Non-Holosystolic MR — CW Tracing & Grading

When the regurgitant jet does not span the entire cardiac cycle

WHEN THIS COMES UP

- **Primary MR — Barlow's spectrum** (mitral valve prolapse).
- Jet timing is **mid-to-late systolic**, not holosystolic.
- If **flail develops → becomes holosystolic**. Without flail, the timing stays mid-to-late.

MENTAL MODEL
The orifice is open only during part of systole, so even a sizeable hole leaks for less time.

HOW TO TRACE THE CW DOPPLER

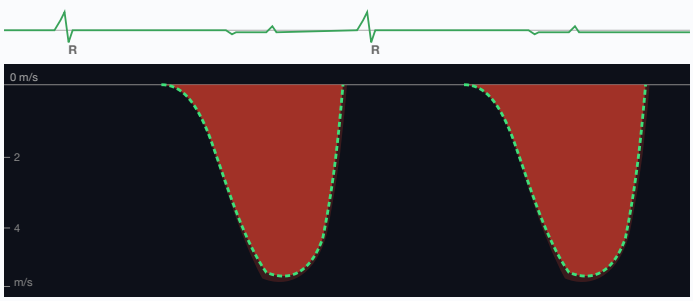
- **Trace what you see** on the CW spectral envelope — nothing more.
- **Do NOT extrapolate** the envelope back into early systole.
- The mid-to-late onset is the diagnosis — respect it on the trace.

COMMON ERROR
Filling in the missing early-systolic portion to make a "full" envelope → falsely high VTI → falsely high regurgitant volume.

TRACE ONLY WHAT YOU SEE — WORKED EXAMPLE

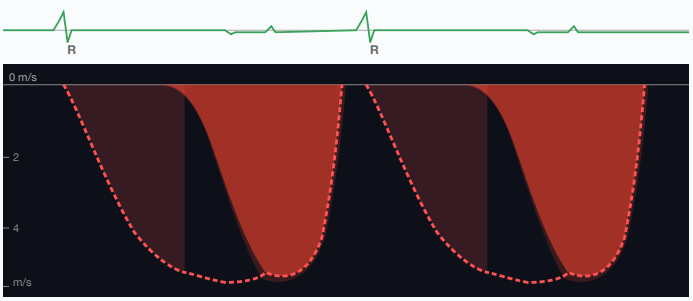
Same patient: PISA radius 0.89 cm, aliasing velocity 45 cm/s, MR peak velocity 4.5 m/s → **ERO = 0.50 cm²**. The only thing that changes between the two panels is how the spectral envelope is traced.

CORRECT — VISIBLE ENVELOPE ONLY ✓



TVI = 85 cm · **R_{vol} = ERO × TVI = 0.50 × 85 = 43 mL** → moderate

WRONG — EXTRAPOLATED THROUGH EARLY SYSTOLE ✗



TVI = 127 cm · **R_{vol} = 0.50 × 127 = 64 mL** → falsely severe

THE ONE RULE
Your trace must follow the spectral signal — only where signal exists. Extending the line backward through the early-systolic gap inflates TVI and turns a moderate leak into a falsely severe one. Same orifice, same patient, two very different reports.

THE ERO ↔ REGURGITANT VOLUME DISCORDANCE

For any given regurgitant orifice, **volume = orifice × time the orifice is open**. A 0.4 cm² ERO that leaks for the entire cardiac cycle delivers more volume than the same 0.4 cm² ERO that leaks for only half the cycle.

	EROA	Time leaking	Regurgitant volume	Concordant?
Holosystolic MR (e.g. flail)	0.40 cm²	Full systole	Severe (~60+ mL)	Yes — both severe
Non-holosystolic MR (MVP, no flail)	0.40 cm²	Half systole	Moderate (~30 mL)	**NO** — the EROA grade (severe) exceeds the R_{vol} grade (moderate); that discordance is itself the clue to non-holosystolic timing.

PATTERN TO RECOGNIZE
In MVP/Barlow's without flail, the EROA *looks* severe but the regurgitant volume tells a more moderate story. That discordance is itself a clue you are dealing with non-holosystolic MR.

HOW TO GRADE SEVERITY

Volume loading on the LV is the actual physiologic problem — the ventricle responds to **how much blood is regurgitated per beat**, not to the size of the hole at any one moment.

- When ERO and regurgitant volume disagree in non-holosystolic MR, **grade based on regurgitant volume**.
- The EROA in this setting overstates severity. Reporting it as the headline number leads to over-treatment.
- Document both numbers in the report — but call the severity off the Rvol.

Non-holosystolic MR → **severity follows the regurgitant volume, not the EROA.**