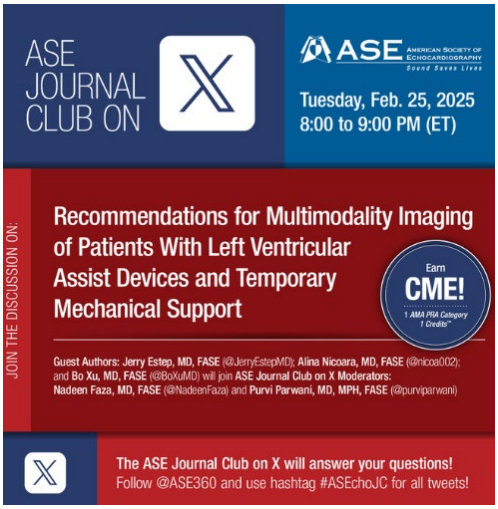
- Purvi Parwani, MD, MPH, FASE (@PurviParwani)
- Nadeen N. Faza, MD, FASE (@NadeenFaza)

Introduction and Welcome:

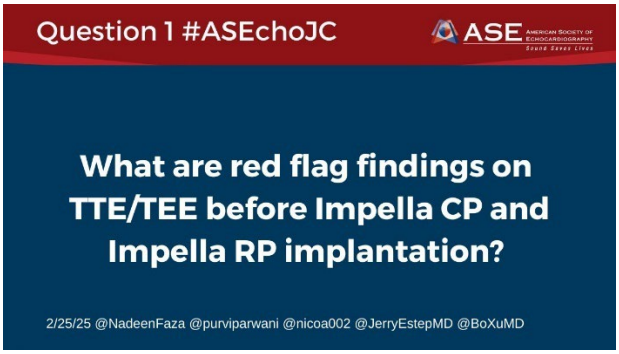
@NadeenFaza: Welcome to our #ASEchoJC featuring the updated @ASE360 guidelines on #MMI imaging in patients with #LVAD & mechanical support! Excited to discuss this important document with the authors @nicoa002 @JerryEstepMD @BoXuMD and my co-moderator @purviparwani!

Let's get started! Remember to use the #ASEchoJC hashtag to follow along!

Sign up for #CME: bit.ly/4hg1MIF



Q1:



A1 Notable Responses:

@NadeenFaza: red flag findings prior to #Impella CP and #Impella RP implantation - straight from the guidelines!

Impella CP, 5.5	LV, LA, RV VSD ASD LV thrombus (see adjacent Figure B, *red arrow*) LA thrombus LV rupture Small LV Narrow LVOT Significant RV dysfunction Valvular abnormalities ≥moderate MS Significant myxomatous MV disease ≥moderate AR Mechanical aortic prosthetic valve Severe AS with AV area ≤0.6 cm^2 Other Aortic dissection Cardiac tamponade Significant atheromatous disease Other aortic pathology (coarctation, aneurysm) Any congenital heart disease
Impella RP, ProtekDuo	RA, RV, PA IVC or SVC strictures or thrombi Congenital abnormalities (interrupted IVC, absent right SVC, prominent Chiari network) IVC filters RA, RV, or PA thrombi or masses (see adjacent Figure D, *red arrow*) Valvular abnormalities Mechanical prosthetic TV Mechanical prosthetic PV ≥moderate TV or PV stenosis ≥moderate PR Other Significant uncorrected left heart disease (LV dysfunction, valvular abnormalities) Severe pulmonary hypertension

@PurviParwani: Impella is very useful for cardiogenic shock patients

❤️ A small LV chamber,

❤️ a narrow LV outflow tract (LVOT) due to the presence of asymmetric septal hypertrophy, or any other form of subaortic obstruction may preclude the placement of the device or make its positioning challenging.

❤️ myxomatous MV may lead to obstruction of the inlet of the device.

❤️ Left ventricular apical thrombi can create challenges or increase thromboembolic risk with device placement

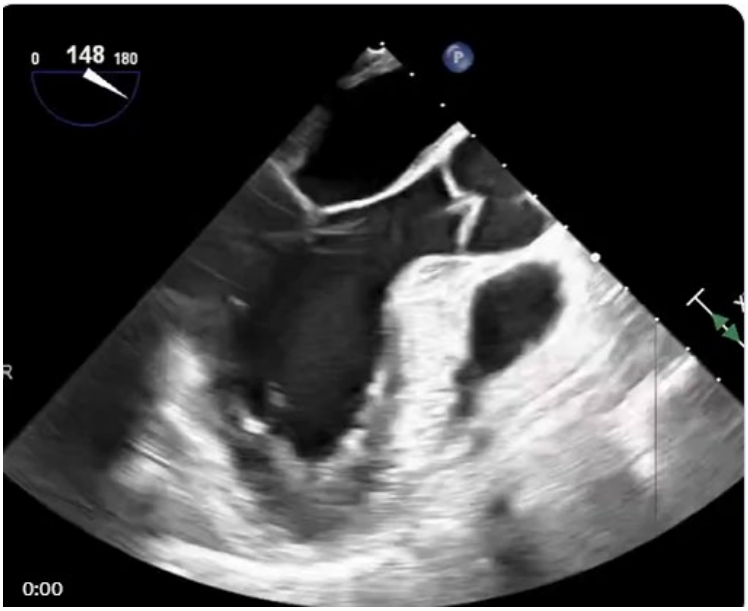
❤️ severe AR and severe ASrelative contraindication

❤️ mechanical AV contraindicated as well

❤️ LA thrombus contraindicated for the tandem Heart

❤️ tandem heart can be placed in LV thrombus (unlike Impella)) since it doesn't involve access to the LV or across the AV

❤️ can be placed in VSD post MI, severe AS/ AR and even in mechanical valve



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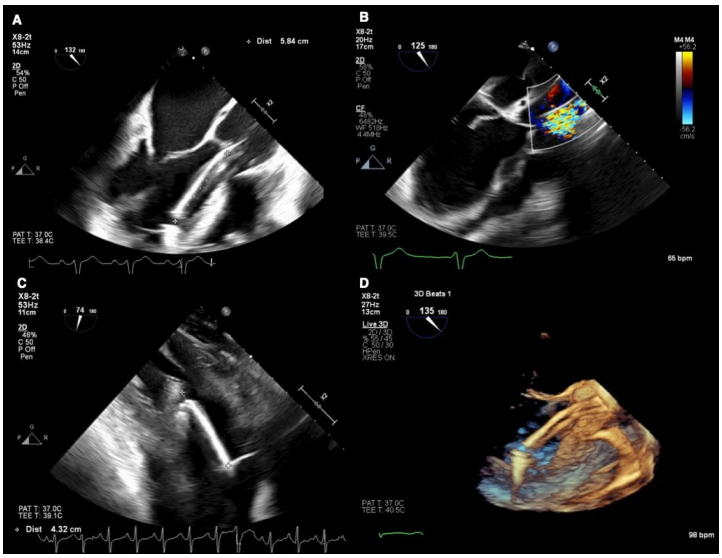
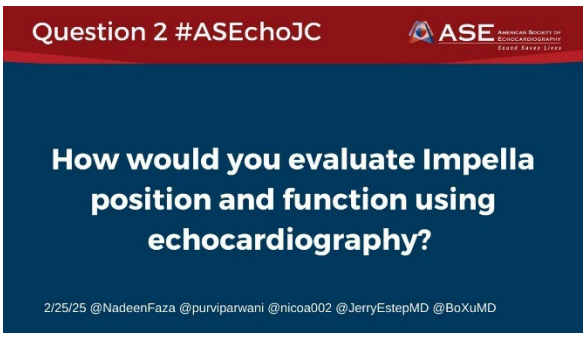
@nicoa002: Red flags Impella CP/5.5: LV thrombus, LV rupture, narrow LVOT, sig RV dysfct, >mod MS, >mod AR, , mechanical AV, aortic dissection/coarc/aneurysm. We have supported patients with VSD, but if you flow too much on the Impella 〓 R to L shunt will occur

For Impella RP: since an oxygenator cannot be spliced in, lung function should be adequate. For PROTEK, an oxygenator can be added to the extracorporeal pump.

Red flags Impella RP (same for PROTEK): SVC thrombi strictures, absent right SVC, RV masses, mechanical TV, PV, > mod PR, uncorrected left heart disease, severe pulm HTN.



Q2:



A2 Notable Responses:

@NadeenFaza:

-Reversible worsening of MR or AR may occur during device positioning due to device-related tethering of the MV or AV.

- Damage to MV or AV leaflets is also a potential risk caused by:

•Strong suction near the device inlet.

•Direct mechanical injury.

-Other complications during device placement include:

•Myocardial injury leading to LV wall perforation, which can cause pericardial effusion and cardiac tamponade.

•Aortic dissection.

•Vascular injury.

@NadeenFaza:

Practical Tips:

-Echo is useful for assessing volume status, catheter positioning, and RV function while on Impella support.

-Cardiac #POCUS helps detect Impella device position, AV opening, and rule out device malfunction from external compression.

-Training and continuous quality improvement are vital for effective use of cardiac ultrasound (including POCUS) in monitoring TMCS-supported patients.

@PurviParwani: Question 2: How would you evaluate Impella position and function using echocardiography? #echofirst

Here is a useful technique for Impella 5.5

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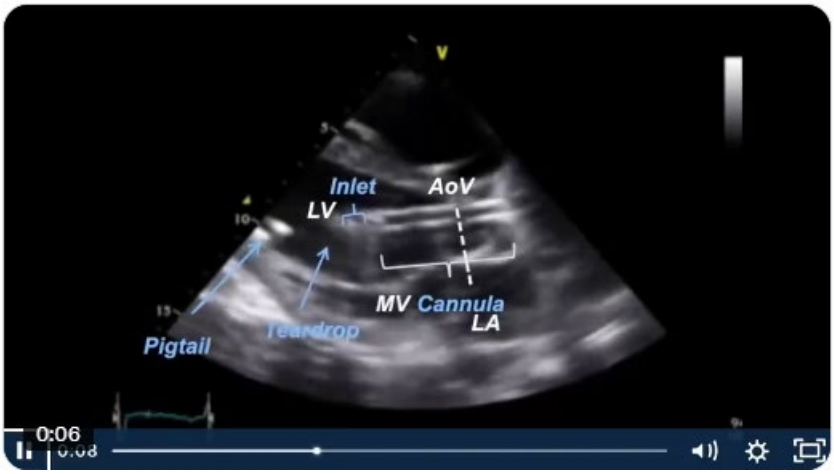
@PurviParwani: Question 2: How would you evaluate Impella position and function using echocardiography? #echofirst

Here is a useful technique for Impella CP.



