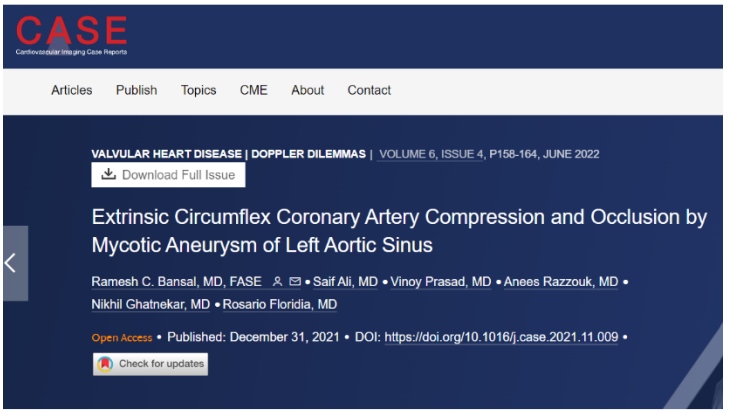
#ASEchoJC Twitter Chat
Thursday, November 2, 2023 – 8 PM ET



- **2023 ShowCASE Winner and Finalist**
  - **Extrinsic Circumflex Coronary Artery Compression and Occlusion by Mycotic Aneurysm of Left Aortic Sinus**
  - **Five-Chambered Heart With Double-Chambered Left Ventricle Diagnosed by Multimodality Imaging**

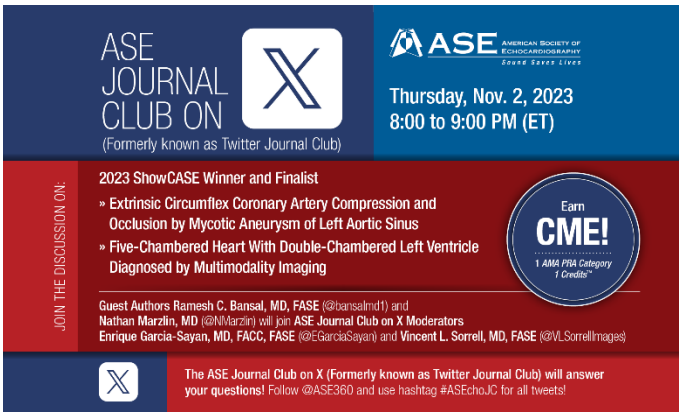
Authors

- Ramesh C. Bansal, MD, FASE (@bansalmd1)
- Nathan Marzlin, MD (@NMarzlin)

Moderators:

- Enrique Garcia-Sayan, MD, FACC, FASE (@EGarciaSayan)
- Vincent L. Sorrell, MD, FASE (@VLSorrellImages)

Introduction and Welcome:



@EGarciaSayan: 💥 Welcome to tonight's #ASEchoJC on X!

💥 2 @CASEfromASE discussions with authors @bansalmd1

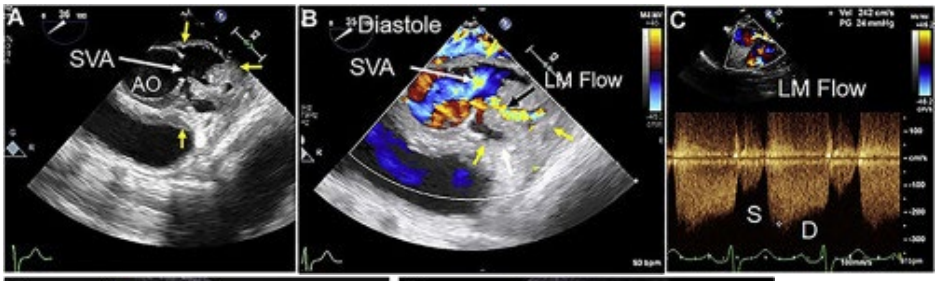
& @nmarzlin & co-moderated by

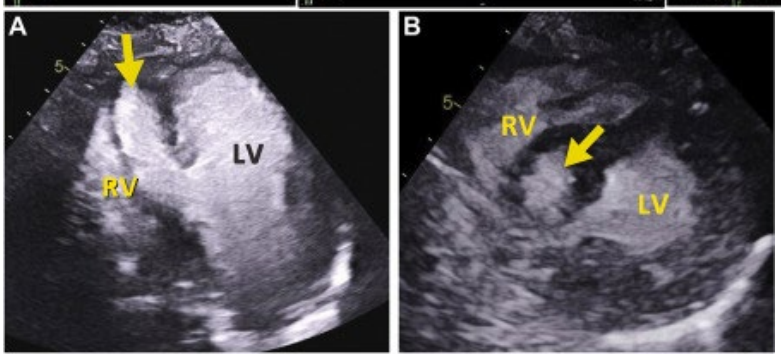
@CASEfromASE EiC @VLSorrellImages

1️⃣ http://bit.ly/3FJ2a1m ❓ 1-5

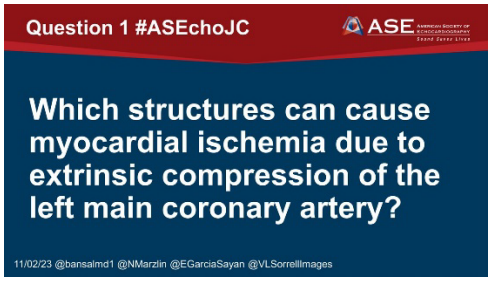
2️⃣ https://bit.ly/49lbiql ❓ 6-10

👉Remember to use #ASEchoJC in all Posts (Tweets)





Q1:



A1 Notable Responses:

@EGarciaSayan: 💥Question 1: (case #1 http://bit.ly/3FJ2a1m): Which structures can cause myocardial ischemia due to extrinsic compression of the left main coronary artery?

@Slwa23288585: 👏PA dilation with PH

👏some ALPACA 🦙

👏congenital aortic sinus of Valsalva aneurysms (SVAs)

and so on😀

@VLSorrelliImages: Great Question:

- Malignant inter-arterial course

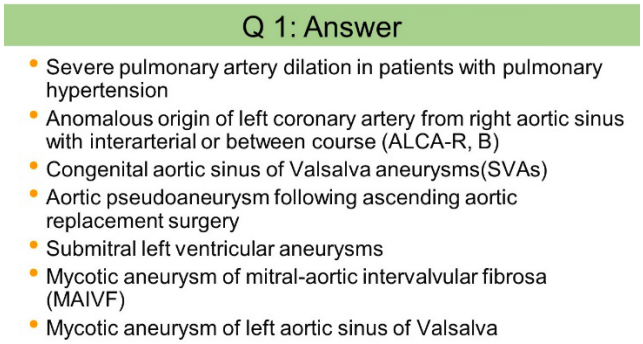
- dilated main PA (pulmonary hypertension)

- congenital &/or pseudo-aneurysms of the SOV

- submitral LV aneurysm

- MAIVF aneurysm from endocarditis

@bansalmd1:



@purviparwani: Which structures can cause myocardial ischemia due to extrinsic compression of the left main coronary artery?

@EGarciaSayan: @bansalmd1 describes various cardiac structures that can cause myocardial ischemia due to extrinsic compression of the left main coronary artery

@bansalmd1:

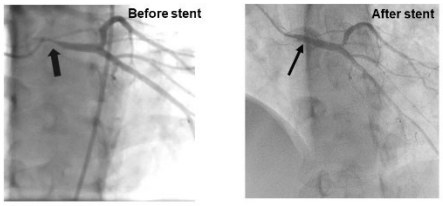
- **Here is an example of severe pulmonary artery dilation in patients with pulmonary hypertension causing LM compression:**

Case 1

@bansalmd1:

Case 1: Dilated MPA, PH, LM compression

- 37-year-old man, ASD, ES, angina. **Angiogram**: LM compression. Treated with IVUS guided LM stent



Cool et al. BMC Cardiovascular Disorders 2022; 22:89

Severe Pulmonary artery dilation and hypertension (PH) and causing LM compression

- First described in 1957 by Corday et al. (Transactions. American College of Cardiology. 1957; 7: 93-103.)
- Dilated MPA compresses the LM, most group 1, can in others
- Incidence: larger studies report in 19-40 % with angina
- Diagnosis by Echo, CT, coronary angiogram and IVUS
- Higher compression risk with following CT criteria: PA diameter > 40 mm, ratio of the MPA and aortic root ≥ 1.5, and LM take-off angle < 45° (between the longitudinal line of the LMCA and orthogonal line of the aortic valve)
- An isolated LM ostial lesion is a class II recommendation for PCI, more complex lesions may be best treated with CABG

@bansalmd1:

BMC Cardiovascular Disorders

bmccardiovascdisord.biomedcentral.com

Eisenmenger syndrome with left main compression s

Background Left main coronary artery disease secondary to pulmonary artery compression relate...

@bansalmd1:

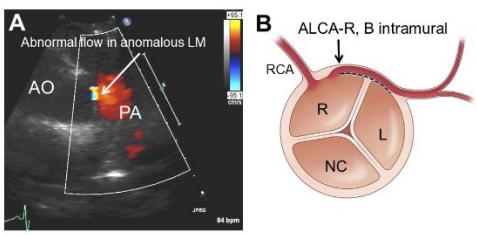
- **Here is an example of anomalous LM from R sinus with interarterial or between intramural course (ALCA-R, B intramural)**

Case 2

@bansalmd1: 10.1148/rg.2017160124

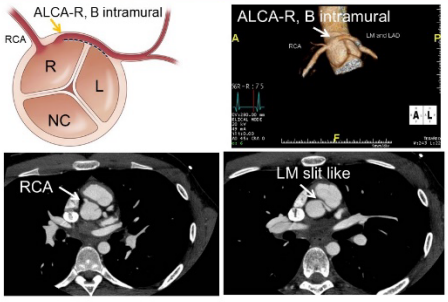
Case 2: TTE, ALCA-R, B intramural

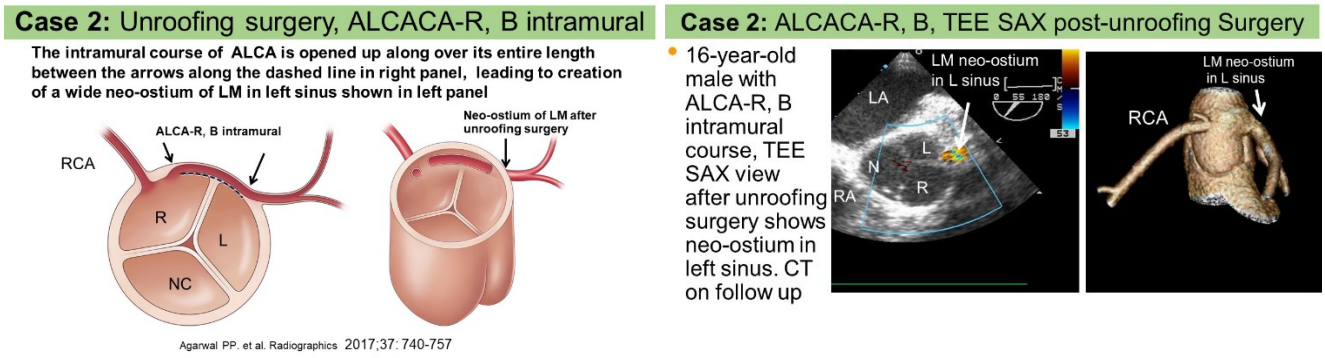
- 16-year-old male, chest pain and syncope. **TTE**: SAX view with color shows abnormal flow in the narrow ostium of ALCA-R, B



Case 2: CCTA, ALCACA-R, B intramural

- 16-year-old male, chest pain and syncope. CT shows abnormal origin of LM from R sinus and between the arteries (B) or interarterial course



