Echocardiographic Techniques for Assessing Aortic Stenosis

Webinar Q&A

The following questions were compiled from participant submissions in the live webinar chat during "Echocardiographic Techniques for Assessing Aortic Stenosis." The original Q&A content was organized and consolidated with the help of AI to remove duplicates and improve clarity, while preserving the intent of the participants' questions. This questionnaire was reviewed and answered by the webinar facilitator so that all participant questions were addressed and a complete written Q&A resource could be shared with attendees.

1. At what Doppler velocity or parameter thresholds do you recommend adding Pedoff? The ASE recommends adding Pedoff when the Doppler velocity reaches 2.6 m/sec.

2. Do these thresholds change when the valve is sclerotic rather than truly stenotic? No, if your velocity or gradients don't meet AS criteria and the valve is calcified it is sclerotic.

3. Do these thresholds change when high gradients are already seen with the imaging probe? No, and you should still do pedoff.

4. For TAVR and SAVR, how do you recommend measuring LVOT (including exact location and inner-to-inner vs other caliper placement)? SAVR is measured like a native valve, 5-10 mm from valve. TAVR is measured at the struts of the TAVR valve. Inner to inner edge for both SAVR and TAVR.

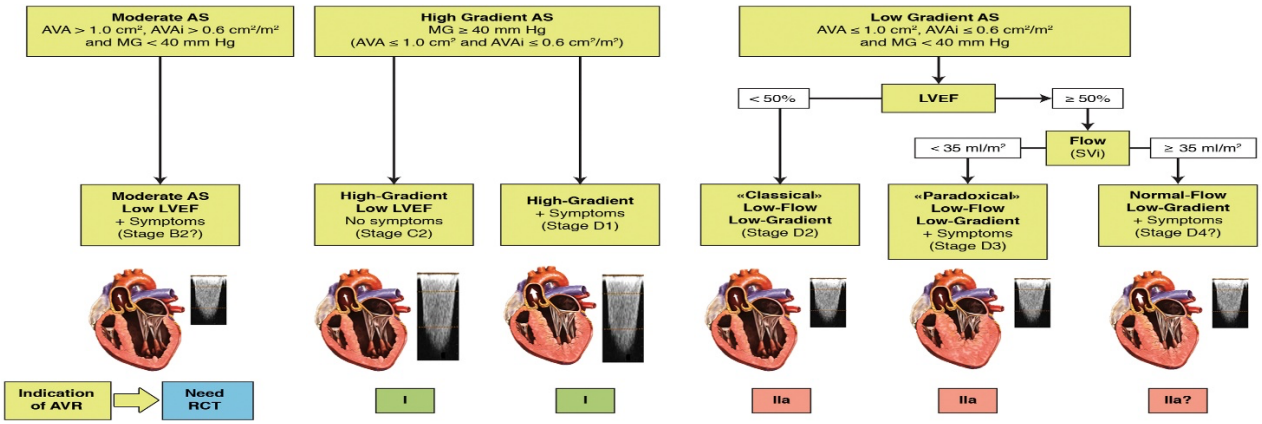
5. In which situations should the manufacturer's inner diameter be used instead of direct LVOT measurement. It is always from inner diameter. The LVOT diameter does not change with SAVR it is sew in the annulus.

6. Does LVOT measurement typically change after valve replacement, and if so, how? No, they do not.

7. In prosthetic valves (TAVR, SAVR, mechanical, and bioprosthetic), when should Pedoff be used to assess for stenosis? Every time there is a velocity over peak velocity >3-4m/s, mean gradient >20-35mmHg, dimensionless velocity index >0.30-0.35, acceleration time <100ms, early peaking, triangular-shaped high velocity jets.

8. What velocity thresholds or Doppler findings do you consider abnormal in these prosthetic valves? Peak velocity >3-4m/s, mean gradient >20-35mmHg, dimensionless velocity index >0.30-0.35, acceleration time <100ms, early peaking, triangular-shaped high velocity jets.