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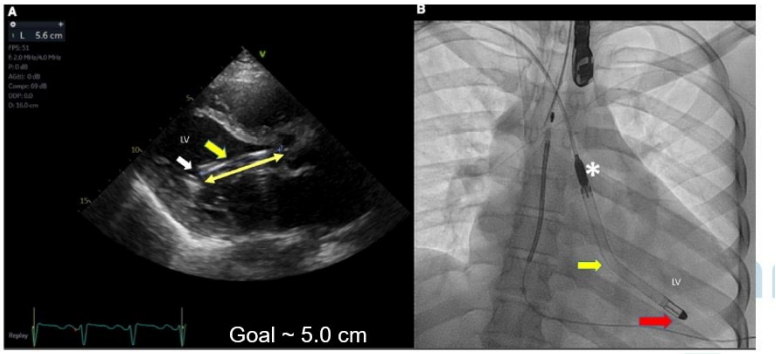
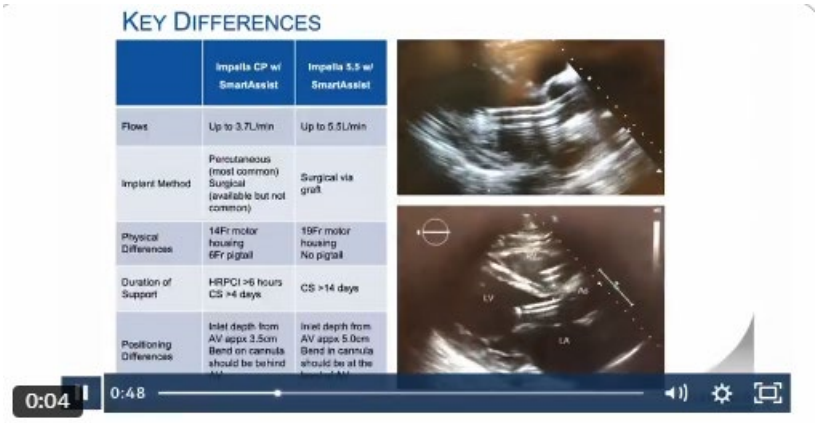
@JerryEstepMD:

Impella 5.5 Assessment



@PurviParwani: Here are some helpful differences between Impella 5.5 and Impella CP



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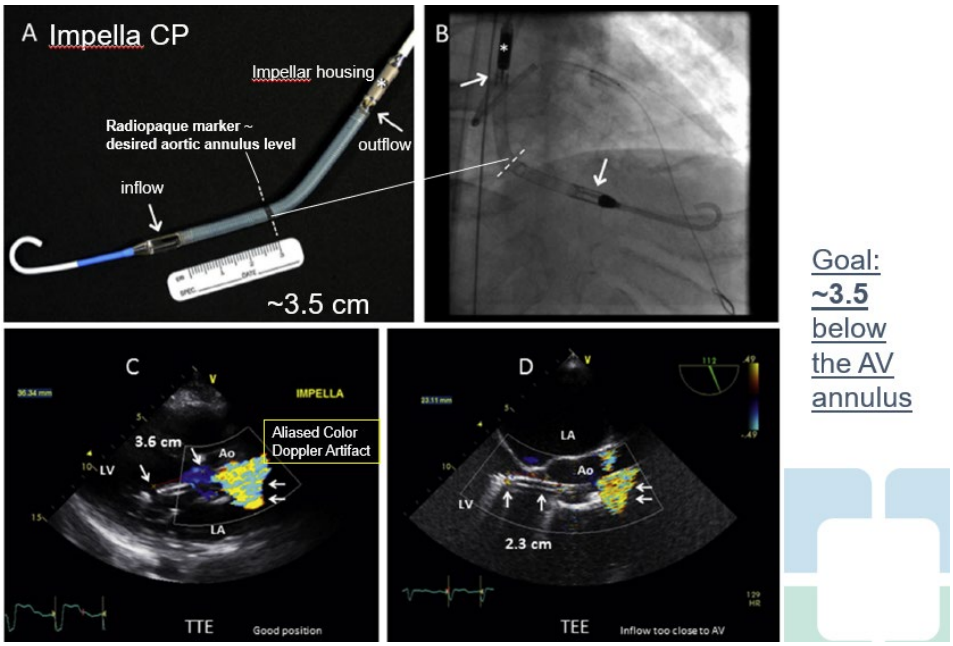
@nicoa002: Impella LV MELAX: direction of the device (towards the LV apex, away from MV), free floating, away from LV walls. 3.5 cm from the AV for CP, 5 cm for 5.5. Make sure during placement that the wire goes between the AV cusps and not through a cusp fenestration.

@JerryEstepMD:



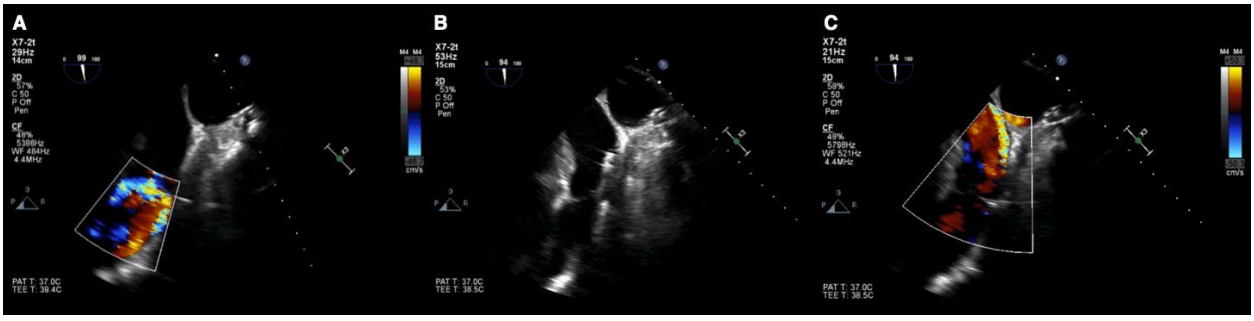
@nicoa002: ImpellaRP/Protek: outlet in the main PA not towards the left or the right. The microaxial pump is located close to the inlet at the and generates a characteristic CFD artifact close to the superior cavoatrial junction.

Correction above: Impella RP Flex similar positioning considerations with Protek

@nicoa002: It would be disastrous to deploy through a cusp, especially if Impella is bridge to recovery or to durable LVAD Look for the dropout artifacts generated by the inlet in the LV and the color mosaic artifact generated by the mciroaxial pump close to the outlet.

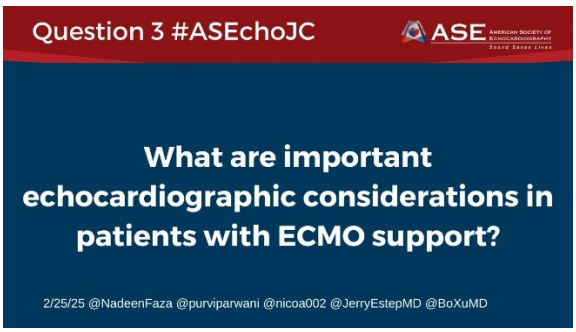
@EchoSoliman: Amazing work! 👏🏻👏🏻

@nicoa002: Protek repositioned after the outlet moved below the PV.



Similar considerations for Impella RP Flex.

Q3:



A3 Notable Responses:

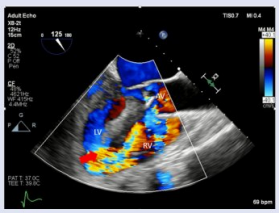
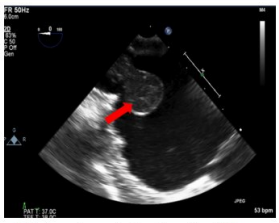
@NadeenFaza: Summary from the guidelines:

💥 Echo helps differentiate causes of VA ECMO low flow, such as hypovolemia, drainage cannula displacement, partial occlusion, or cardiac tamponade.

💥 LV & LA assessment should include size, blood stasis, thrombus formation, MR severity, and AV opening frequency during VA ECMO support.

💥 UEAs (ultrasound-echo-angiography) should NOT 🛑 be used in ECMO patients unless supervised by experienced perfusionists and clinicians, due to potential interference with alarms and device function

Table 4 Red flag findings on TTE/TEE before ECMO implantation

Type of ECMO	Red flag findings	Example illustrations
VA ECMO	During deployment IVC strictures or thrombi IVC filters RA clot, masses, pacemaker/defibrillator leads Atrial septal aneurysm ASD or VSD (see adjacent Figure A, *red arrow*) Prominent Chiari network Aortic dissection Significant atheromatous disease ≥moderate AR During support LA, LV dilation Absence of AV opening Significant MR Spontaneous echo contrast or clot in LV apex and aortic root	 Figure A. Post–myocardial infarction VSD (see text).
VV ECMO	During deployment IVC or SVC strictures or thrombi (see adjacent Figure B, *red arrow*) Congenital abnormalities (interrupted IVC, absent right SVC, prominent Chiari network) IVC filters RA, RV, or PA thrombi or masses Prominent Chiari network Atrial septal aneurysm ASD Severe RV or LV dysfunction	 Figure B. Thrombus obstructing the IVC.