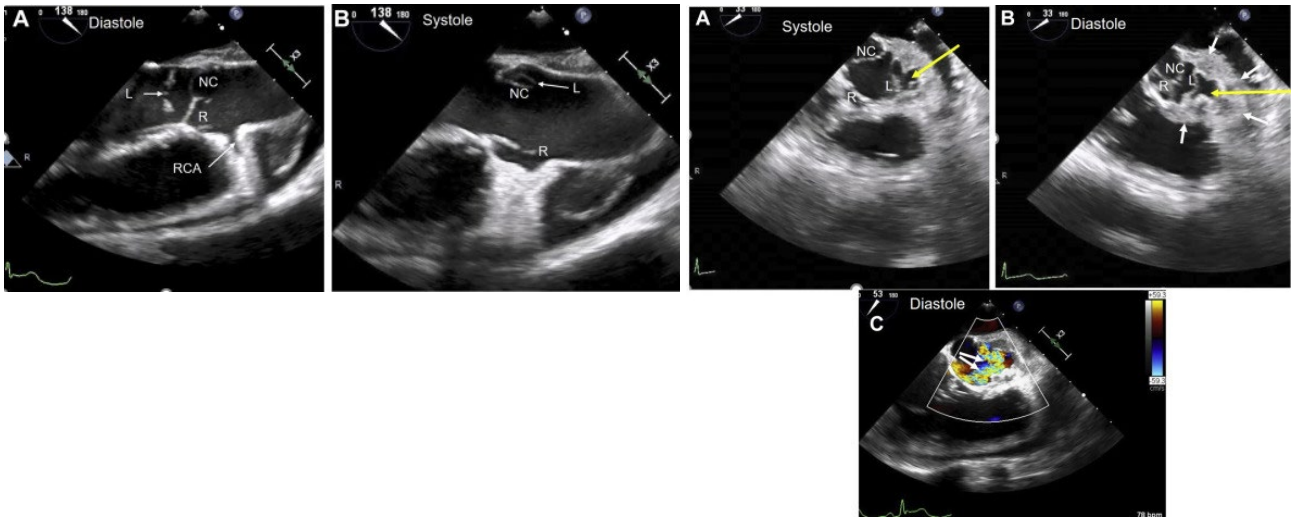


@VLSorrelIImages: Ramesh, I remember that excellent slide from your ShowCASE presentation during the 2023 ASE annual scientific sessions. Congrats!

@DavidWienerMD: #ShowCASE was a special session during @ASE360 2023 Scientific Sessions showcasing case reports and judged by experts. Another reason to join us in Portland in June for #ASE2024

@VLSorrelIImages: We learned so much during ShowCASE 23... hope to see you next year for ShowCASE24! Better yet... submit your CASE today to get invited to participate and possibly win the COY! https://cvcasejournal.com/content/authorinfo

@VLSorrelIImages: Nice examples of the coronary origins with TEE:



@bansalmd1:

- **Here is an example of Submitral LV aneurysm causing LM compression**

Case 3

Case 3: Submitral LV aneurysm with LM compression

- 19-year-old girl, HF, TTE: submitral aneurysm, LM compression. Had surgical repair and MVR

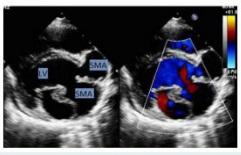


Fig. 1: Two dimensional echocardiography Color Doppler imaging revealed systolic flow into the SMA and from SMA into LA

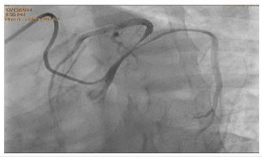
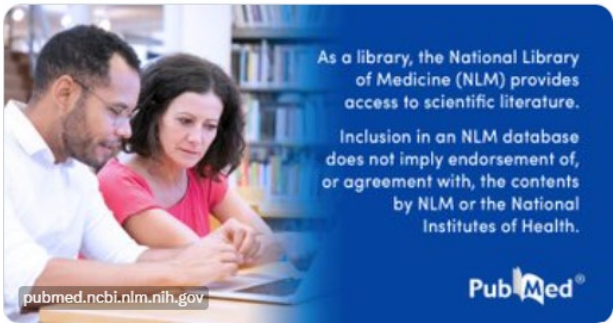


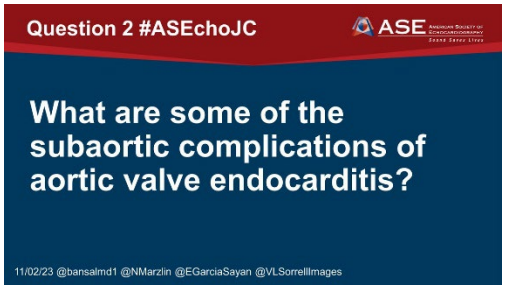
Fig. 4: Coronary angiogram showing compression of left main, left anterior descending and left circumflex artery by large SMA

Kumar P et al. Journal of The Association of Physicians of India 2018: 66 : 90-91

@bansalmd1:



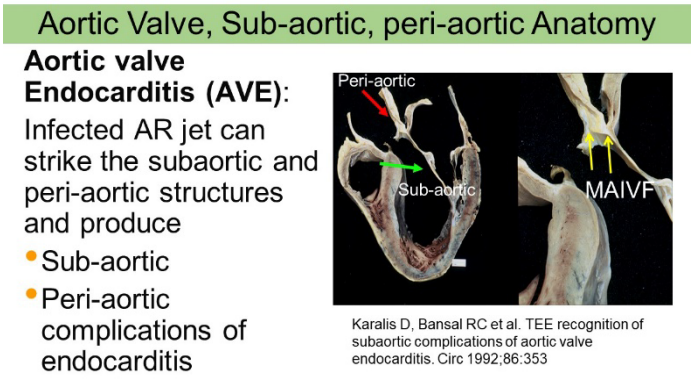
Question 2:

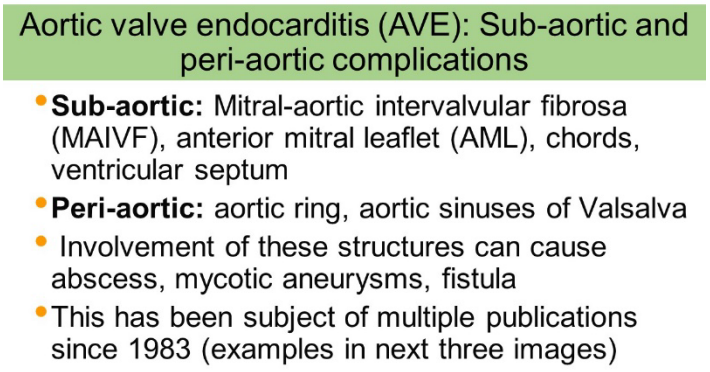


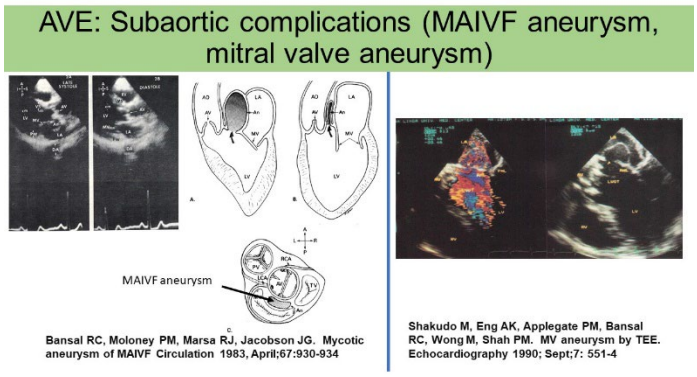
A2 Notable Responses:

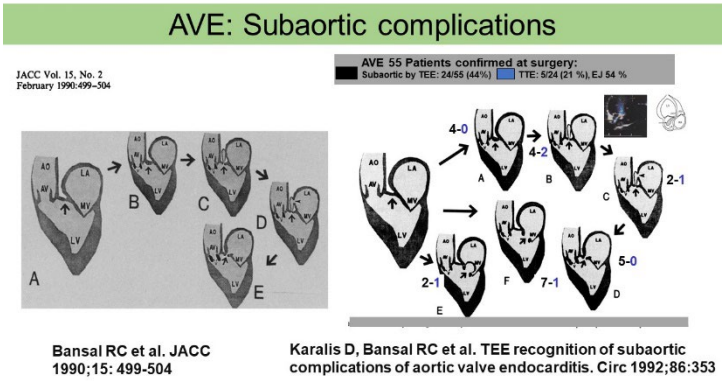
@EGarciaSayan: 💥 Question 2: What are some of the subaortic complications of aortic valve endocarditis?

@bansalmd1:









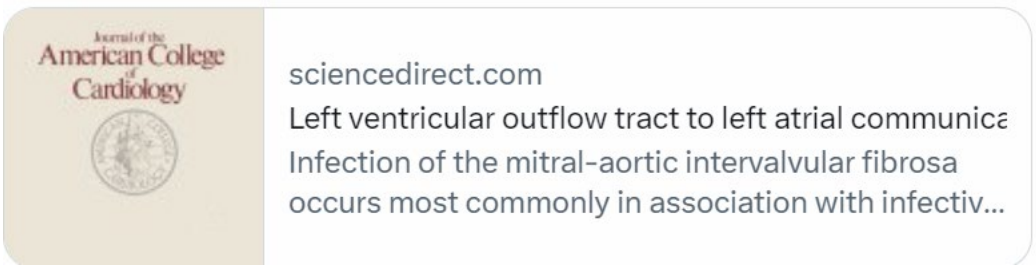
@bansalmd1: 10.1161/01.cir.86.2.353

https://ahajournals.org/doi/pdf/10.1161/01.CIR.67.4.930

10.1111/j.1540-8175.1990.tb00399.x

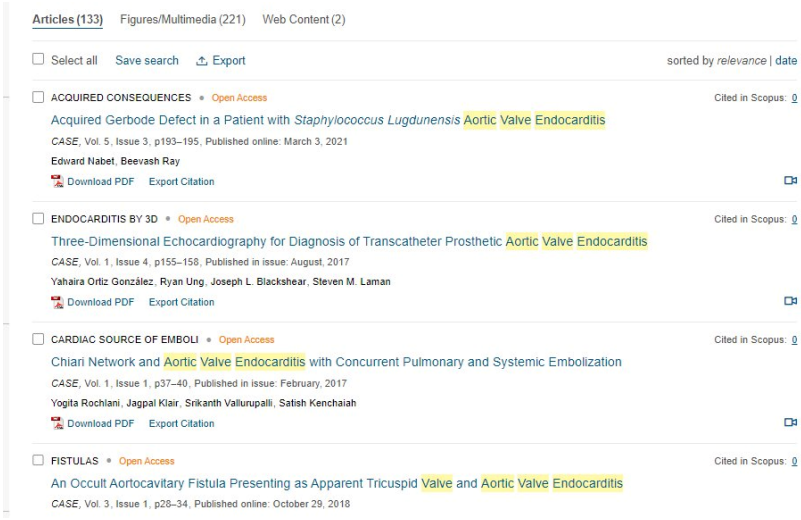
https://doi.org/10.1016/S0735-1097(10)80082-8

10.1161/01.cir.86.2.353



@VLSorrelllmages: CASE allows you to search for reports by disease. Here are the 133 search results for AV endocarditis:

https://cvcasejournal.com/action/doSearch?type=quicksearch&text1=aortic+valve+endocarditis&field1=AllField

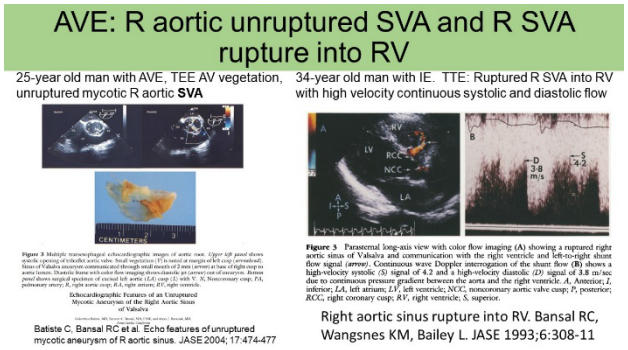


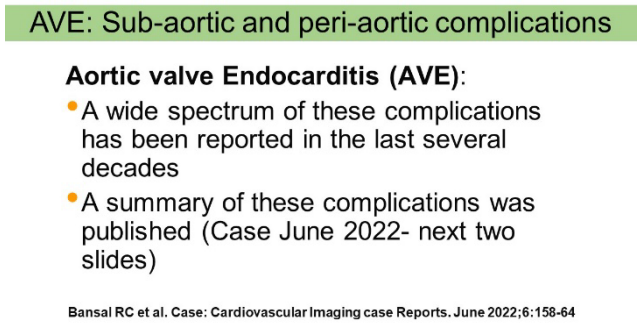
@EGarciaSayan: @CASEfromASE editor-in-chief @VLSorrelllmages demonstrates the journal's searchable case and image database. A rich library of complex pathology that continues to grow.