9. What are the definitions and diagnostic criteria for low-flow/low-gradient aortic stenosis? Copy classification for AS



10. How do you distinguish classical low-flow/low-gradient aortic stenosis from paradoxical or normal-flow low-gradient aortic stenosis? Classical has EF < 50%, paradoxical has EF > or equal to 50% and stoke index of <35ml/m^2

11. How do you recognize these low-flow/low-gradient patterns in everyday practice? Watch for low EF, calcification degree Aortic cups.

12. How should aortic stenosis velocities and VTIs be measured in patients with bigeminy or trigeminy? You will need to measure the normal beat and measure multiple like afib.

13. How many beats do you recommend averaging in these arrhythmias to obtain an accurate gradient? Three or more in each view.

14. What are the key Doppler and timing features that differentiate aortic stenosis from mitral regurgitation? MR will be more rounder flow pattern, occurs during Isovolumic contraction time and relaxation time during systole, AV has a pointier pattern at peak velocity, will occur AFTER IVCT & BEFORE IVRT during systole. Look and listen for the click of the valves.

15. How do these distinguishing features change or need to be applied in patients with high heart rate? You would measure same as normal sinus. Measure multiple beats.

16. What is your recommended parasternal technique (probe position, marker orientation, and typical intercostal space)? Probe placed in 2nd or 3rd intercostal space on the right side of sternum; probe is aimed at the ascending aorta.

17. What patient positioning options do you use when the standard right-side-down position is not possible? You are not always able to roll your patient. You can get some right parasternal view with the patient supine.

18. Why does the right parasternal window often yield the highest aortic stenosis velocities? Due to having a more parallel alignment between the ultrasound beam and the direction of the aortic jet.

19. When do you use suprasternal and supraclavicular/right supraclavicular views in assessing aortic stenosis? Every time you have a patient with Aortic stenosis, with a velocity 2.6m/s

20. What additional anatomic or hemodynamic information can these views provide? When using imaging probe you can see the aorta ascending, arch and descending to determine if it is dilated or has clots.

21. What are your recommendations for LVOT measurements in aortic stenosis (location, timing, and tracing technique)? Inner edge to inner edge in mid systole 0.5 -1 cm below the annulus. The normal range is 2.0 – 2.2 cm with ranges from 1.4 cm to 3.0cm depending on patient's body habitus.

22. How do you handle LVOT and AV measurements in heavily calcified valves? Zoom up on the Aorta in PLAX, decreases your gain to see the valve more clearly.

23. How do you measure LVOT and AV velocities in patients with atrial fibrillation, including beat selection and averaging? You need to measure multiple beats in all views for an average. You will also need to change your measurement package to give you an average velocity and not the peak velocity.

24. In what situations is it appropriate to reuse a prior LVOT diameter instead of re-measuring? Never.

25. How do you adjust Doppler gain when using contrast agents such as Definity? That will be a great question for a rep. I personally would just lower my doppler gain.

26. What filtering or reject settings do you recommend to avoid overestimating gradients with contrast? Doppler gain to 0-20% using as minimal gain as possible. I would also check with your rep for the contrast you use.

27. How do you interpret aortic stenosis gradients when contrast is used in low-flow/low-gradient or dobutamine stress studies? The doctor is in the room during these cases and that is their call. You will also see the gradients and velocity as the Dobutamine dose increases. You may need to have the patient exercise with stress balls or by moving their legs.

28. For low-flow/low-gradient aortic stenosis and TAVR assessment, what forms of physical exercise do you recommend during echocardiography? I have patients move their legs or use stress balls (one in each hand).

29. When is Valsalva useful, and how should it be performed in this context? Use Valsalva when you have a thickened septum, minimize your speed run your doppler and have patient Valsalva. You should see an increase in velocity when they do this.

30. When do you prefer pharmacologic stress (e.g., dobutamine) instead of physical maneuvers? I would do physical maneuvers during your echo. Pharmacological stress is a doctor's call.

31. How should clips and measurements be annotated during exercise, Valsalva, or dobutamine stress? You just annotate Valsalva or exercise when performing with the patient. Dobutamine annotate the dosage used each time it is changed by the nurse.

32. During a low-dose dobutamine stress echo, at what mean pressure gradient or other endpoint do you stop the dobutamine infusion? The mean Gradient > 40mmHg during the test with an AVA <1.0 cm2. That is a doctor's call, they must be in the room when stress test is being done.