@PurviParwani:

During VA ECMO deployment red flags

🚩 IVC stricture or thrombus

🚩 IVC filter

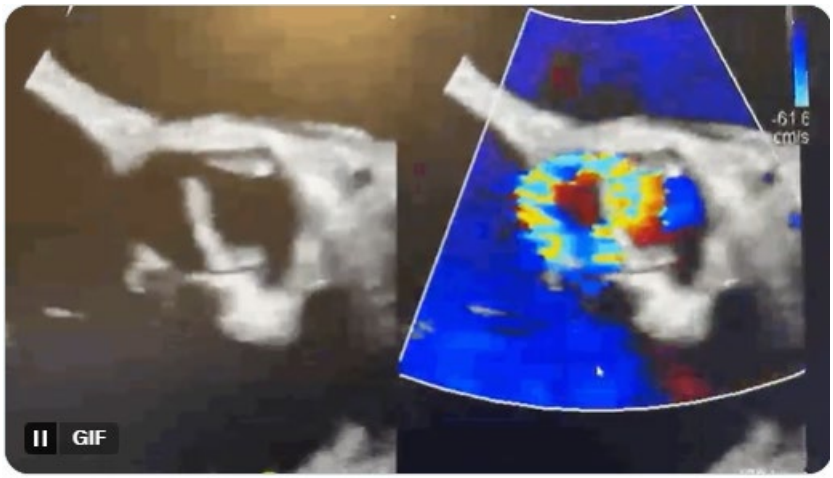
🚩 RA clot/ mass

🚩 atrial septal aneurysm

🚩 ASD or VSD

🚩 aortic dissection

🚩 more than moderate AR (see flail AR in the attached video)



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@PurviParwani:

During VV ECMO deployment red flags

🚩 IVC stricture or thrombus

🚩 congenital abnormality affecting IVC or SVC

🚩 RA /RV/ PA clot/ mass

🚩 atrial septal anuersym

🚩 prominent chiari

🚩 ASD

🚩 severe LV or RV dysfunction

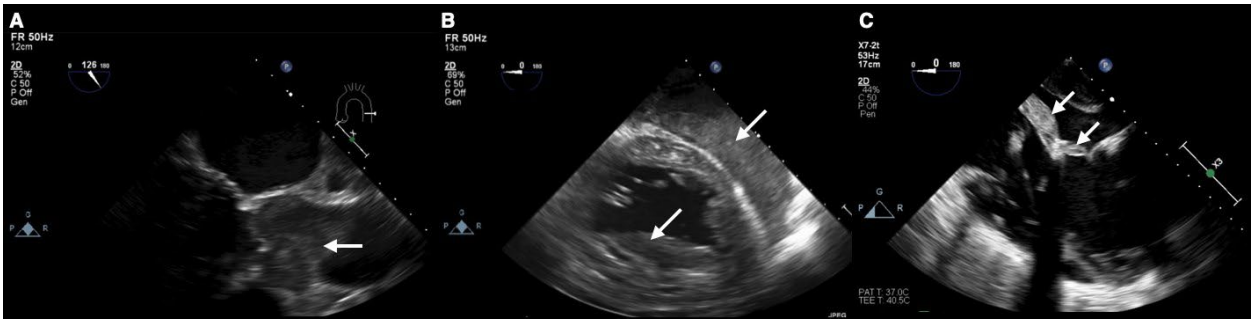
@nicoa002: Confirm wire placement and final cannula position. For VV ECMO make sure cannulas are sufficiently apart (>8 cm) to prevent recirculation. Cannula position can change intraop with chest closure, or in the ICU with patient position

Confirm indication, guide placement, monitor support, guide weaning. VV ECMO should not be placed in the presence of severe RV and/or dysfct, or severe pulmonary hypertension. Red flags for VA ECMO: >mod AR, aortic dissection, significant atheromatous disease.

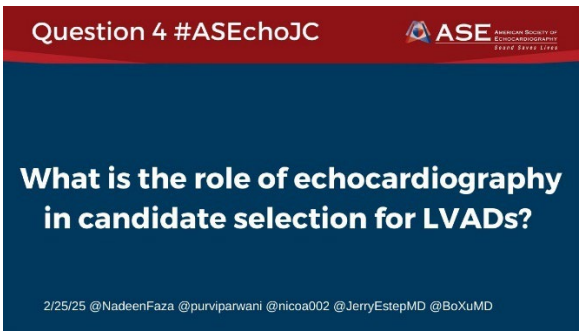
For VA ECMO monitor LV unloading, AV opening, change in MR, spontaneous echo contrast formation in the LA, LV, aortic root, and ventricular function recovery.

For the Avalon or Crescent cannulas, echo is paramount for positioning. Inlet – in the IVC below inferior cavoatrial junction. Outlet- in the RA opening towards the TV.

Complications of VA ECMO:



Q4:



A4 Notable Responses:

@NadeenFaza: BAD VALES AND #LVAD! #EchoHawaii Nostalgia!

Key Points: Valve Disease and LVAD Patient Selection Considerations

- A comprehensive pre-LVAD implantation assessment of the AV, MV, and TV anatomy and function should be performed.
- Surgical treatment of AR greater than mild severity before LVAD implantation remains a recommendation for HM3 implantations.
- AS is well tolerated during LVAD support and does not typically require concomitant intervention.
- Severe MR prior to HM3 implantation is associated with an increased likelihood of persistent MR following LVAD implantation and has been added to the red flag pre-LVAD implantation high-risk findings.
- Mitral stenosis (moderate or greater) may prevent adequate LVAD filling and may need to be addressed at the time of LVAD implantation.
- Tricuspid regurgitation remains a red flag before HM3 placement, although there remain mixed data regarding the benefits of concurrent TV repair or replacement at the time of LVAD implantation.

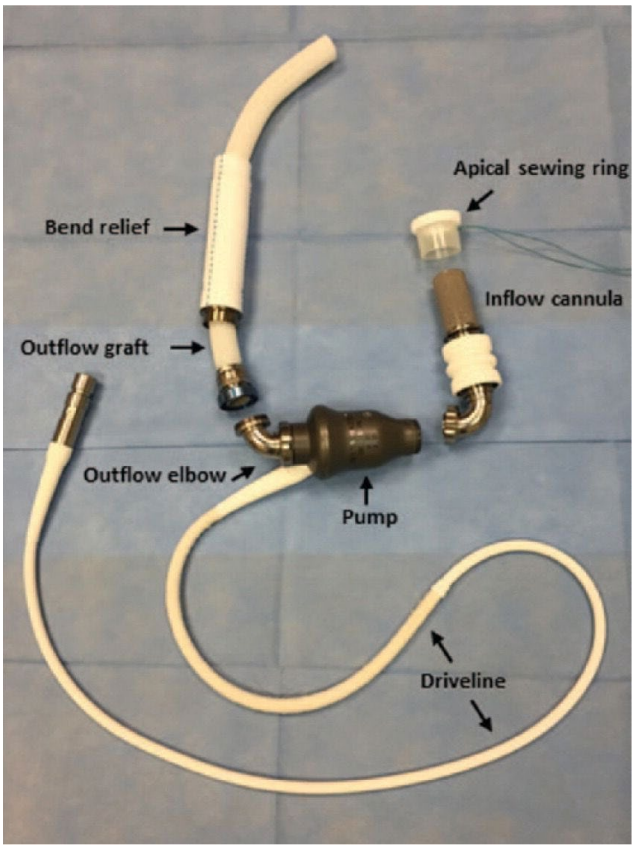
@PurviParwani: Role of echocardiography in candidate selection for #LVAD

❤️ A comprehensive pre-LVAD implantation assessment of the AV, MV, and TV anatomy and function should be performed.

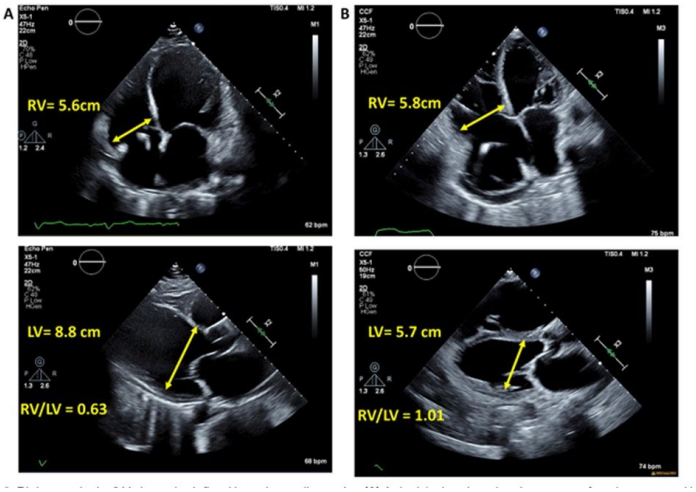
❤️ Surgical treatment of AR > mild before LVAD implantation

❤️ moderate-severe MS treatment at the time of LVAD (AS well tolerated)

❤️ MR/TR red flag as well



@JerryEstepMD: Assessing RV remodeling (RV Size) relative to LV size is a key metric to report with a RV/LV ratio > 0.75 being a red flag as illustrated on the right



@BoXuMD:

· Optimal candidate selection HM3 LVAD = key for successful operative and long-term outcome

· LVEF < 25% = CMS qualifying condition for LVAD

· Assess LV size

o Small LV cavity size (LVIDd)< 5.5 cm

@BoXuMD:

Assess RV size and function

o RV failure (early versus late) affects outcomes

- RV/LV diameter ratio

- ≥0.75 was independently associated with a higher risk of RVF

- value of RV strain

@BoXuMD:

· Assess valves

o Surgical Rx of > mild AR

o Severe MR àincreased risk for persistent MR – red flag

o AS: well tolerated; generally does not warrant concomitant intervention

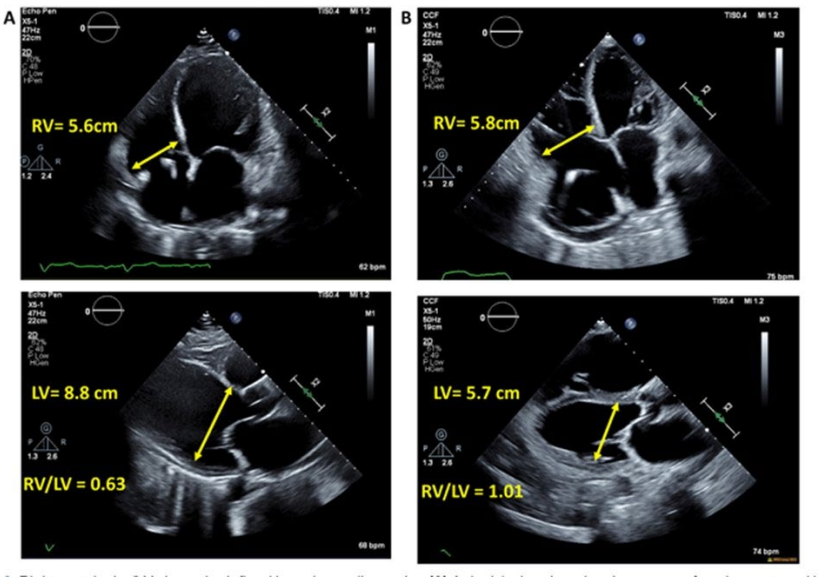
o MS (≥moderate)

@BoXuMD:

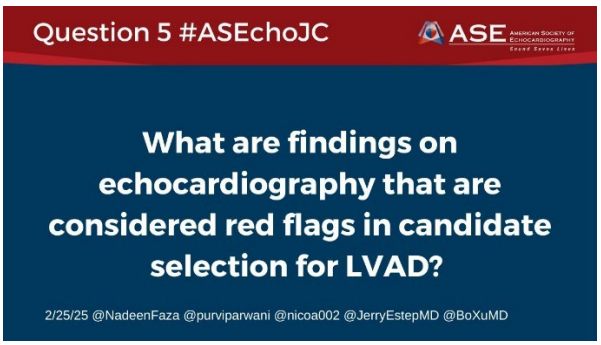
o MS (≥moderate): affects LVAD filling; may need correction

o TR: red flag; mixed data regarding benefits of concurrent TV repair/replacement