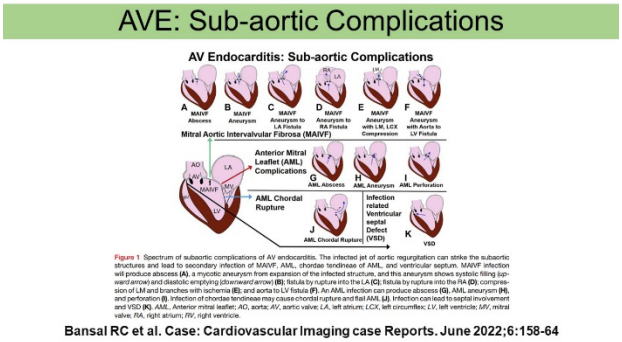
@bansalmd1: 10.1016/j.echo.2004.01.002

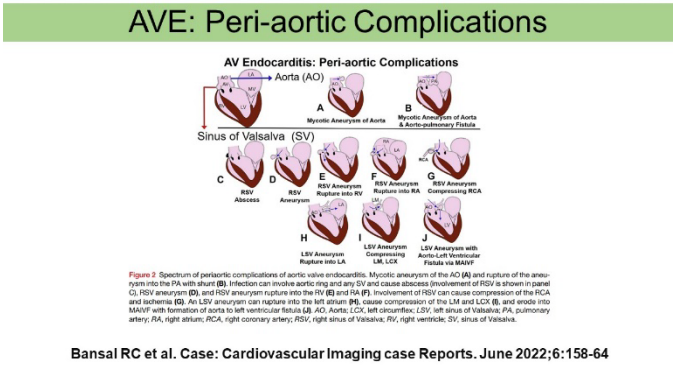
10.1016/s0894-7317(14)80068-0

https://doi.org/10.1016/j.case.2021.11.009

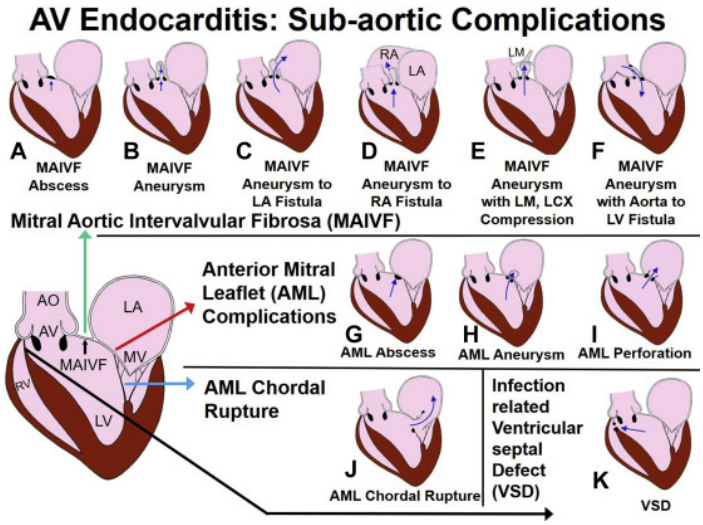








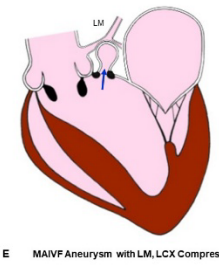
@EGarciaSayan: @bansalmd1 describes various subaortic complications of AV endocarditis. Also, see the fantastic Figure 1 from the case!



@bansalmd1:

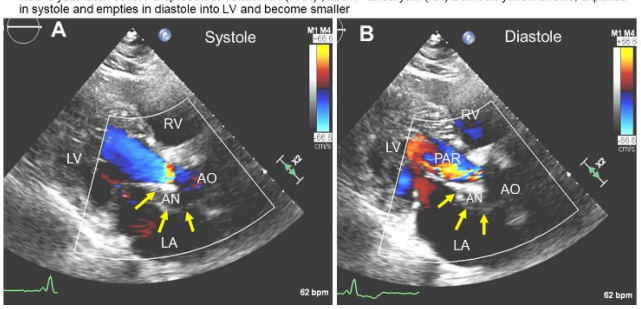
MAIVF aneurysm with compression of anomalous CX

- An example of a case of mycotic aneurysm of mitral-aortic intervalvular Fibrosa (MAIVF) causing LM/ circumflex(CX) compression



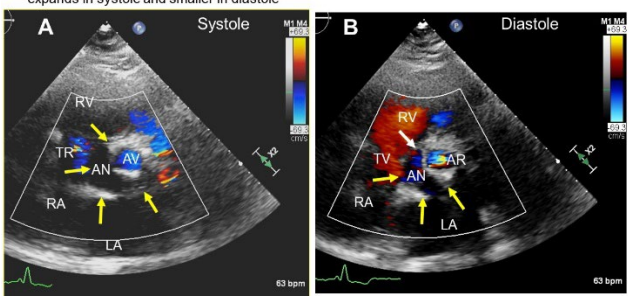
Case 4: MAIVF aneurysm, compression of anomalous CX

- 68-year-old female, h/o surgical AVR due to IE using St. Jude Trifacta bioprosthesis at OSH in 9/2015. TTE PLAX view 5 year later: severe bioprosthetic central AR (PAR) , MAIVF aneurysm (AN) between yellow arrows, expands in systole and empties in diastole into LV and become smaller



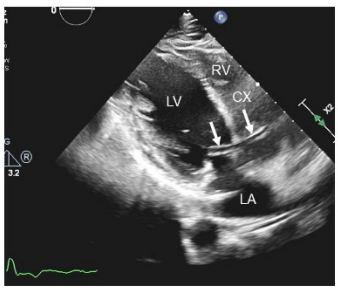
Case 4: MAIVF aneurysm, compression of anomalous CX

- 68-year-old female, h/o surgical AVR due to IE using St. Jude Trifacta bioprosthesis at OSH in 9/2015. TTE SAX view: severe bioprosthetic central AR (PAR) , MAIVF aneurysm (AN) between yellow arrows, expands in systole and smaller in diastole



Case 4: MAIVF aneurysm, compression of anomalous CX

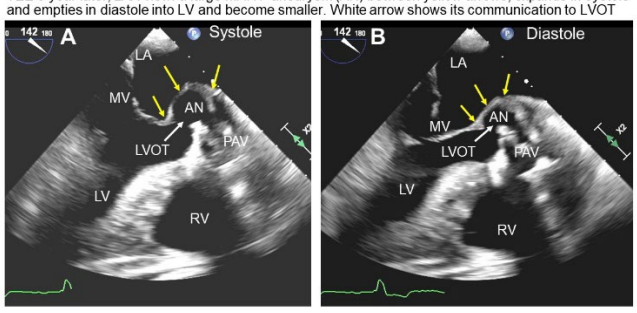
- 68-year-old female, h/o surgical AVR due to IE using St. Jude Trifacta bioprosthesis at OSH in 9/2015. TTE foreshortened 4-CV: anomalous circumflex (CX) from right aortic sinus with retroaortic course (arrows)



@bansalmd1:

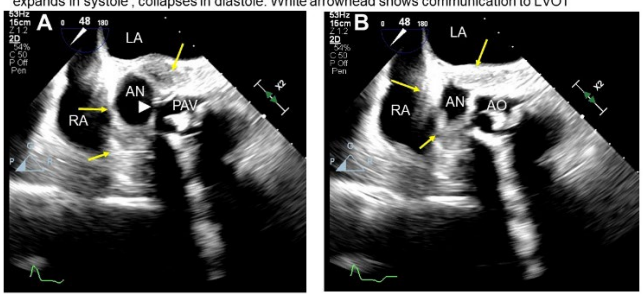
Case 4: MAIVF aneurysm, compression of anomalous CX

- 68-year-old female, h/o surgical AVR due to IE using St. Jude Trifacta bioprosthesis at OSH in 9/2015. TEE 5 year later, LAX view: a large MAIVF aneurysm (AN) between yellow arrows, expands in systole and empties in diastole into LV and become smaller. White arrow shows its communication to LVOT

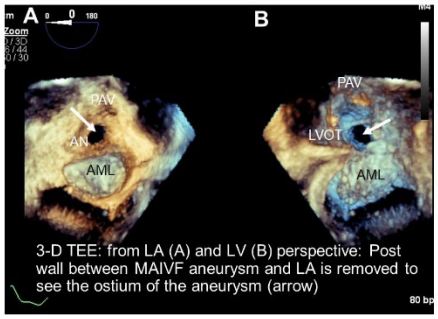


Case 4: MAIVF aneurysm, compression of anomalous CX

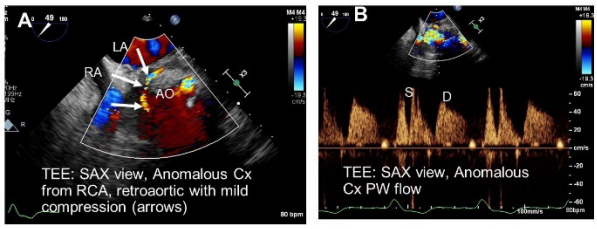
- 68-year-old female, h/o surgical AVR due to IE using St. Jude Trifacta bioprosthesis at OSH in 9/2015. TEE 5 year later, SAX view: a large MAIVF aneurysm (AN) between yellow arrows. It is partially clotted, expands in systole , collapses in diastole. White arrowhead shows communication to LVOT



Case 4: MAIVF aneurysm, compression of anomalous CX



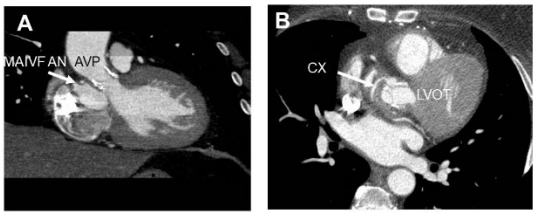
Case 4: MAIVF aneurysm with mild compression of anomalous Cx



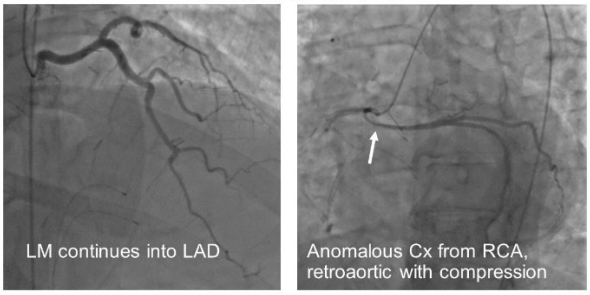
@bansalmd1:

Case 4: MAIVF aneurysm, compression of anomalous CX

- 68-year-old female, h/o surgical AVR due to IE using St. Jude Trifacta bioprosthesis at OSH in 9/2015. **CT 5 years** : Panel A coronal image shows biprosthetic aortic valve, MAIVF aneurysm (AN-arrow). Panel B shows anomalous CX from right sinus coursing retroaortic in the wall of aneurysm