33. Can you outline step-by-step how to obtain a modified apical 5-chamber view for assessing aortic stenosis? You need to move probe more laterally in your apical view to make your aortic valve more parallel to the CW beam.

34. What specific optimizations (depth, angle, color/Doppler settings) do you recommend for that modified apical 5-chamber view? You can increase your depth or zoom in on valve to concentrate on the valve more. I personally will use color and if I'm not getting a clear gradient will turn color off.

35. In which clinical situations do you recommend using the Pedoff probe in pediatric echocardiography? I would ask a pediatric sonographer or cardiologist. That is not my specialty.

36. In which clinical situations do you recommend using the Pedoff probe in adult echocardiography? With any valve stenosis patient or when you know you have a higher velocity then you are getting with your imaging probe for regurgitation.

37. How does Pedoff technique differ, if at all, between pediatric and adult patients? It does not differ, other than your patient being much smaller and images will be easier to obtain.

38. What practical strategies do you use to obtain reliable aortic stenosis measurements when patients cannot turn to the left or right side? You do the best you can with what you have to work with. I would see if the nurse can help you roll the patient on either side and prop with a pillow or rolled blanket.

39. How do you adapt your approach in ventilated or non-ambulatory patients who must remain upright or semi-upright? You do the best you can do. You may not get a good SSN due to tube.

40. What is your approach when, despite all adjustments, you still cannot obtain optimal velocities? Just document with annotation that you attempted the view. Make note of it in your report to the doctor.

41. Can you show or summarize the grading criteria for aortic stenosis severity?

Table 3 Recommendations for grading of AS severity

	Aortic sclerosis	Mild	Moderate	Severe
Peak velocity (m/s)	≤2.5 m/s	2.6–2.9	3.0–4.0	≥4.0
Mean gradient (mmHg)	–	<20	20–40	≥40
AVA (cm^2)	–	> 1.5	1.0–1.5	<1.0
Indexed AVA (cm^2/m^2)	–	>0.85	0.60–0.85	<0.6
Velocity ratio	–	> 0.50	0.25–0.50	<0.25

42. What is your recommended format for reporting aortic stenosis severity in the echo report? I report it according to my numbers from the ASE guidelines, the doctor has the final call.

43. How does a depressed ejection fraction affect the interpretation of severity and grading? The blood is not being pumped like it should, so the flow will be decreased and not flow as well.

44. How does the presence of a prosthetic valve change your approach to grading and reporting? You will need to document in the report that there is a prosthetic valve and the type. The size is helpful as well. The grading of the valve should have values of a normal range. This ASE article should help:

https://www.asecho.org/wp-content/uploads/2024/01/PIIS0894731723005333.pdf

45. When imaging prosthetic valves, how can you differentiate paravalvular leak from washing jets? Paravalvular leaks will be on the outside of the valve. Can be best visualize in PSAX.

46. How do you distinguish transvalvular from paravalvular regurgitation on color and spectral Doppler? Both color and PW doppler will be helpful. You will need to see where the color jet is coming from in PSAX and when in apical when you see the jet follow it with the PW doppler.

47. How do you monitor for or recognize complications such as calcium shower during TAVR from an echocardiographic perspective? These can be visualized when doing a TEE during the TAVR. Most TAVR in my facility are done with TTE.

48. When you see a small flap-like structure near a TAVR cusp, how do you distinguish possible calcification, vegetation, or a device edge? Try zooming up to the valve to see if you can see it clearer, mention it to the doctor. The best way is to see it is with a TEE.

49. How would you describe and report such an uncertain flap-like finding in the final report? I would report it as probable or possible echo genic structure seen on the prosthetic valve.

50. Can you obtain LVOT (V1) peak velocity using a CW probe, and in which situations is this appropriate? You can if you have a clear double envelope in the CW. The only time I have done this is with TEE when the Doctor is having a hard time getting deep tran-gastric view.

I do not recommend doing it as a short cut for not getting your PW.

51. How do you decide when to use PW versus CW Doppler for LVOT versus transvalvular measurements? You should use PW and CW and Ped off all patients with aortic stenosis with velocities over 2.6m/s.