@JerryEstepMD: Assessing RV remodeling (RV Size) relative to LV size is a key metric to report with a RV/LV ratio > 0.75 being a red flag as illustrated on the right



Q5:



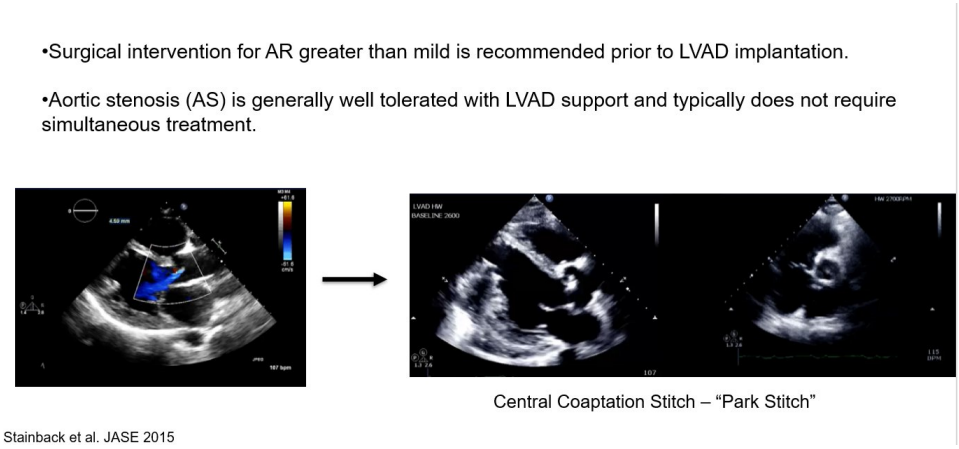
A5 Notable Responses:

@NadeenFaza: How would you treat a patient with severe functional MR pre LVAD implantation?

@nicoa002: More likely that we would not address it surgically. It requires cross clamping and arresting the heart, it prolongs bypass time.

@JerryEstepMD: Optimize heart failure pre LVAD using swan ganz tailored therapy to achieve PCWP reduction and if low CO , IABP pre LVAD use can help to get the patient through the operation. Most of the time significant MR will improve after durable LVAD placement.

@NadeenFaza: AV disease and LVAD!



@nicoa002: yes we would address surgically mild AR or more, either through a Park stitch if AR is central or AV bioprosthetic valve, depending on several other factors.

@BoXuMD:

o Surgical Rx of > mild AR

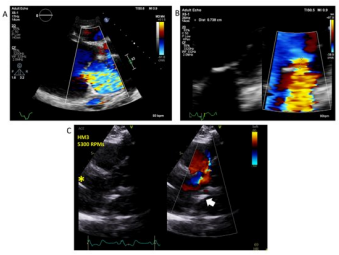
o AS: well tolerated; generally does not warrant concomitant intervention

@NadeenFaza:

•Severe MR before HM3 implantation is linked to a higher chance of persistent MR after LVAD placement and is considered a red flag in pre-implantation high-risk findings.

•Moderate or severe MS can impede LVAD filling and may require correction during implantation.

•TR is a red flag before HM3 placement, although evidence is mixed on the effectiveness of concurrent tricuspid valve repair or replacement during LVAD surgery.



MV repair followed by LVAD implantation

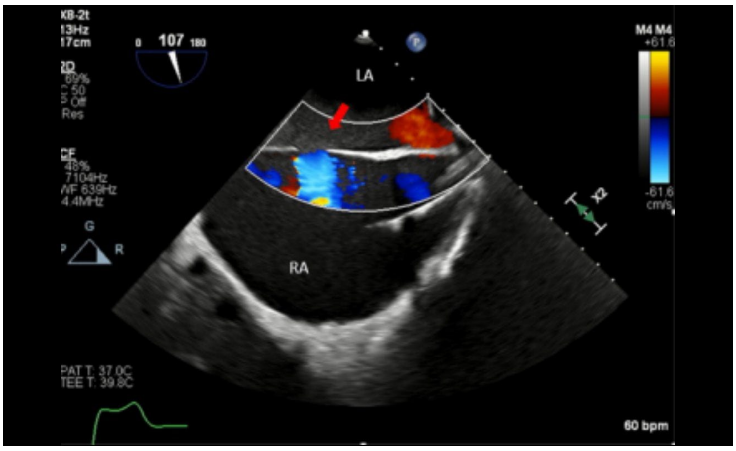
@PurviParwani:

Red flag for LVAD on

Atrial findings

->LAA thrombus

-> PFO or ASD



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@BoXuMD: Note with ASD, there is concern for right to left shunt and refractory hypoxia from LV unloading and decreased LA pressure after LVAD = red flag!

@PurviParwani:

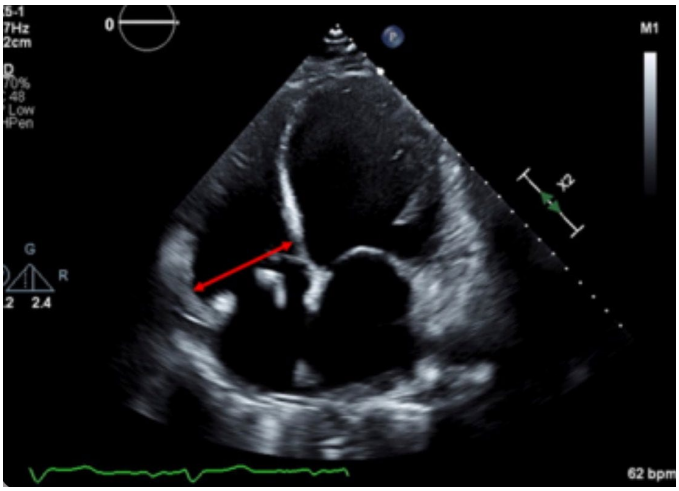
Red flag for LVAD on

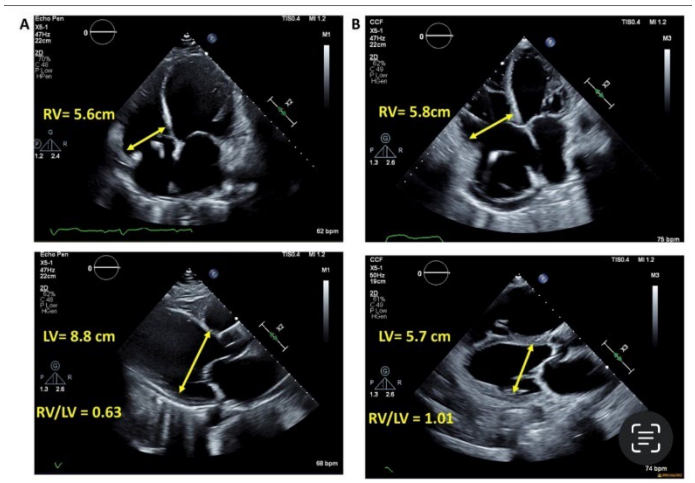
RV factors

-> RV dilation relative to LV size

-> RV/LV diameter ratio 0.75

-> RV systolic dysfunction





@BoXuMD: RV/LV diameter ratio is an important parameter

@alex1708ander: Kukucka M, Stepanenko A, Potapov E, Krabatsch T, Redlin M, Mladenow A, Kuppe H, Hetzer R, Habazettl H. Right-to-left ventricular end-diastolic diameter ratio and prediction of right ventricular failure with continuous-flow left ventricular assist devices. J Heart Lung Transp 2011

@alex1708ander: J Heart Lung Transplant. 2011 Jan;30(1):64-9. doi: 10.1016/j.healun.2010.09.006. Epub 2010 Oct 29. PMID: 21036066.

@PurviParwani:

Red flag for LVAD on

LV factors

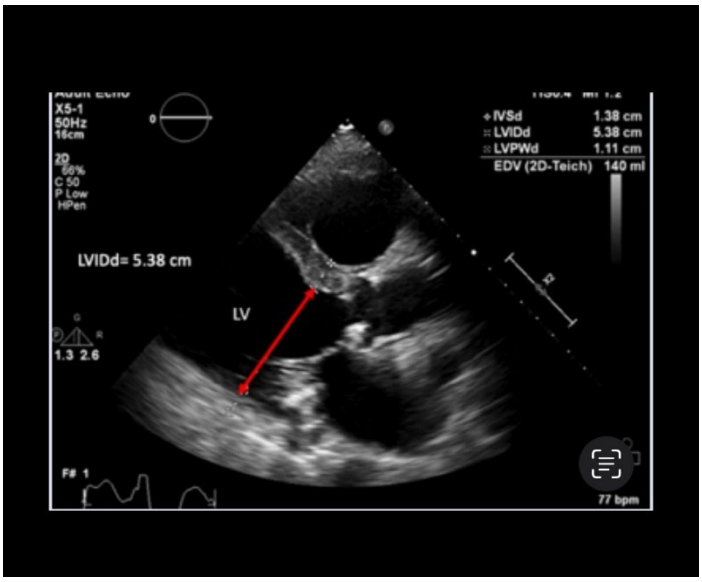
->Small LV size (LVIDd <5.5 cm)

-> LV trabeculation

-> LV thrombus

-> LV apical aneurysm

-> VSD



@PurviParwani:

Red flag for LVAD on

#Echofirst valvular factors

-> Any prosthetic valve (especially mechanical MV)

Any significant valve lesion

-> More than Mild AR

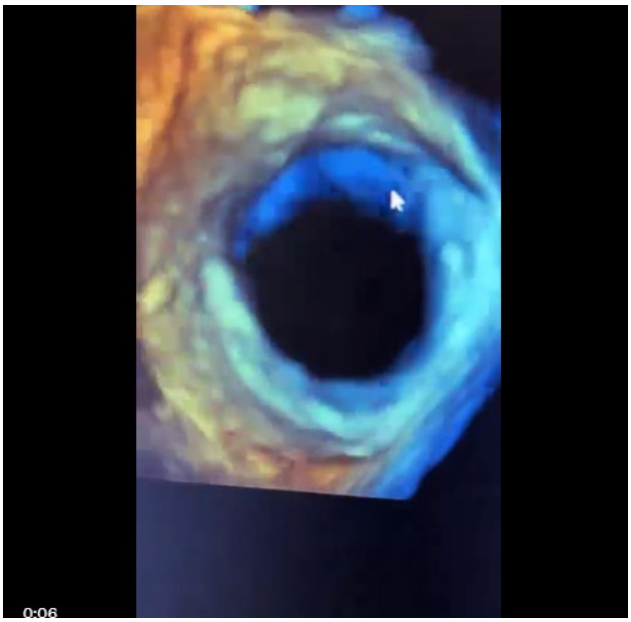
-> More than or Equal to Moderate MS

-> More than >Moderate MR

-> More than or Equal to Moderate TR or > mild TS

-> More than Mild pulmonary stenosis; moderate PR

Bonus video - severe MR due to hypo plastic posterior leaflet in patient going for LVAD