Case 4: MAIVF aneurysm with compression of anomalous CX by angiography



@purviparwani: Nice example of #Echofirst features of a mycotic aneurysm of the Left Ventricular Outflow Tract Caused by Perforation of Mitral-Aortic Intervalvular Fibrosa

See the schematic showing systolic expansion and diastolic collapse. Showing this live on the TEE helps determine the pathophysiology of the lesion. https://ahajournals.org/doi/pdf/10.1161/01.CIR.67.4.930

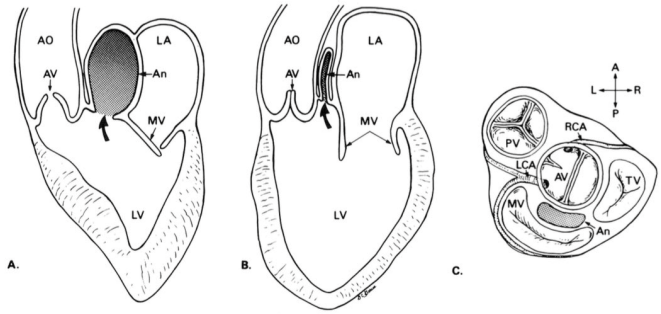
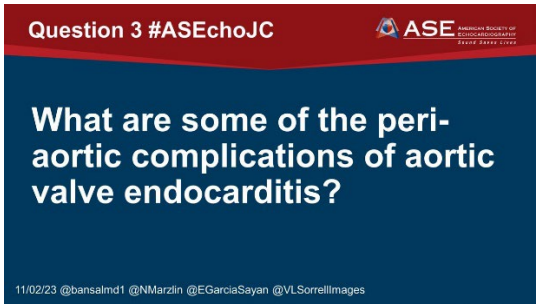


FIGURE 4. *The location of the left ventricular outflow tract pseudoaneurysm (An). (A) Systolic frame of the left ventricular long-axis view showing the opening (curved arrow) of the aneurysm between the posterior aortic valve (AV) cusp and the anterior mitral leaflet. Bicuspid aortic valve shows systolic doming. (B) Diastolic frame showing collapse of the aneurysm. (C) Relation of aneurysm to cardiac valves, viewed from above. PV = pulmonic valve; TV = tricuspid valve; other abbreviations as in figures 1 and 2.*

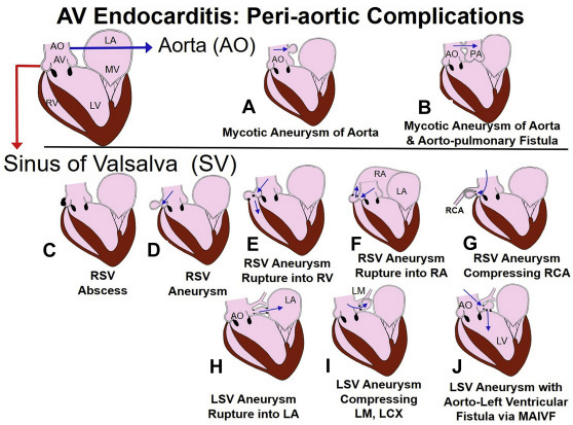
Question 3:



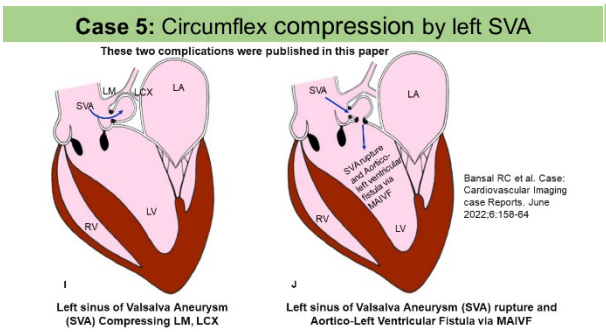
A3 Notable Responses:

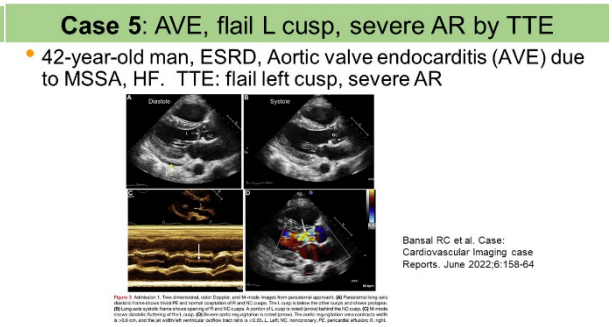
@EGarciaSayan: 💥 Question 3: What are some of the peri-aortic complications of aortic valve endocarditis?

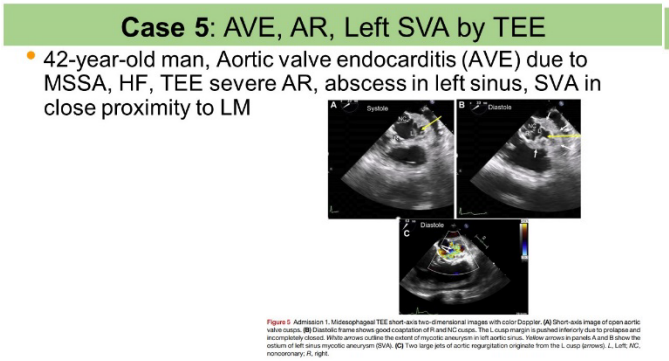
@EGarciaSayan: Figure 2 from the case by @bansalmd1 illustrates peri-aortic complications of AV endocarditis

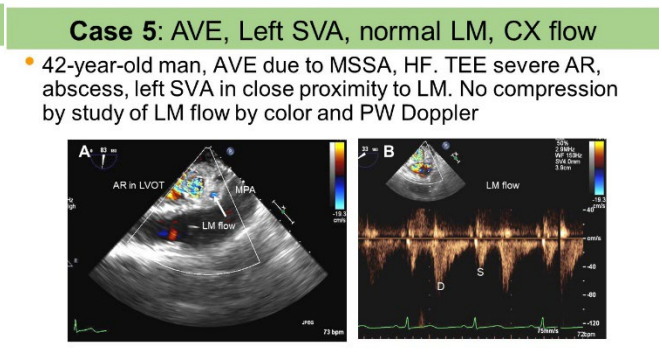


@bansalmd1: https://doi.org/10.1016/j.case.2021.11.009









@bansalmd1:

Case 5: AVE, L SVA, no compression by CT

- 42-year-old man, ESRD, Aortic valve endocarditis (AVE) due to MSSA, HF. CT shows left SVA in close proximity to LM. Circumflex (CX) courses over the SVA but no compression

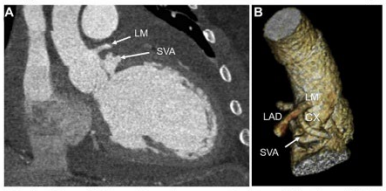
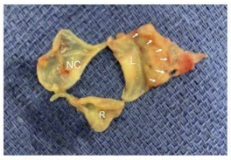


Figure 6 Admission 1. Cardiac CT scan. **(A)** Coronal image shows separation between LM ostium and SVA. **(B)** Three-dimensional volume-rendered cardiac CT image shows the proximity of LM, LAD, CX, and coronary artery to SVA but no compression. *CX*, Circumflex; *LAD*, left anterior descending artery.

Case 5: Left SVA with AVE-surgery

- 42-year-old man, AVE due to MSSA, HF, s/p surgical AVR with # 21 On-X, pericardial patch repair of SVA. Excised AV specimen on left. Post-op TTE: normal prosthetic valve function, intact repair of SVA (arrows)



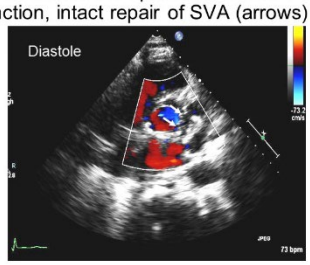


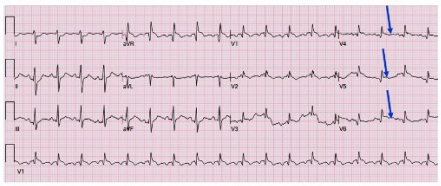
Figure 7 Admission 1. The aortic valve explanted at surgery; leaflets are shown to correspond to the TEE short-axis view. The right cusp is the smallest. The left cusp is very large. No vegetation is noted. Basal attachment of the left cusp to the left sinus (*outlined by arrowheads*) is shown. The cusp appeared thick, redundant, and inflamed and showed severe prolapse at surgical inspection. *L*, Left; *R*, right.

Case 5: Left SVA with AVE, s/p AVR, Readmitted

- Re-admitted 3 month later with SOB, Trop-T increased 4.8 ng/mL, ECG STEMI, BC + for Enterococcus, mycotic left SVA, causing extrinsic compression of L Cx, MI. Aortico-LV fistula, Echo findings confirmed, had Bentall, MVR for FMR

Case 5: Left SVA with AVE, s/p AVR, Readmitted with lateral MI

- Re-admitted 3 month later with SOB, Trop-T increased 4.8 ng/mL, ECG lateral STEMI (arrows



@bansalmd1:

Case 5: Left SVA, Cx compression

- Re-admitted 3 month later with SOB, lateral STEMI, **angiogram**: LM compression, occluded CX

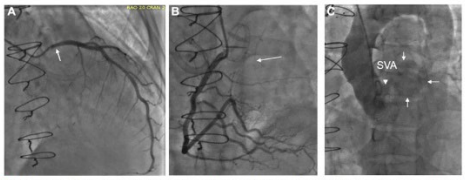


Figure 8 Admission 2. Images of coronary angiography during second admission 3 months after first surgery when the patient presented with lateral infarction. **(A)** Compression of the proximal LM (*arrow*) and absence and complete occlusion of left circumflex coronary artery. **(B)** Right coronary artery angiogram shows filling of circumflex via collaterals (*arrow*). **(C)** Aortogram shows opacification left SVA outlined by *thin arrows* (SVA) via a connection (*arrowhead*) in the left aortic sinus. The bottom of the SVA showed a small connection with the left ventricle through MAIVF in real-time angiography that was not appreciated in the still image.

Case 5: Left SVA, cx compression

- Re-admitted 3 month later with SOB, lateral STEMI, angiogram: LM compression, occluded CX, BC + for Enterococcus. **TTE**: lateral MI

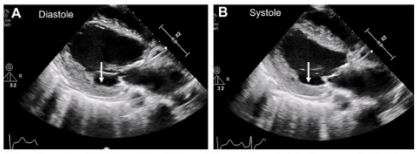
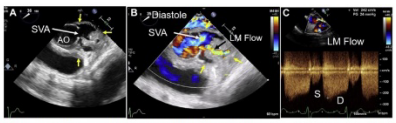


Figure 9 Admission 2. Two-dimensional TTE parasternal long-axis images acquired during second admission when the patient presented with acute lateral wall myocardial infarction. **(A)** Diastole. **(B)** Systole. There is preserved myocardial thickness with regional akinesis of the basal and midinferolateral wall segments (*arrows*) consistent with an acute myocardial infarction.

Case 5: Left SVA, CX compression, lateral MI

- Re-admitted 3 month later with SOB, lateral STEMI, angiogram: LM compression, occluded CX, BC + for Enterococcus. TTE: lateral MI, **TEE**: L SVA causing LM compression, occluded CX



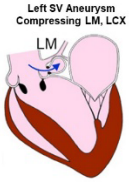
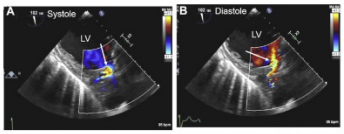


Figure 10 Admission 2. Midesophageal TEE two-dimensional, color Doppler, and continuous-wave Doppler images. **(A)** Short-axis image of the aortic root shows a large left SVA due to patch dehiscence. The ostium of the SVA is shown by a *large arrow*, and its extent by *yellow arrows*. **(B)** Color flow imaging shows emptying of SVA in blue in diastole (*arrow*). The extent of the SVA is shown by *yellow arrows*. Turbulent, mosaic color, high-velocity flow (*black arrow*) suggests LM obstruction due to extrinsic compression. **(C)** Color-guided continuous-wave Doppler examination of the LM flow shows mildly increased systolic (S) and very high diastolic (D) velocity of > 2 m/sec. The LM is very long, and no left circumflex is noted. Findings are consistent with LM compression and likely left circumflex occlusion. *AO*, aorta.

