# Endocarditis and Valve Emergencies

Duke-ISCVID and ESC 2023 diagnosis, antibiotics, surgery and complications; bedside goals for acute valve lesions

**ICU Basics**
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## ENDOCARDITIS: SUSPECT IT

- Fever with a risk: prosthetic valve, prior IE, injecting drugs, CIED, lines, dialysis; any S. aureus bacteremia
- Signs: new murmur, emboli, Janeway lesions (painless), Osler nodes (painful), Roth spots, splinter hemorrhages

| ORGANISM | TYPICAL SETTING |
|---|---|
| **S. aureus (most common)** | Drug use, lines; acute, destructive |
| **Viridans streptococci** | Dental source; subacute |
| **Enterococci** | Older adults; GU or GI source |
| **S. gallolyticus (bovis)** | Colon cancer: colonoscopy |
| **Coagulase-negative staph** | Prosthetic valve, first year |

## DIAGNOSIS

1. Three culture sets from separate sticks before antibiotics (ESC 2023: 30 min apart); in sepsis, antibiotics right after
2. TTE first, then TEE in nearly all: prosthetic valve, device, negative TTE, abscess search
3. Repeat echo in 5–7 days if suspicion persists; cardiac CT for abscess, PET/CT for prosthetic valves

Definite IE (Duke-ISCVID, ESC 2023): 2 major, 1 major + 3 minor, or 5 minor. Major: typical organism in 2 culture sets; vegetation, abscess or fistula on echo, CT or PET. Minor: risk factor, fever >38 °C, emboli, immune signs.

## ANTIBIOTICS

| SITUATION | PLAN |
|---|---|
| **Native or late prosthetic** | Cover staph, strep, enterococci: e.g. vancomycin + ceftriaxone |
| **Prosthetic <12 months, health care** | ESC 2023: vancomycin + gentamicin + rifampin (IIb) |
| **Organism known** | Narrow it; native 2–6 weeks (often 4), prosthetic ≥6 |
| **Staph, prosthetic valve** | Add rifampin; gentamicin: ESC yes, 2026 AHA no |

- Count days from the first negative culture; vancomycin AUC 400–600
- Stable after ≥10 days IV, clean TEE: oral step-down (POET; ESC 2023 IIa)

## SURGERY: ESC 2023 INDICATIONS

*Emergency <24 h; urgent 3–5 days. ACC/AHA 2020 (Class 1) adds left-sided S. aureus or fungal IE and fever or bacteremia >5 days.*

| INDICATION | WHEN (CLASS) |
|---|---|
| **Shock or refractory edema from the valve** | Emergency (I) |
| **Severe regurgitation with HF signs** | Urgent (I) |
| **Abscess, fistula, new AV block** | Urgent (I) |
| **Fungi or resistant organism** | Urgent or same stay (I) |
| **Bacteremia >1 week despite therapy** | Urgent (IIa) |
| **Vegetation ≥10 mm + embolus or other reason** | Urgent (I) |

## COMPLICATIONS AND ANTITHROMBOTICS

| COMPLICATION | CLUES, THEN ACTION |
|---|---|
| **Stroke or TIA** | Neuro checks; CT or MRI; no lytics; thrombectomy possible |
| **Root abscess** | New PR prolongation or AV block: serial ECGs, TEE, surgery |
| **Mycotic aneurysm** | Headache, bleed: CTA or MRA; coil or clip if large, growing, ruptured |
| **Spleen, kidney, limb emboli** | LUQ or flank pain, hematuria, cold limb |
| **AKI (about 18%)** | Vancomycin, aminoglycoside, contrast, glomerulonephritis |

- IE alone: no aspirin or anticoagulant (more bleeding, no fewer emboli)
- Major bleed or ICH: stop; mechanical valve: restart UFH early after team review
- Surgery likely (e.g. S. aureus), no stroke: warfarin or DOAC to UFH (ESC IIa)
- Surgery indicated after TIA or ischemic stroke without coma: no delay; after ICH, about 4 weeks if stable

**EXAM TIP** Injection drug use: tricuspid S. aureus IE with septic lung emboli; about 90% heal without surgery; treat the addiction too (ESC 2023 Class I).

## VALVE EMERGENCIES

*Valve thrombosis: ACC/AHA 2020 Class 1 for lysis (alteplase 25 mg over 6 or 25 h) or surgery.*

| PROBLEM | CLUES | BRIDGE, THEN FIX |
|---|---|---|
| **Papillary muscle rupture** | Inferior MI, day 3–5; edema; v waves | Nitroprusside, IABP or Impella; surgery |
| **Acute AR** | IE or dissection; short diastolic murmur | Nitroprusside, inotrope, HR up; surgery |
| **Critical AS** | Syncope, HF; AF or low preload crashes it | Phenylephrine; cardiovert AF; TAVR or BAV |
| **Mitral stenosis** | AF, fever, pregnancy: pulmonary edema | β-blocker; warfarin if AF; valvotomy |
| **Mechanical valve clot** | Low INR; muffled clicks; HF, emboli | Heparin; slow low-dose alteplase or surgery |
| **LVOT obstruction** | SAM; worse on dobutamine; systolic murmur | Stop inotropes; fluid, esmolol, phenylephrine |

**SAFETY** IABP helps acute MR but worsens acute AR and SAM. No nitrates in hypotensive AS; no dobutamine in SAM.

## BEDSIDE HEMODYNAMIC GOALS

*Typical teaching (Miller, JACC Adv 2024; Sherrid, JAHA 2021).*

| LESION | PRELOAD | HEART RATE | SVR | CONTRACTILITY | AVOID |
|---|---|---|---|---|---|
| **Aortic stenosis** | Keep full | Slow-normal, sinus | Keep up | Maintain | Vasodilators, tachycardia, AF |
| **Mitral stenosis** | Adequate, not overloaded | Slow | Keep up | Maintain | Tachycardia, hypoxia, hypercarbia |
| **Acute aortic regurgitation** | Keep up | Faster | Lower | Support | Bradycardia, β-blockers, IABP |
| **Acute mitral regurgitation** | Lower if congested | Normal to fast | Lower | Support | Rising SVR, bradycardia |
| **LVOT obstruction (SAM)** | Keep full | Slow | Keep up | Lower (β-blocker) | Inotropes, nitrates, diuretics, IABP |

**Sources** (24) are listed with links at icubasics.com/sheets/endocarditis-valves.html. For education and exam preparation only. Not medical advice; follow current guidelines and your institution's protocols. ICU Basics is an independent study aid not affiliated with any certifying body.