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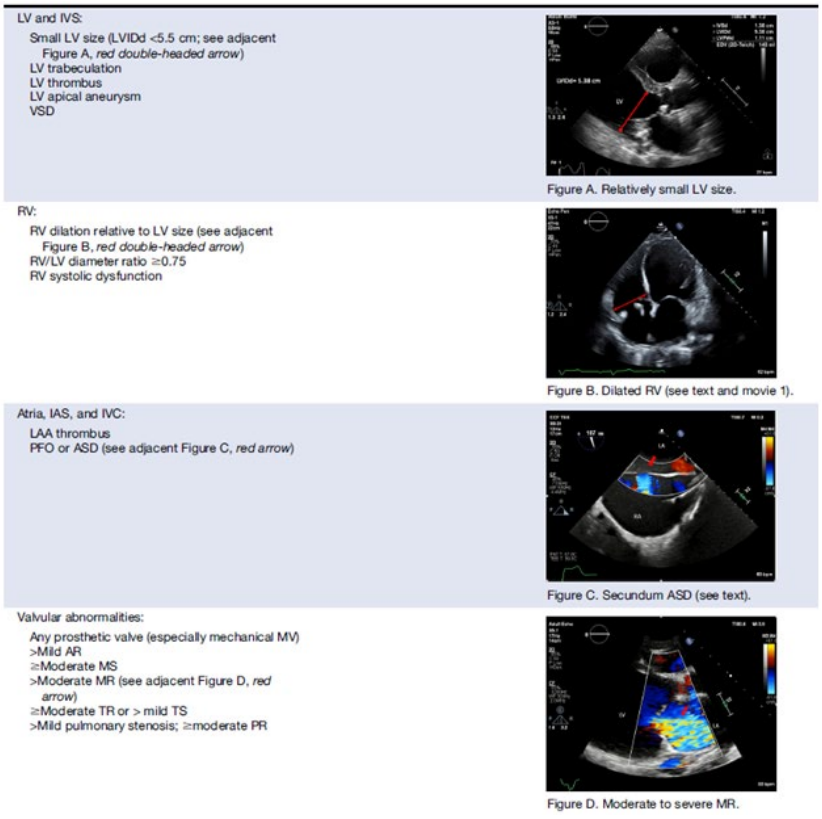
@BoXuMD:

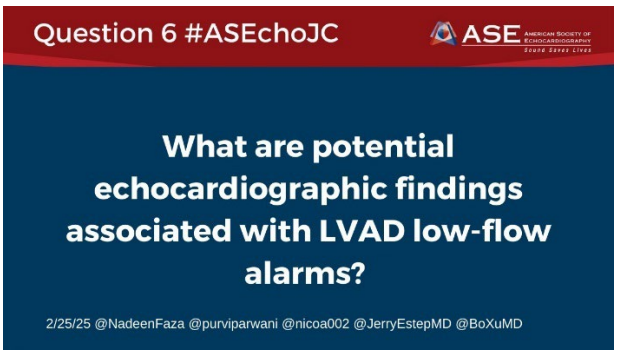


@BoXuMD:

· Important echo findings pre LVAD implant to check on comprehensive echocardiogram

- LV and IVS
- RV
- Atria, IAS, IVC
- Valvular abnormalities

Q6:



A6 Notable Responses:

🔑 points from the guidelines!

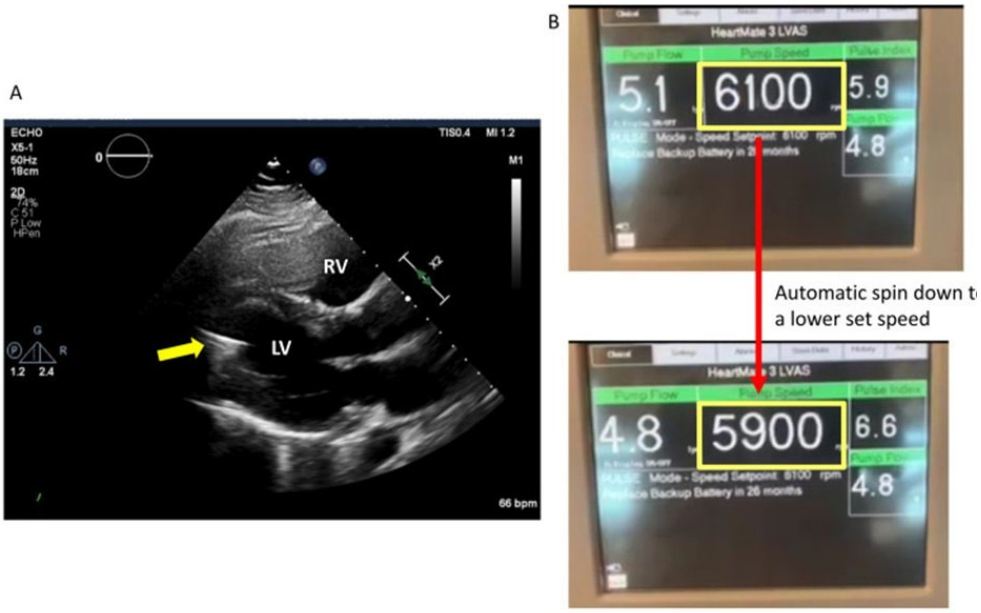
Key Points: Echocardiographic Findings and LVAD Low-Flow Alarms

- Echocardiography is helpful to define the cause(s) of low-flow alarms including cardiac tamponade, RVF, hypovolemia, and inflow cannula obstruction or malposition.
- Low-flow alarms due to mechanical outflow graft obstruction can result from kinking, malposition, external compression, or thrombosis. These conditions are more challenging to diagnose using echocardiography and are better defined by CT imaging (see "Multimodality Imaging While on LVAD Support").
- Echocardiographic signs of low-flow alarms related to RVF include bowing of the IVS toward the LV during systole and diastole, shifting of the IAS to the left, a dilated IVC without collapsibility, and Doppler measures reflective of hepatic vein flow reversal.
- Cardiac tamponade should be suspected with echocardiographic detection of a pericardial effusion or organized pericardial clot in conjunction with LVAD alarms and a small LV and/or RV chamber.
- Echocardiographic features of inflow cannula obstruction may include visualized thrombus and/or trabeculations near the inflow cannula, abnormally increased inflow cannula velocities, and/or dynamic interaction of the inflow cannula and endocardium.

@JerryEstepMD: Low -flow alarm due to inflow cannula malposition

-Posteriorly positioned inflow cannula (yellow arrow)

-Intermittent interaction with the endocardium associated with LVAD suction events as noted by decrements in the pump speed as noted



@NadeenFaza: Highlighting the echo parameters in speed change #EchoFirst studies in #LVAD patients!

Speed Change Echo

Echocardiographic Views to Guide Parameter Acquisition	Parameters Acquired at Each Pump Speed Change	Baseline and Final Set Pump Speed Report Recommendations
PLAX, Apical 4Ch (2D)	LVIDd	Define LV dilation according to ASE guidelines.
Apical 4Ch RV-focused (2D)	RV diameter at the base and midlevel	Define RV dilation according to ASE guidelines.
Apical 4Ch (2D)	IVS position	Define appearance as midline, bowed to the LV (leftward) or to the RV (rightward) and note if bowing is seen during ventricular systole, diastole, or both.
Apical 4Ch (2D)	IAS position	Define appearance as midline, bowed to the LA (leftward) or to the RA (rightward).
PLAX, PSAX, 5Ch (2D, M-mode, CFD)	AV opening status AR assessment (e.g., jet width of the LVOT and vena contracta)	Define AV opening status and note as opens every beat, intermittent, or persistently closed. AR defined per ASE guidelines and note if presence is seen during diastole or during diastole and systole (continuous AR).
PLAX, Apical 4Ch (2D, CFD)	MR assessment (e.g., central jet % LA involvement and vena contracta)	MR defined per ASE guidelines.
PSAX, Apical 4 Ch (2D, CFD)	TR assessment (e.g., central jet % RA involvement and vena contracta)	TR defined per ASE guidelines.

Echocardiographic parameters to guide pump speed optimization

@JerryEstepMD:

Low flow alarms related to a pericardial effusion and impending cardiac tamponade

-Relatively small LV size/internal dimension (double headed arrow)

-Presence of a large pericardial effusion (asterisk)

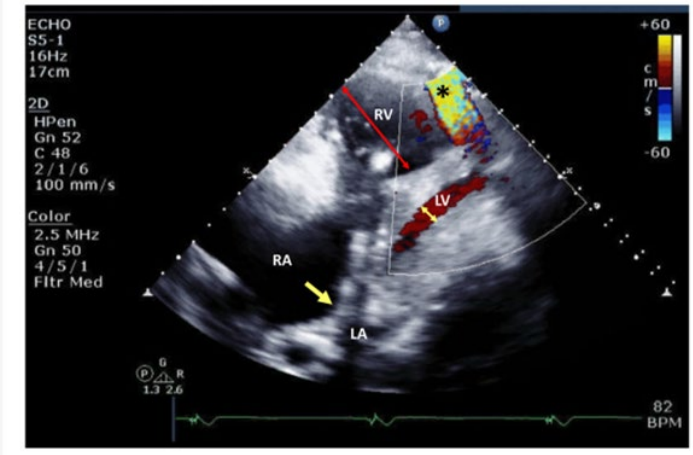
-Don’t wait for MV/TV inflow significant Doppler variation