Case 5: LSV aneurysm, CX compression, lateral MI, and aortico-LV fistual

- Re-admitted 3 month with lateral STEMI, angiogram: LM compression, occluded CX, BC + for Enterococcus. TTE: lateral MI, **TEE**: L SVA- MAIVF-LV fistula



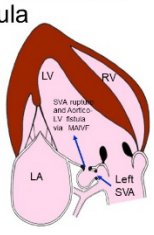
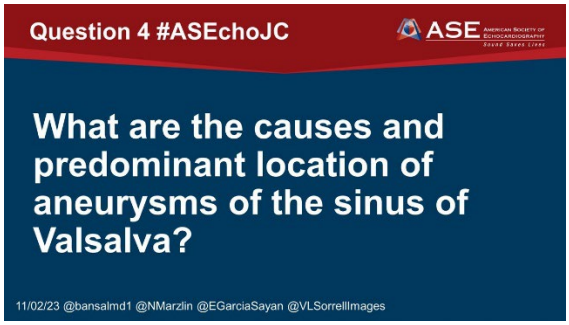


Figure 11 Admission 2. TEE transgastric long-axis two-dimensional and color Doppler images. **(A)** Blood flows toward the LV outflo tract and aorta in *blue* (*arrow*) in systole. **(B)** Blood returns toward the LV outflow tract in *red* (*arrow*) in diastole. This finding combine with a normal functioning prosthetic aortic valve suggested that the left SVA had eroded into the MAIVF and created an aorta to l fistula (which was confirmed at surgery). *LV*, Left ventricular, ventricle.

@VLSorrellImages: Has anyone stented a stenotic coronary from an extrinsic-compression etiology? @CASEfromASE

Question 4:



A4 Notable responses

@EGarciaSayan: 💥 Question 4 What are the causes and predominant location of aneurysms of the sinus of Valsalva?

@EGarciaSayan: 🔺 Most common is right SOVA (~70%) rupturing into RV, and non-coronary SOVA (~25%) rupturing into RA. Extracardiac rupture is rare

🔺 Dx by #EchoFirst (TTE + TEE) > 90% yield. Add #YesCCT & #WhyCMR when needed

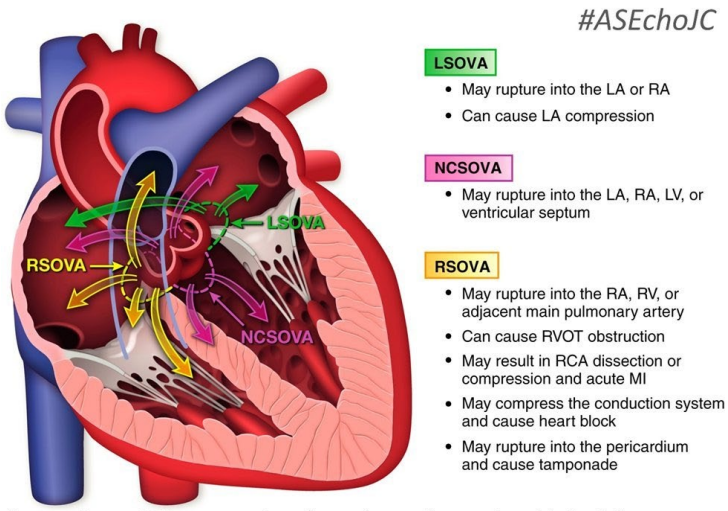


Image from: ASEs comprehensive echocardiography, third edition.

@bansalmd1: 10.1016/j.jtcvs.2012.12.059

Aortic Sinus of Valsalva Aneurysm (SVA): Etiology, location,

- Etiology:
  - Congenital
  - Acquired: IE, trauma, surgical, trauma, Takayasu
- Location:
  - RSVA 75-80 %, NSVA 20 %, LSVA < 2 %
  - Rupture site: RSVA into RV (70 %), into RA (30 %)
    NSVA into RA (90 %), into RV (10 %)
    LSVA into LA, LV

Aortic SVA: Site of origin, rupture

159 patients with ruptured SVA had surgery (yr 2006-12)

- Site of origin :
  -RSVA= 122 (78 %), NSVA = 35 (22 %), LSVA = 2 (1 %)
- Site of rupture:
  -RSVA (T 122): 85 (70 %) into RV; 36 (30 %) into RA;
  1 (1 %) into LV
  -NSVA (T 35): 31 (89 %) into RA; 4 (11 %) into RV
  -LSVA (T 2): 2 (100 %) into LA
- VSD: 77/159 (48 %), supracristal, membranous

Xin-Jin L et al. J Thorac Cardiovasc Surg 2013;146:874-8

Aortic SVA: Location, classification

TABLE 2. Classification systems for RSVA

Type	Sakakibara classification	Modified Sakakibara classification
I	Originating from left part of right coronary sinus; protruding into conus of right ventricle, just beneath commissure of right and left pulmonary valves	Protrusion and rupture into right ventricle just beneath pulmonary valve
II	Originating from central part of right coronary sinus; protruding into right ventricle; penetrating crista supraventricularis	Penetration and rupture into or just beneath crista supraventricularis of right ventricle
IIIv	Originating from posterior part of right coronary sinus; protruding into right ventricle, just beneath septal leaflet of tricuspid valve; penetrating membranous septum	Penetration and rupture into right ventricle adjacent to or at tricuspid annulus
IIIa	Originating from posterior part of right coronary sinus; protruding into right atrium, near commissure of septal and anterior leaflets of tricuspid valve	Penetration and rupture into right atrium adjacent to or at tricuspid annulus
IV	Originating from right part of noncoronary sinus; protruding into right atrium, near septal leaflets of tricuspid valve	Protrusion and rupture into right atrium
V		Other rare conditions (eg, rupture into left atrium, pulmonary artery, left ventricle, or other structures)

RSVA, Ruptured sinus of Valsalva aneurysm.

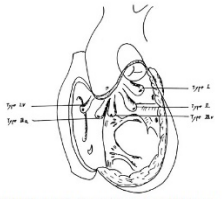
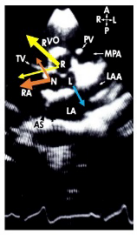


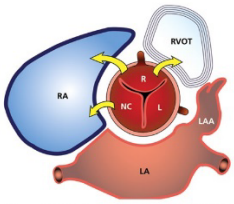
FIGURE 1. Illustration of types I to IV ruptured sinus of Valsalva aneurysm (RVSA) in modified Sakakibara classification system.

Modified Sakakibara classification system for ruptured sinus of Valsalva aneurysm. Xin-Jin L et al. J Thorac Cardiovasc Surg 2013;146:874-8

Aortic SVA rupture site and TTE image

TTE SAX image: RSVA into RV, RA; NC SVA into RA or RV; L SVA into LA, LV
R SVA can be associated with subpulmonic or membranous and NC SVA can be associated with membranous VSD

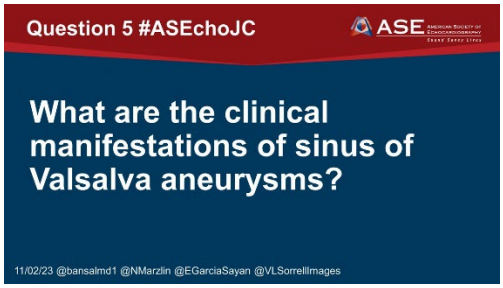




Hoey ET. A et al. AJR 2010:194: W495-504

@EGarciaSayan: @bansalmd1 describes causes and predominant location of aneurysms of the sinus of Valsalva

Question 5:



A5 Notable responses

@EGarciaSayan: 💥 Question 5: What are the components of a successful IE training program?

@EGarciaSayan:

- 🔺 Presentation depends on sinus affected & relationship with adjacent structures
- 🔺 Rupture into RA or RV or compression of RV inflow/ outflow ➡️ RV Vol overload + RHF
- 🔺 Rupture into LA ➡️ RV Vol overload & LHF
- 🔺 Can involve cond system, or cause endocarditis, thrombus

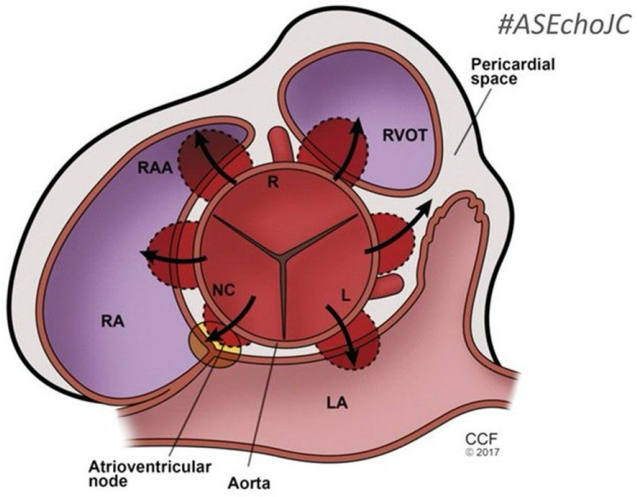


Image from: J Am Soc Echocardiogr. 2020 Mar;33(3):295-312.

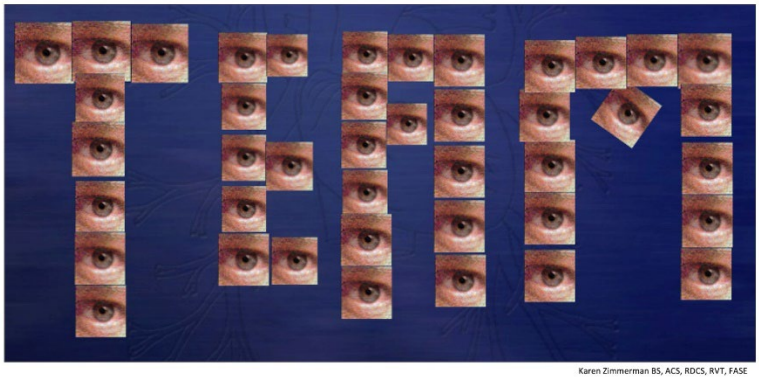
@kgzimmerman: A picture is always worth a thousand words, thank you CCF for these great images to help explain!

@DavidWienerMD: And a big H/T to @kgzimmerman one of the founding editors of @CASEfromASE

@EGarciaSayan: thank you @kgzimmerman for your comments. @CASEfromASE would not be what it is without you!

@kgzimmerman: Takes many eyes to make a TEAM! Thank you to all those who share these experiences and teach us all!

Takes many eyes to make a team!



@VLSorrellImages: These are often zebras and require a high index of suspicion. Lately, we have been fooled by the initial appearance of tricuspid valve endocarditis... as the wind-sock aneurysm moves near the TV!

@EGarciaSayan: @VLSorrellImages highlights importance of having a high index of suspicion for ruptured SoV aneurysms

@bansalmd1:

Clinical manifestations of aortic SVA

- Frequently asymptomatic, incidental finding on imaging
- Associated lesions: VSD, AR, Coarctation, ASD, BAV
- Rupture into RA, RV, rarely LA, LV
- Coronary compression, RVOT / LVOT obstruction
- HF due to AR, VSD, rupture

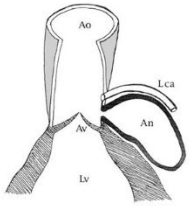
@EGarciaSayan: @bansalmd1 describes the various clinical manifestations of sinus of Valsalva aneurysms. Often asymptomatic and incidental. High index of suspicion in cases of shunt, regurg leasions, coronary compression and HF.