Low flow alarm RV Failure related findings

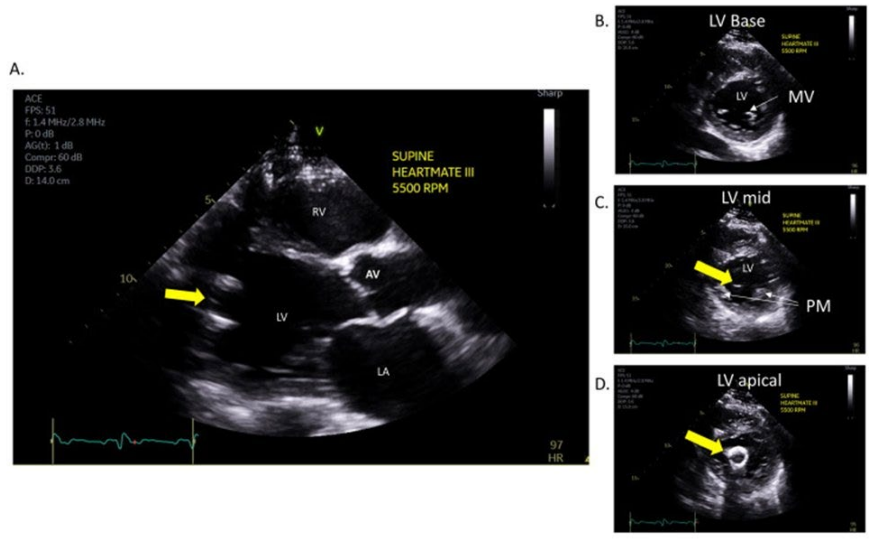
- Dilated RV (double headed red arrow)

-Underfilled (small LV -double headed arrow)

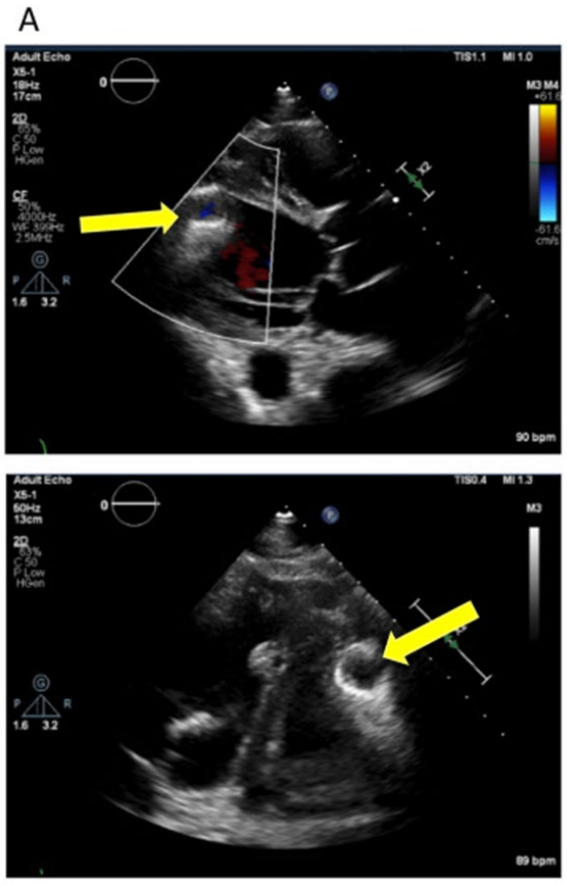
-interatrial septum bowing into the left atrium (yellow arrow)



Important to know the ideal apical inflow cannula position directed toward to anterior MV leaflet and LVOT parallel to the IVS and free of interaction with adjacent structures as noted (yellow arrow)



Low -flow alarm due to inflow cannula malposition and directed toward the distal anterolateral free wall and in close proximity to the endocardium (anterior apical position) noted by the yellow arrow.

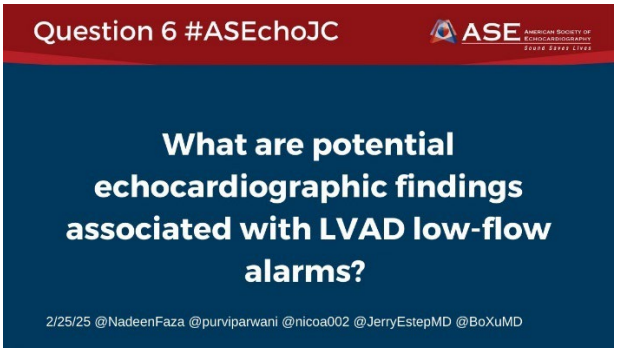


@nicoa002: Similar considerations for the LV inflow cannula intraoperatively. Very important to check and document. Record inflow cannula velocities.

@JerryEstepMD: It is important to keep in mind the differential!

Table 6 Durable LVAD low-flow alarm differential
Cardiac tamponade
RV Failure
Inflow cannula related:
Malposition and dynamic obstruction with the endocardium
Inlet obstruction due to thrombus, excessive trabeculation, or myocardial recovery
Outflow cannula/graft-related:
Twist
Kinking
Intraluminal thrombus
Extraluminal thrombus or biodebris
Other medical reasons:
Uncontrolled hypertension
Hypovolemia
Dysrhythmias (atrial or ventricular)

Q7:

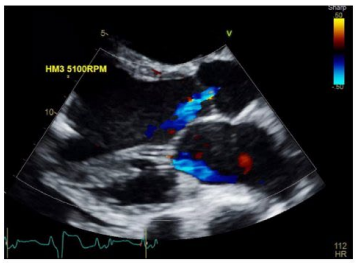


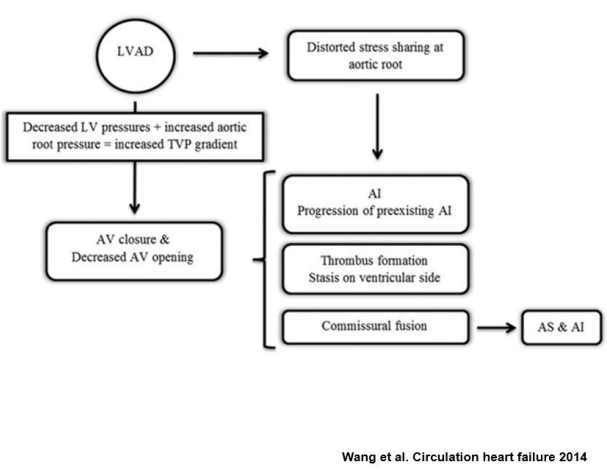
A7 Notable Responses:

@NadeenFaza:

- AR etiology
- AR evaluation

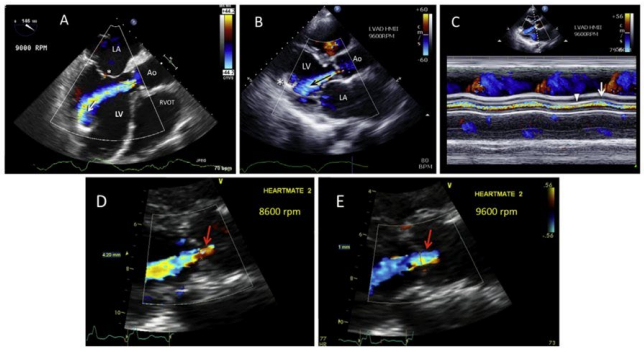
AR occurs in approximately 1 in 4 patients within 1-year post-implantation of continuous-flow LVAD.





Wang et al. Circulation heart failure 2014

- Without definitive cutoff criteria for classifying AR severity post-LVAD implantation, an **aggregate assessment** is recommended.
- Key factors for assessment include:
  - VC width.
  - Jet height relative to LVOT.
  - Comparative LVAD and native circuit flow measurements.



VC width of ≥0.3 cm or a jet width/LVOT width of >46% at a Nyquist limit of 50-60 cm/s should be considered to indicate at least moderate (and possibly severe) AR, owing to the prolonged (if not continuous) duration

@PurviParwani:

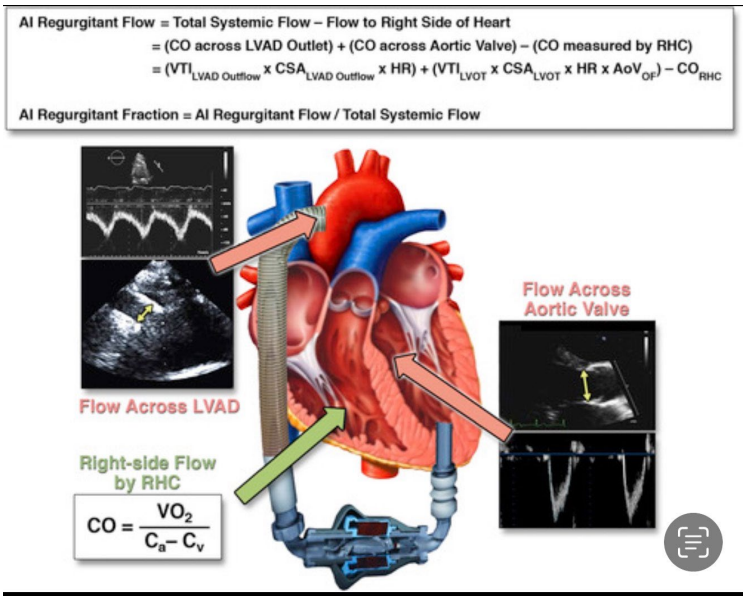
The new TTE parameters,

-> diastolic acceleration of the LVAD outflow cannula and -> S/D ratio of the LVADoutflow cannula, allow for reliable and easily reproducible evaluation of AR

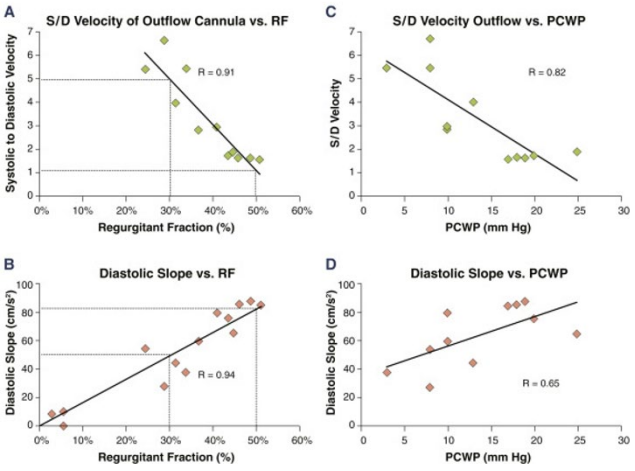
-> These novel parameters are better correlated with intracardiac filling pressures than traditional parameters

#JACCIMG

🔗 https://jacc.org/doi/10.1016/j.jcmg.2015.06.020?_ga=2.128642316.1485621213.1740421760-439694588.1733329820



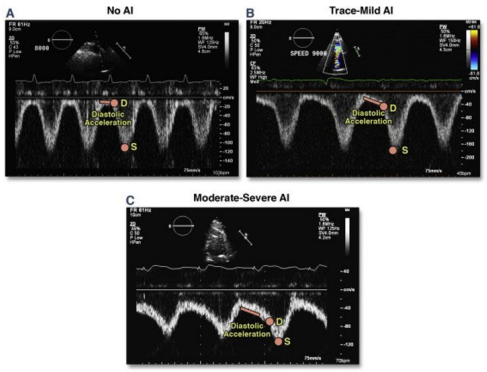
@NadeenFaza: A figure demonstrating the correlation of these novel parameters with RF and PCWP!