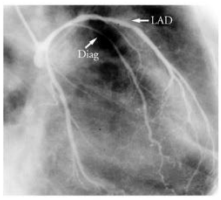
@EGarciaSayan: @bansalmd1 reviews the clinical manifestations of sinus of Valsalva aneurysms

@bansalmd1: https://ncbi.nlm.nih.gov/pmc/articles/PMC101268/

Case 6: Aortic Left SVA causing coronary compression

- 75-year-old woman, L SVA, compression of diagonal artery by angiogram

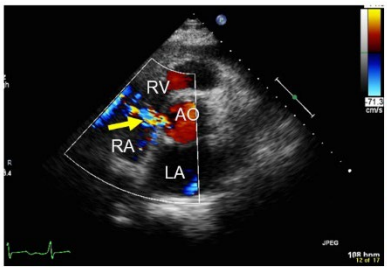


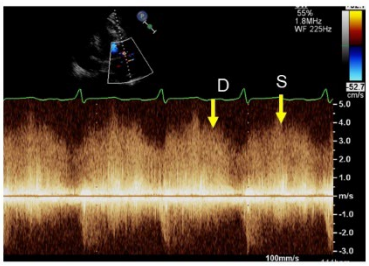


Lijoi A. et al. Tex Heart J 2002; 29:40-4

Case 7: AVE, aortic Right SVA, rupture into RA

- 51-year-old man, AV endocarditis, right SVA, rupture into RA. TTE with color flow and Doppler show high velocity systolic and diastolic continuous flow into RA





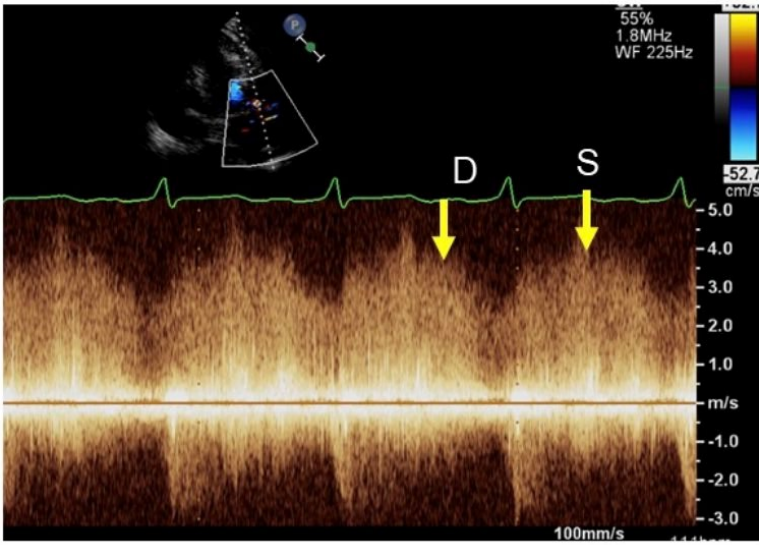
@purviparwani: This Doppler profile showing rupture of sinus of Valsalva aneurysm into RA should be noted!

-> Doppler with rupture SOV will be Continuous.

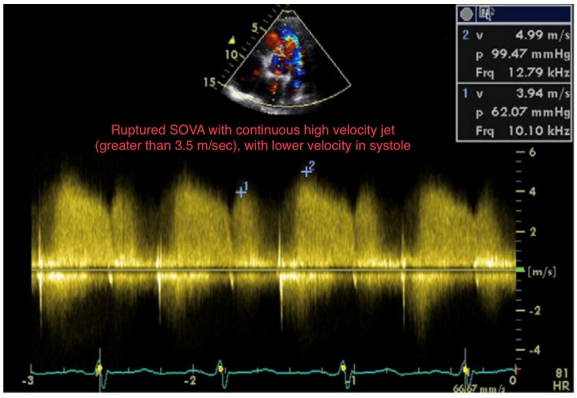
-> almost 4m/ s jet due to the pressure difference between RA and aorta

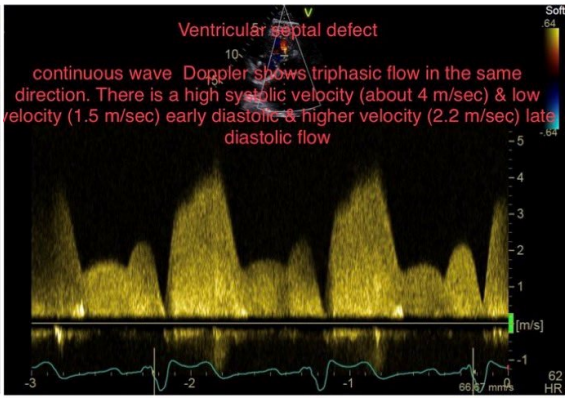
@iamritu: With SOV rupture into RA.

the Doppler shows continuous high velocity systolic and diastolic flow into RA (continuous pressure gradient b/w aorta & RA) #echofirst



@EGarciaSayan: @bansalmd1 demonstrates characteristic spectral Doppler pattern of ruptured SoV aneurysm. Continuous high-velocity flow with diastolic accentuation. Differentiate from characteristic biphasic pattern of VSD with predominant systolic flow. @iamritu shared this in a prior #ASEchoJC

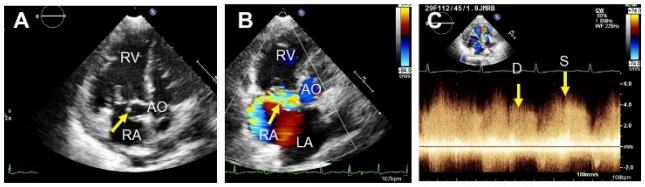




@bansalmd1:

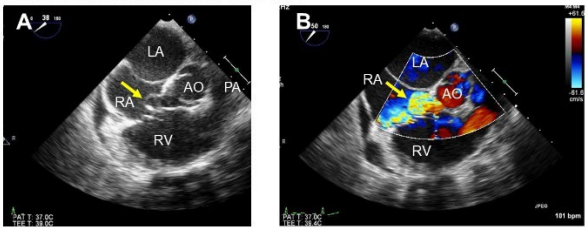
Case 8: AVE, aortic NC SVA, rupture into RA

- 29-year-old female, congenital non coronary (NC) SVA, rupture into RA. TTE with color flow and Doppler show high velocity systolic and diastolic continuous flow into RA



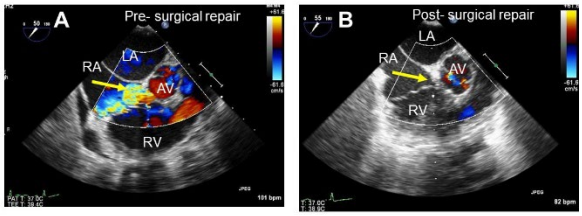
Case 8: AVE, aortic NC SVA, rupture into RA

- 29-year-old female, congenital NC SVA, rupture into RA. TEE with color flow and Doppler show high velocity systolic and diastolic continuous flow into RA



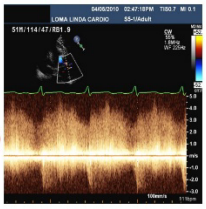
Case 8: S/p surgical repair of aortic NC SVA that had ruptured into RA

- S/p surgical repair of aortic NC SVA that had ruptured into RA. After surgery no shunt by color Doppler



D/D of Continuous flow, murmur, Doppler signal

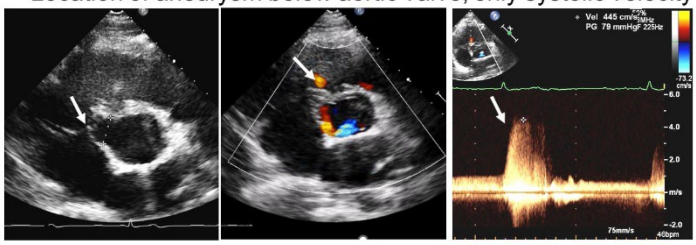
- PDA
- A-P window
- Aortico-RV tunnel
- Ruptured SVA into RA, RV, LA
  (Ruptured SVA into LV only diastolic)
- Coronary A-V fistula
- Arterial collaterals in coarctation and Pulmonary atresia
- Surgical shunts
- Peripheral pulmonary artery stenosis



@bansalmd1:

Case 9: VSD with septal aneurysm not to be confused with ruptured SVA

- 20-year-old male, dyspnea, murmur,
- VSD with membranous septal aneurysm (arrow)
- Location of aneurysm below aortic valve, only systolic velocity

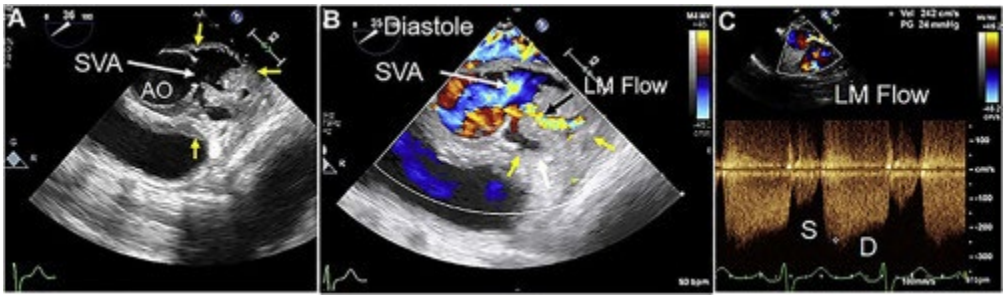


@purviparwani: Great point-

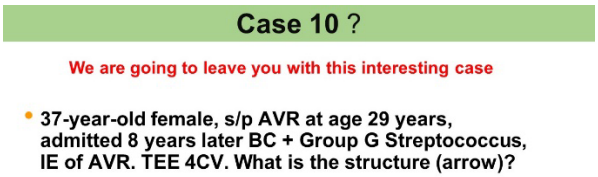
VSD with septal aneurysm will have only systolic velocity and should not be confused with rupture of sinus of Valsalva aneurysm since the latter will have continuous flow on doppler!

@VLSorrellImages: Here's the full report for our first CASE:

https://doi.org/10.1016/j.case.2021.11.009



@bansalmd1:



@VLSorrellImages: Interested in additional CASES of SOV aneurysms?

Be sure to click on these:

https://doi.org/10.1016/j.case.2019.09.006

https://doi.org/10.1016/j.case.2023.08.005

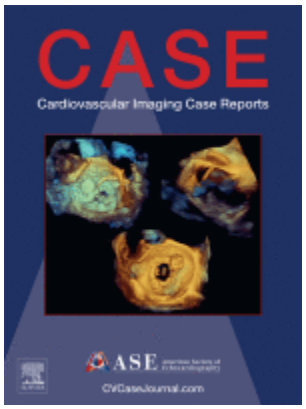
https://doi.org/10.1016/j.case.2021.10.001

https://doi.org/10.1016/j.case.2019.11.001

https://doi.org/10.1016/j.case.2021.09.011

https://doi.org/10.1016/j.case.2022.02.005

https://doi.org/10.1016/j.case.2022.11.004



@iamritu: Interesting #echofirst CASES of SOV aneurysms compiled

click below:

http://doi.org/10.1016/j.case...

http://doi.org/10.1016/j.case...

http://doi.org/10.1016/j.case...

http://doi.org/10.1016/j.case...

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http://doi.org/10.1016/j.case...

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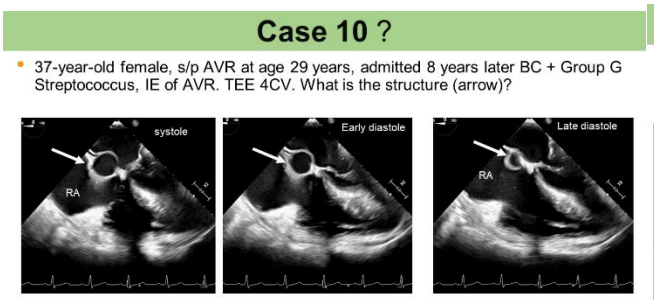
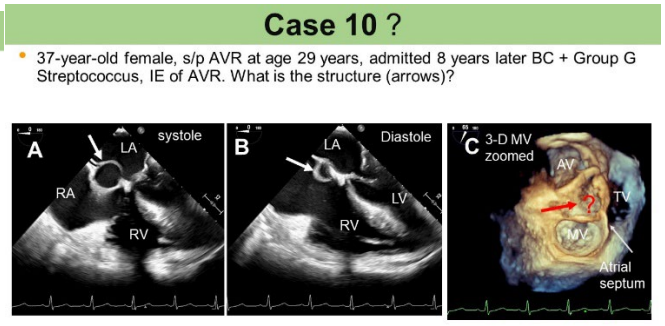
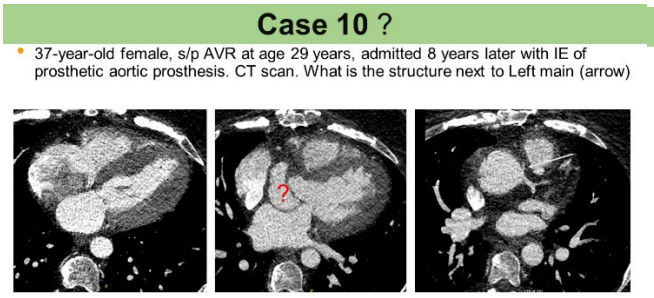
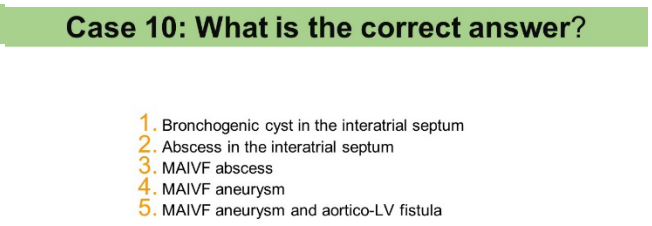
@bansalmd1:



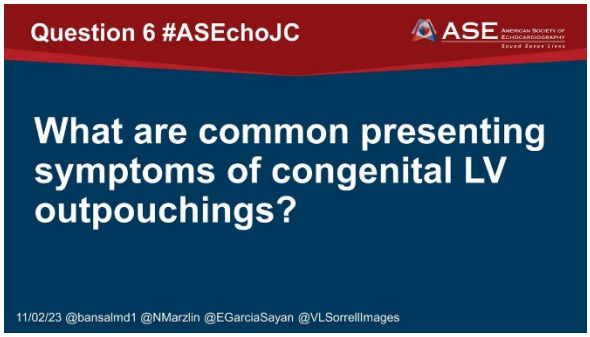






@EGarciaSayan: @VLSorrellImages has compiled several other interesting @CASEfromASE cased of SoV aneurysms, check them out.

Question 6:



A6 Notable responses

@EGarciaSayan: 💥 Moving on to case #2: https://bit.ly/49lbiql

💥 Question 6: What are common presenting symptoms of congenital LV outpouchings?

@NMarzlin: There is a wide range of presenting symptoms for all congenital LV outpouchings. Many are asymptomatic and found incidentally on imaging.

Arrhythmias/Palpitations are the most common symptom

@iamritu: wide range of symptoms of LV congenital outpouchings

@EGarciaSayan: @nmarzlin describes presenting symptoms of congenital LV outpouchings (often asymptomatic)

@NMarzlin: One study found ~ 50% had VT/NSVT on follow up monitoring

Although many are asymptomatic there seems to be a correlation with double chamber LV and sudden cardiac death

@EGarciaSayan: What are common presenting symptoms of congenital LV outpouchings?

@nmarzlin discusses increased incidence of ventricular arrhythmias in double-chambered LV but further research needed for outcomes (given rarity of condition).

@bansalmd1: I would like to thank @AJamilTajik for his mentorship.

I would like to thank my fellow @RamySedhomMD for navigating through @X

@EGarciaSayan: Thank you, @bansalmd1 for participating in tonight's #ASEchoJC on X and for the outstanding images and explanations on your case: http://bit.ly/3FJ2a1m

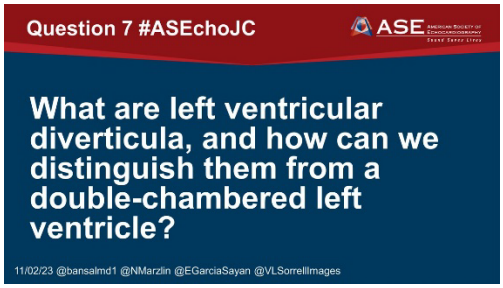
@bansalmd1: Thank you @EGarciaSayan and @VLSorrellImages for getting us involved in this great educational opportunity.

@VLSorrellImages: There are rare; often incidental findings.

May also find ventricular ectopy.

If stasis within the 'out-pouch', risk for thrombus and embolic events is real.

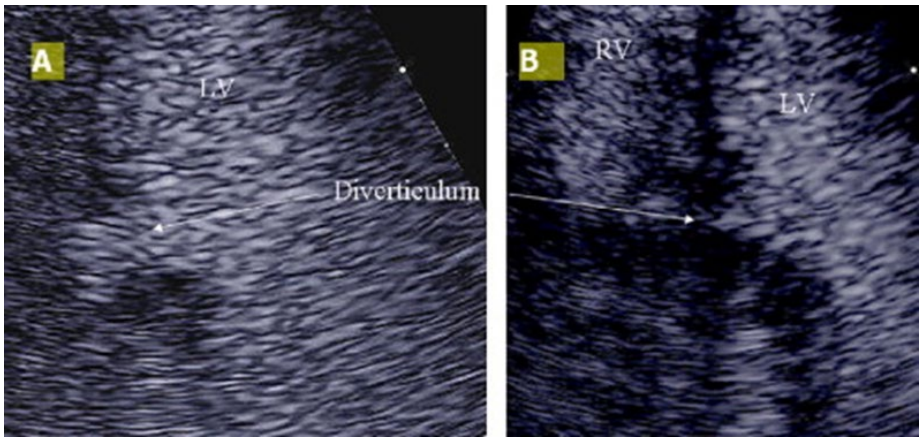
Question 7:



A7 Notable responses

@EGarciaSayan: 💥 Question 7: What are left ventricular diverticula, and how can we distinguish them from a double-chambered left ventricle?

@EGarciaSayan: LV diverticula, like accessory LV chambers, contain all 3 cardiac layers (epicardium, myocardium, and endocardium) and have synchronous myocardial contraction in systole, but they have a narrow neck. See another great @CASEfrom ASE: https://onlinejase.com/article/S0894-7317(06)00894-7/fulltext



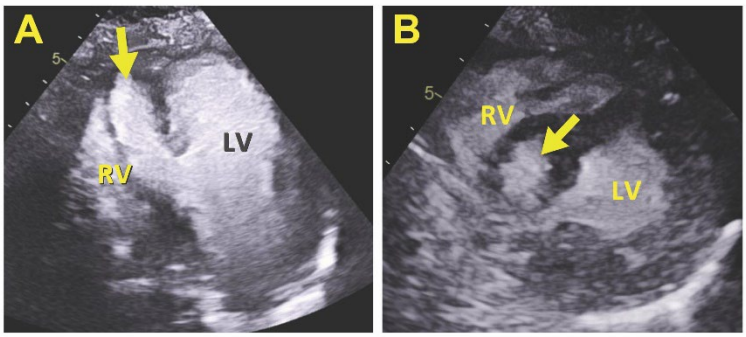
@NMarzlin: Left ventricular are similar to double chamber LV in that they are comprised of epicardium, myocardium and endocardium

Both have synchronous contraction with the LV

Double Chamber LV will have a wider neck and be divided by a muscular septum

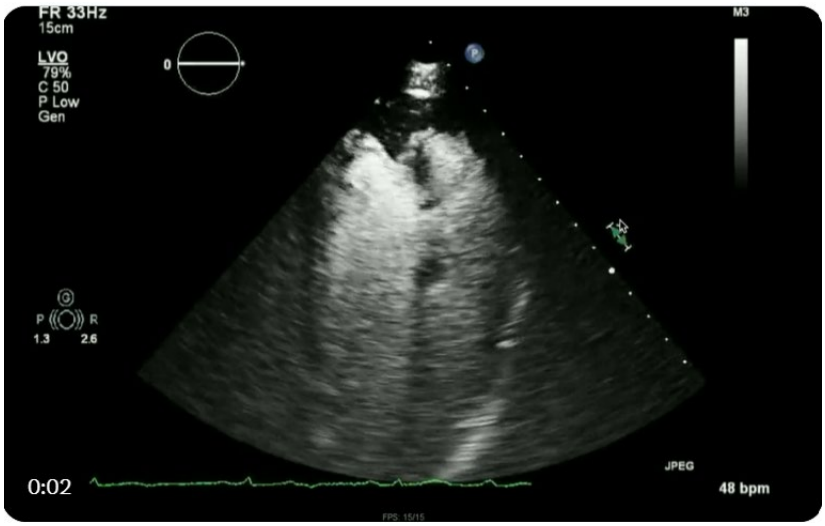
@EGarciaSayan: @nmarzlin describes differences between left ventricular diverticula and double-chambered left ventricle?

@NMarzlin:



@VLSorrellImages: Here is another double-chambered LV who presented with VT:

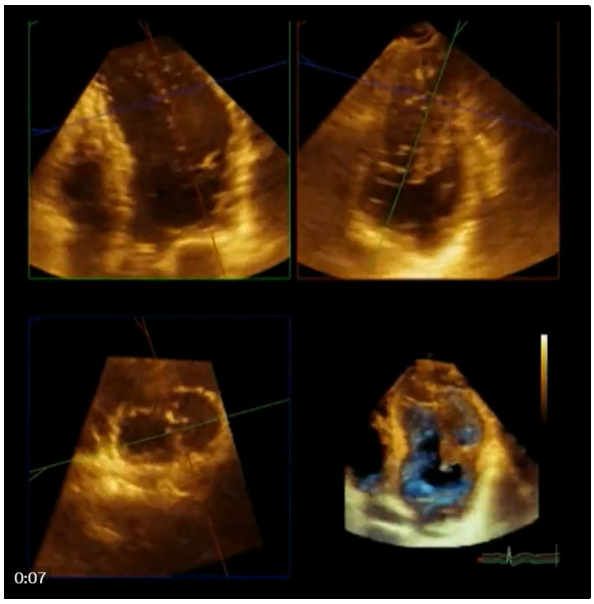
https://doi.org/10.1016/j.case.2018.11.008



@EGarciaSayan: @VLSorrellImages demonstrates another @CASEfromASE case of double-chambered LV presenting with VT.