@NadeenFaza: Novel parameters for evaluation of #AR in #LVAD patients!

- Peak S/D velocity ratio of the outflow cannula: a metric that is inversely proportional to AR severity
  - Moderate or greater AR, correlating with a regurgitant fraction of>30% is more likely with an S/D ratio of < 5.

- Diastolic acceleration of outflow cannula flow: a metric that is directly proportional to AR severity.
  - Moderate or greater AR more likely when the diastolic acceleration time is more than 49.0 cm/sec^2 .



Grinstein J, et al. JACC Cardiovascular Imaging. 2016;9(6):641-51

@PurviParwani:

Novel TTE Parameters: Diastolic Acceleration and S/D Ratio published in #JACCIMG

Good reference

https://jacc.org/doi/10.1016/j.jcmg.2015.06.020?_ga=2.128642316.1485621213.1740421760-439694588.1733329820

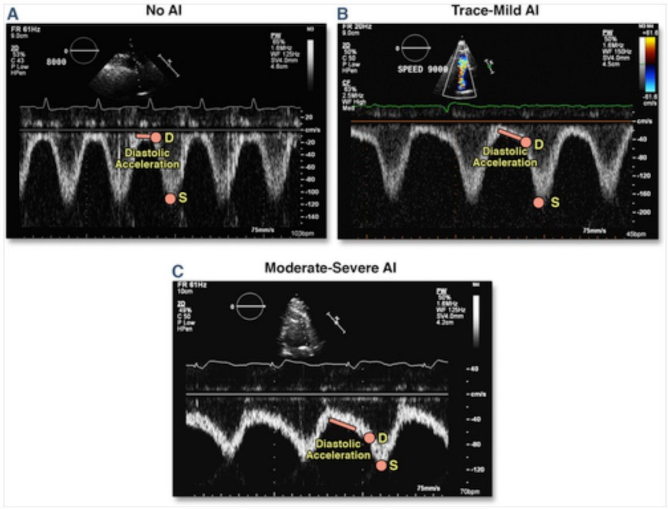
-> Measurement of LVAD cannula diastolic acceleration and LVAD outflow cannula systolic-to-diastolic peak velocity ratio (S/D ratio)

In patients with

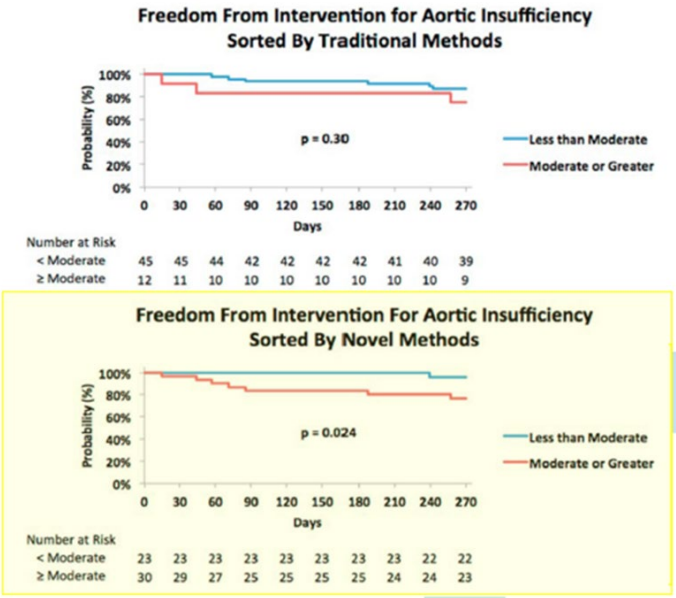
(A) no AR,

(B) trace-mild AR

(C) moderate-severe AR



@JerryEstepMD: These novel parameters can help predict freedom for AR interventions!



@PurviParwani:

🩸 AR is a common complication after continuous-flow left ventricular assist device (CF-LVAD) implantation

🩸 1 in 4 patients, at least mild to moderate AI will develop within 1 year of implantation

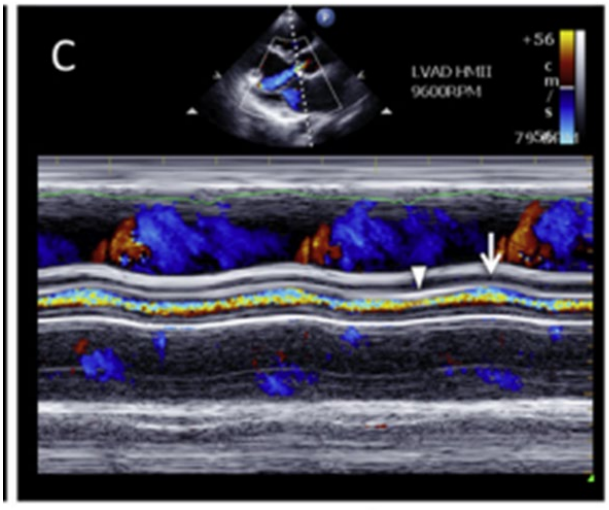
🩸 AR develops probably from failure of aortic valve opening during LVAD support that leads to aortic valve commissural fusion and leaflet deterioration

🩸 In a native heart, AI occurs in diastole, in an LVAD-implanted heart, AI is pancyclic, occurring throughout systole and diastole

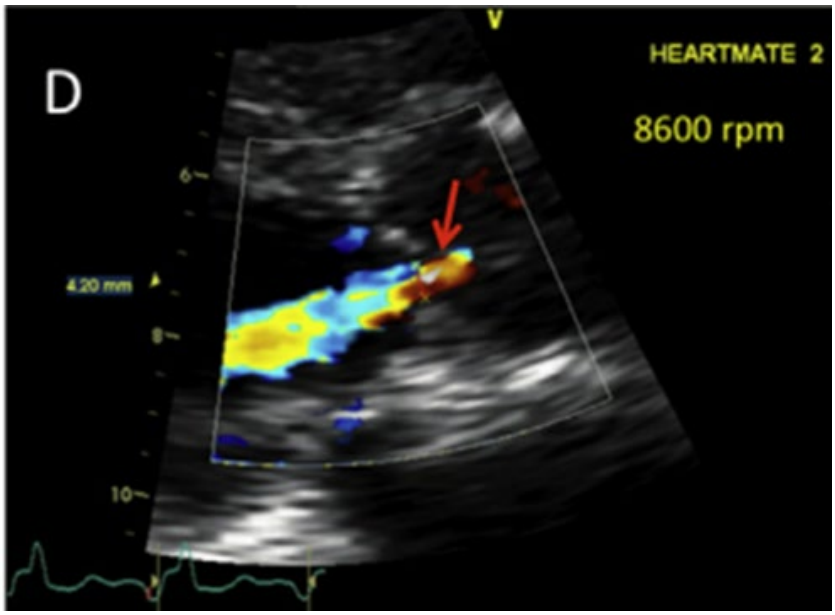
🩸 Traditional echocardiographic indices of AI severity (vena contracta, jet width/left ventricular outflow tract [LVOT] diameter, and PISA) do not take into consideration the pancyclic nature of AI jets in patients with LVADs

@JerryEstepMD:

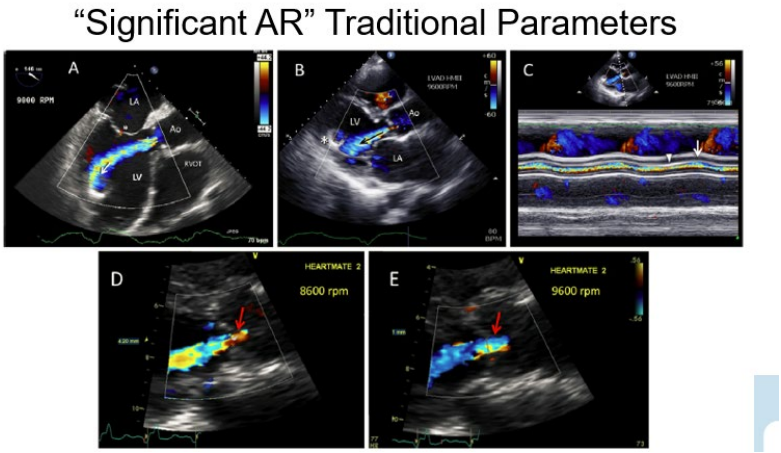
First, it is important to recognize AR is often continuous (noted during both systole and diastole)



@JerryEstepMD: Use standard recommendations, as noted here (AR VC width > 3 mm) which may increase at higher pump speeds in the same patient.



@JerryEstepMD: In addition to vena contracta > 3mm, a jet width/LVOT width > 46% reflects significant AR



@JerryEstepMD: Be familiar with novel metrics

JACC: CARDIOVASCULAR IMAGING
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ORIGINAL RESEARCH

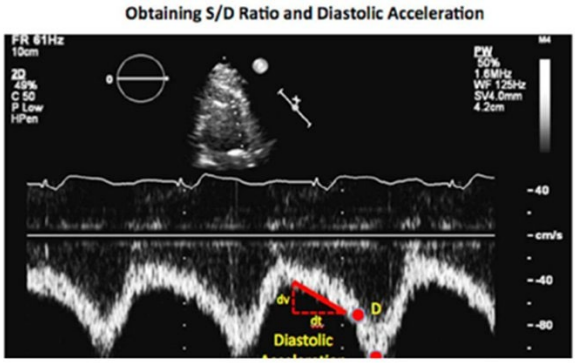
Accurate Quantification Methods for Aortic Insufficiency Severity in Patients With LVAD

Role of Diastolic Flow Acceleration and Systolic-to-Diastolic Peak Velocity Ratio of Outflow Cannula

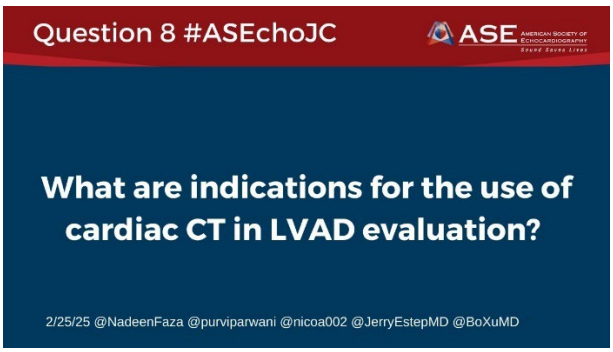
Jonathan Grinstein, MD,[a] Eric Kruse, BS, RDCS,[a] Gabriel Sayer, MD,[a] Savitri Fedson, MD,[a] Gene H. Kim, MD,[a] Ulrich P. Jorde, MD,[b] Colleen Juricek, RN,[a,c] Takeyoshi Ota, MD, PhD,[a,c] Valluvan Jeevanandam, MD,[a,c] Roberto M. Lang, MD,[a] Nir Uriel, MD[a]

@JerryEstepMD: The peak S/D velocity ratio of the outflow cannula is a metric that is inversely proportional to AR severity and the diastolic acceleration of outflow cannula flow is a metric that is directly proportional to AR severity

-S/D < 5;
-Diastolic acceleration >49 cm/s2



Q8:



A8 Notable Responses:

@NadeenFaza:

-CCT with contrast and ECG gating optimizes LVAD visualization and reduces motion artifacts.