@VLSorrellImages: 3D echo is very helpful in completely evaluating LV diverticula from DC-LV:

https://doi.org/10.1016/j.case.2018.11.008



@VLSorrellImages: This excellent table 1: https://doi.org/10.1016/j.case.2022.06.004

... has all the hallmarks of an excellent set of Echo Teaching Points from the 1 & Only @AJamilTajik

Table 1 Characteristics of left ventricular outpouchings

	Architecture	Synchronous myocardial contraction	Communication/neck
Double-chambered left ventricle	A division of the left ventricle involving the myocardium and endocardium creating a muscular septum	Yes	Wide
Left ventricular diverticula	Outpouching of the epicardium, myocardium, and endocardium	Yes	Narrow
Left ventricular aneurysm	Outpouching of the epicardium, myocardium, and endocardium	No	Wide
Left ventricular pseudoaneurysm	Outpouching of the epicardium and pericardium only	No	Narrow

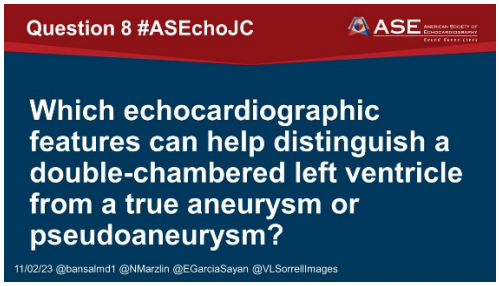
Open table in a new tab

Two-dimensional transthoracic echocardiography is the initial, main modality for evaluation of cardiac structure and function. Two-dimensional echocardiography, especially with the aid of echocardiography ultrasound-enhancing agent, can accurately evaluate left ventricular contractility and exclude left ventricular thrombus. Both aneurysm and pseudoaneurysm were excluded in this patient due to normal, synchronous contractility seen on the two-dimensional transthoracic echocardiogram (Videos 4 and 5). An association with congenital diverticulum and cardiac arrhythmias has been reported. One report found that the 2 most common presenting symptoms were syncope and palpitations.[5] During clinical follow-up, sustained or nonsustained ventricular tachycardia was seen in 53% of the cohort.[5]

@EGarciaSayan: @VLSorrellImages reviews differential diagnosis and #EchoFirst characteristics of LV outpouchings in table by

@AJamilTajik. Look at architecture, synchronous or asynchronous motion, and neck size.

Question 8:



A8 Notable responses

@EGarciaSayan: 💥 Question 8: Which echocardiographic features can help distinguish a double-chambered left ventricle from a true aneurysm or pseudoaneurysm?

@NMarzlin: The most import difference between the Double Chamber LV and a aneurysm or pseudoaneurysm is synchronic contraction with the left ventricle.

This can be seen on echo as well as CT and CMR

@kgzimmerman: Very interesting! Could have easily been tricked into suspecting a large VSD from this image. So very important to investigate multiple imaging planes... and modalities... need all the tools in our toolboxes for sure!

@NMarzlin: DCLV and aneurysms will both have a wide neck/communication where a pseudoaneurysm classically has a narrow communication on imaging

@EGarciaSayan: Which echocardiographic features can help distinguish a double-chambered left ventricle from a true aneurysm or pseudoaneurysm?

@VLSorrellImages: Interested in reading more about congenital LV aneurysms? Check these out from @CASEfromASE:

https://doi.org/10.1016/j.case.2022.01.005

https://doi.org/10.1016/j.case.2021.11.010

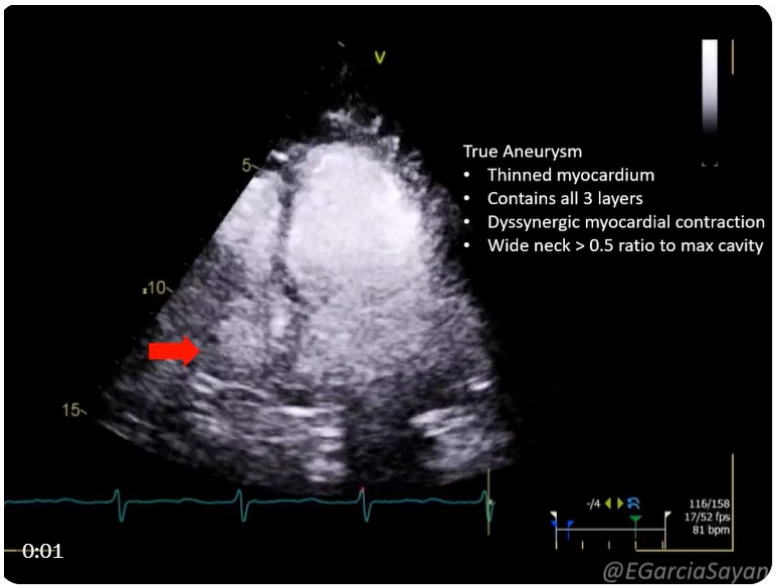
https://doi.org/10.1016/j.case.2023.05.007

https://doi.org/10.1016/j.case.2017.01.008

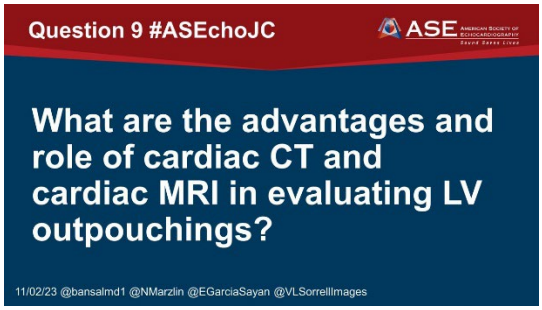
@VLSorrellImages: I am a HUGE fan of LVO with UEA, 3DE and CMR (with LGE) to comprehensively investigate these. Some patients may need only 1, others all 3.

@EGarciaSayan: Excellent point by @NMarzlin.

- Pseudo-aneurysm: small neck and ratio to max cavity <0.5
- True aneurysm: Wide neck, contains all 3 layers
- Unlike double-chambered LV, both have dyssynchronous myocardial contraction


True Aneurysm
• Thinned myocardium
• Contains all 3 layers
• Dyssynergic myocardial contraction
• Wide neck > 0.5 ratio to max cavity
5
10
15
0:01
116/158
17/52 fps
81 bpm
@EGarciaSayan

Question 9:



A9 Notable responses

@EGarciaSayan: 💥 Question 9: What are the advantages and role of cardiac CT and cardiac MRI in evaluating LV outpouchings?

@purviparwani: An easy table to review!

How do you differentiate Anursym, pseudoaneurysm and diverticulum on #whyCMR #Echofirst

Important to look beyond the neck criteria since it can be variable in the case of LV diverticulum. LV contractility and correspondence to the scarred myocardium helps further

MR imaging features	Aneurysm	Pseudoaneurysm	Diverticulum
Anatomic location	Apical or anterior	Posterior or inferior	Apical (congenital)
Neck	Wide	Narrow	Variable
Neck/mouth ratio	0.9-1	0.25-0.5	Variable
Contractility	Dyskinesia	Akinesia	Synchronous
Appearance in viability imaging	Enhancement in the wall of sac corresponding to scarred myocardium	Enhancement of overlying pericardium	No enhancement in the wall of sac or pericardium

MRI, magnetic resonance imaging.

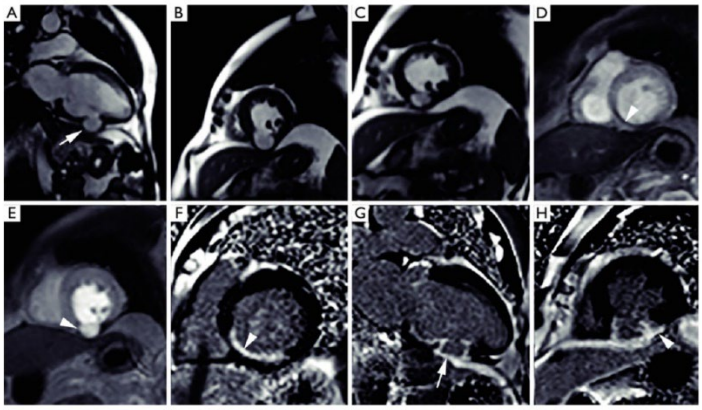
Characteristic MRI features of left ventricular outpouchings

@purviparwani: LV outpouching Table from the publication https://researchgate.net/publication/287212334_Overview_of_left_ventricular_outpouchings_on_cardiac_magnetic_resonance_imaging...

@purviparwani: #whyCMR provides additional tissue characterization. Important to note the scar in case of LV aneurysm and Pseudo aneurysm

Here is a great publication

https://researchgate.net/publication/287212334_Overview_of_left_ventricular_outpouchings_on_cardiac_magnetic_resonance_imaging

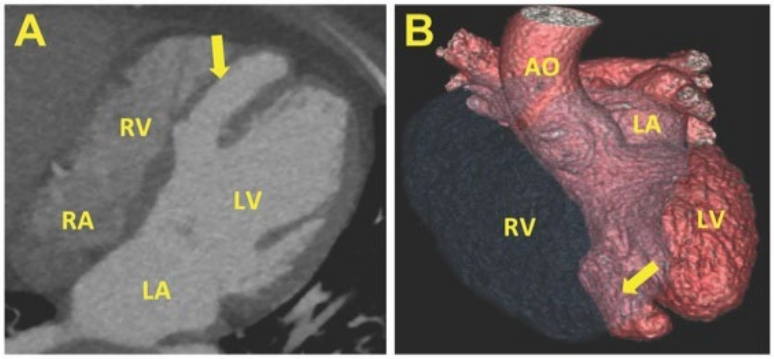


@EGarciaSayan: @purviparwani reviews the role of #WhyCMR in evaluating LV outpouchings, tissue characterization, LGE, etc. Thanks for sharing this article.

@kgzimmerman: curious if anyone has seen this and can share images with TEE?

@NMarzlin: CT can provide detailed structural analysis and 3D reconstruction. We also used it to rule out anomalous coronary arteries in our patient.

@NMarzlin:



@iamritu: can rule out anomalous coronary arteries with #Yessct or look for LGE by #WhyCMR which increases risk of arrhythmias #echofirst

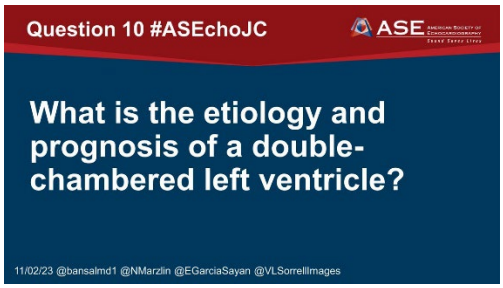
@EGarciaSayan: @nmarzlin demonstrates the role of #YesCCT in the evaluation of double-chambered LV cases. https://bit.ly/49lbiql

@NMarzlin: Both CT and MRI can provide important additional important clinical information

CMR is often used in DCLV to look for LGE to help determine the risk of malignant arrhythmias.

@EGarciaSayan: @NMarzlin reviews the advantages and role of #YesCCT and #WhyCMR in evaluating LV outpouchings, anatomy, morphology and risk/prognosis.

Question 10:



A10 Notable responses

@EGarciaSayan: 💥 Question 10: What is the etiology and prognosis of a double-chambered left ventricle?

@NMarzlin: The truth is the prognosis is not well known. This is partially because of how rare the finding is and the wide range of clinical manifestations from asymptomatic to sudden cardiac death. This is what makes management challenging!

@NMarzlin: DCLV are thought to be a result of abnormal development of the myocardial intratrabecular sinusoids during fetal development.

@NMarzlin: The truth is the prognosis is not well known. This is partially because of how rare the finding is and the wide range of clinical manifestations from asymptomatic to sudden cardiac death. This is what makes management challenging!

@EGarciaSayan: 🙏 Thank you all for participating in tonight's first #ASEchoJC on X! Thanks to authors @bansalmd1 & @nmarzlin & to

@VLSorrellImages for co-moderating. If you missed anything, follow the #ASEchoJC hashtag, and read the upcoming summary on our page.

👉https://asecho.org/twitterjournalclub/

@EGarciaSayan: Another fantastic #ASEechoJC! Thanks to authors @bansalmd1 & @nmarzlin & to @VLSorrellImages for co-moderating. If you missed anything, follow the #ASEchoJC hashtag

@iamritu: Thank you for another fantastic #ASEchoJC @ASE360 ❤️ ❤️ ❤️ ❤️ ❤️ Tweeting from Costa Rica on a mission to improve imaging for CVD in women in Latin America

@EGarciaSayan: Thank you @iamritu for taking the time to participate in #ASEChoJC from this important international mission 🙏

@EGarciaSayan: If you participated in yesterday's fantastic #ASEchoJC on X, don't forget to claim your 1.0 CME/MOC credit in the @ASE360 Learning Hub (FREE for ASE members). Stay tuned for discussion of the new #COVID19 guidelines in December's #ASEchoJC on X!

👉https://aselearninghub.org/topclass/topclass.do?expand-OfferingDetails-Offeringid=13388063