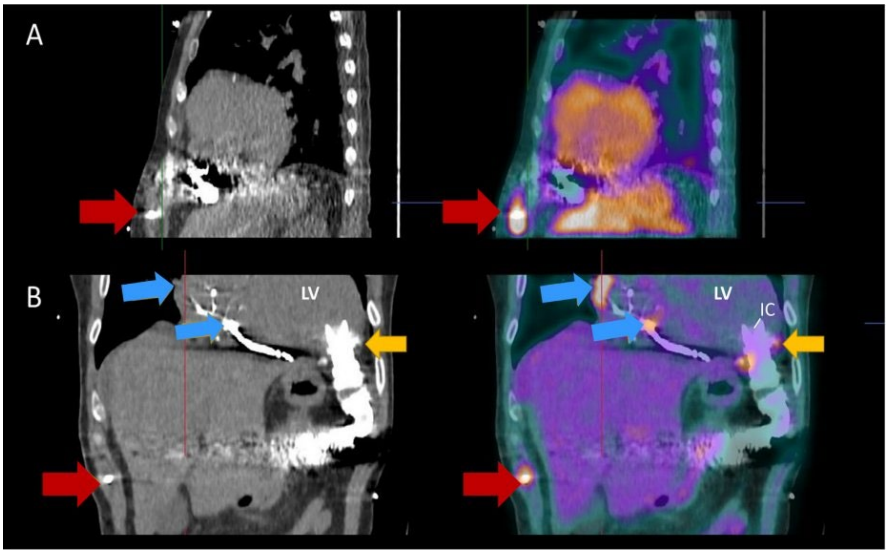
-CCT detects inflow cannula malposition and myocardial tissue interaction.

-CCT assesses the outflow graft, identifying issues like kinking or thrombus.

-CCT helps determine cannula positions and proximity to cardiac structures before LVAD explantation.

-FDG PET distinguishes central LVAD infections from peripheral ones. #ASEchoJC

An example of driveline PET in assessing driveline and inflow canula infection.



@PurviParwani:

#YesCCT for LVAD evaluation

#YesCCT is a valuable diagnostic tool when LVAD outflow graft complication is suspected, such as graft kinking or narrowing

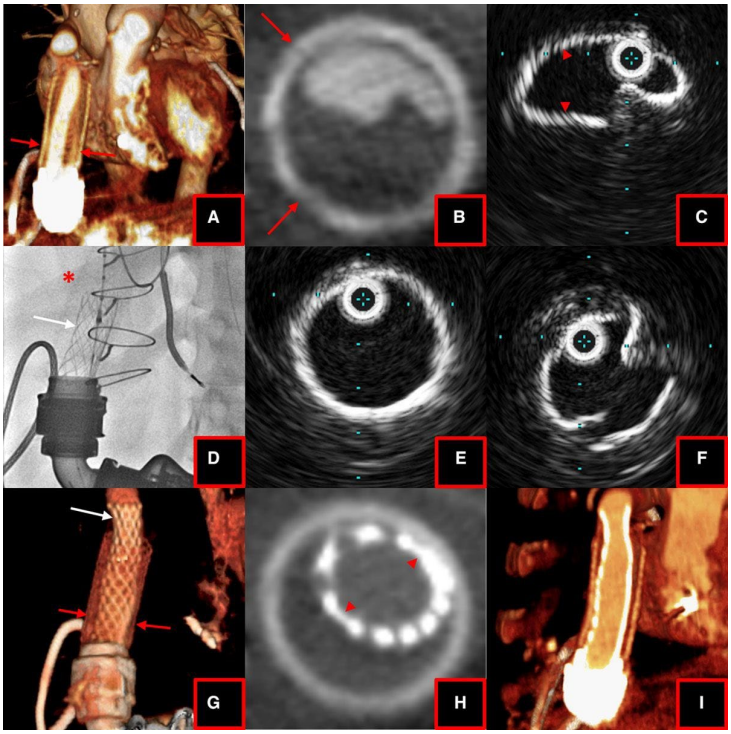
-> One has to be careful when evaluating LVAD patients with #YesCCT

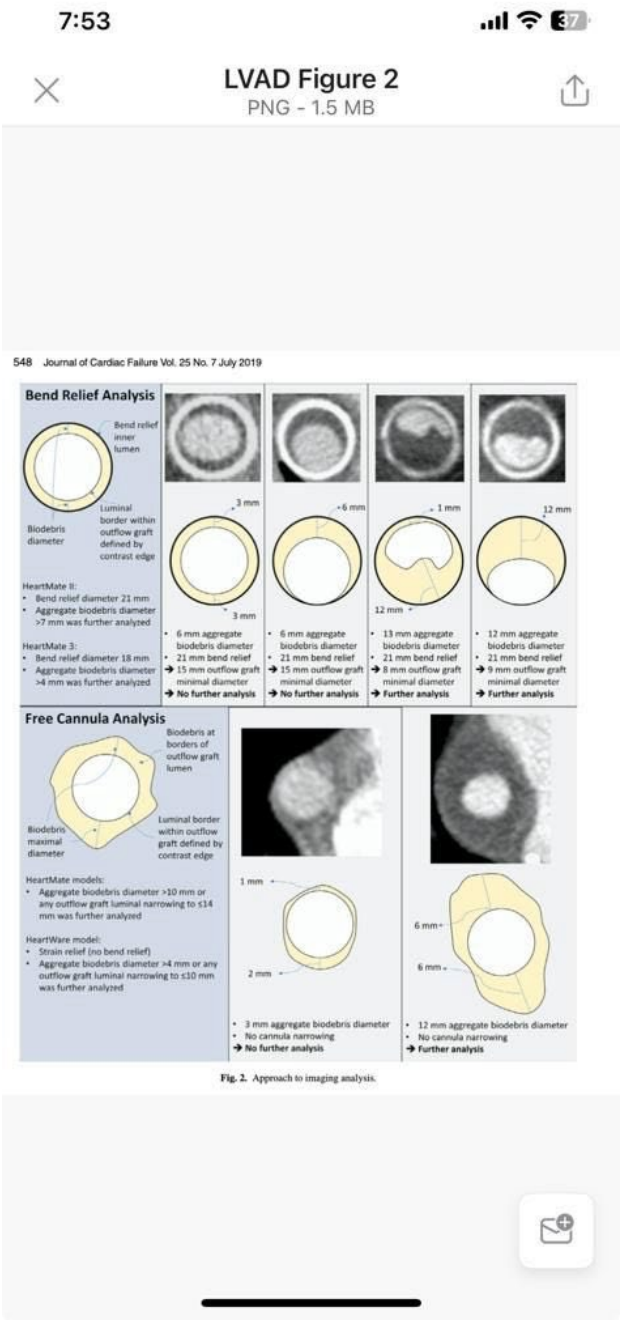
-> Outflow graft narrowing can be seen in a number of patients with HeartMate LVADs within the portion covered by the bend relief.

-> In the some patients the narrowing can be due to extrinsic compression rather than intraluminal thrombus.

https://sciencedirect.com/science/article/abs/pii/S1071916419300028

-> plasma leaked through the semi-permeable outflow graft that gets collected by the non-permeable bend relief and biodebri can form externally.





@danilorenzatti: 🔑 point about the difference between debris accumulation in the bend relief mechanism causing extrinsic compression (see pic) vs true intraluminal thrombosis

🍩☢️

@PurviParwani:

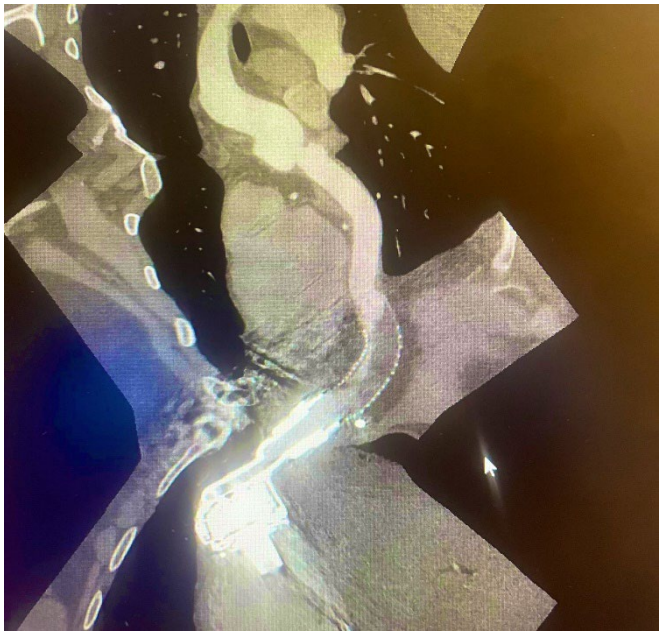
#YesCCT very useful in

❤️‍🩹Pump Positioning and Cannula Alignment

❤️ Detection of Thrombus or Obstruction

❤️ Assessment of Outflow Graft Patency and kinking

❤️ Detection of Infections or Pseudoaneurysms



@NadeenFaza: Thank you SO very much to our guest authors @nicoa002 @JerryEstepMD @BoXuMD for joining our insightful and informative #ASEchoJC discussion tonight! A special thank you to my co-moderator @purviparwani and to all #EchoFirst enthusiasts who have joined us-

@iamritu @PWesslyMD @renujain19 @rajdoc2005! See you next time! Use the #ASEchoJC hashtag to review the questions posted tonight if you were unable to join us!

@ASE360: Thank you to EVERYONE who participated in tonight's #ASEchoJC! ❤️‍🩹 Huge shout-outs to our moderators, @NadeenFaza and @purviparwani, and our guest authors, @nicoa002, @JerryEstepMD, and @BoXuMD.

@NadeenFaza: 🚀 Our #ASEchoJC just hit 10 million+ impressions! A huge shoutout to our ⭐ guest authors @nicoa002 @JerryEstepMD @BoXuMD and my ⭐ co moderator @purviparwani for

an incredible discussion on the guideline document for MMI in patients with LVADs & temporary support devices!