🩺 **Clinical Case 1: Prophylaxis Decision**

"A 65-year-old gentleman underwent AVR with a St. Jude mechanical prosthesis for bicuspid aortic regurgitation 5 years ago."

- This patient had **aortic valve replacement (AVR)** 5 years ago.
- The type of valve is a **St. Jude mechanical valve**—this is a **prosthetic** (mechanical) valve.
- The original disease was **bicuspid aortic valve** with **aortic regurgitation**—meaning the valve didn't close properly and blood leaked back into the heart.

"The patient is scheduled for a screening colonoscopy +/- polypectomy."

- He's going to have a **colonoscopy**—a routine scope to check his colon.
- There may or may not be **polypectomy** (removal of small growths/polyps).

"He is asymptomatic."

- He has **no symptoms** at all.

"He has a soft, short early systolic ejection murmur on examination with a crisp closing click and no diastolic murmurs."

- The murmur heard is:
- **Soft and short**
- Happens in **early systole**
- A **crisp click** is heard (typical of mechanical valves)
- No diastolic murmur → no evidence of new valve disease or infection

"He has no allergies."

- This will matter if we were to choose an antibiotic—but we won't need one 😉

❓ **Question: What is the appropriate regimen for infective endocarditis prophylaxis prior to his colonoscopy?**

Options:

1. Amoxicillin 2g orally
2. Cephalexin 2g orally
3. Clindamycin 600mg orally
4. Ceftriaxone 1g IV
5. ❗ **No pharmacological prophylaxis necessary** ✅

✅ **Correct Answer: #5 — No prophylaxis necessary**

Why?

🔷 Even though he has a **mechanical valve** (which makes him high risk), 🔷 **GI procedures** like **colonoscopy**, with or without polypectomy, **do NOT require prophylactic antibiotics** unless there's:

- **Active GI infection** (which he doesn't have)
- **Infected tissue being cut** (not the case here)

According to **AHA and ESC guidelines**, only certain procedures require IE prophylaxis:

🧠 **Clinical Pearl:**

Only high-risk patients undergoing high-risk procedures need IE prophylaxis. Dental procedures with gingival manipulation = YES GI/GU procedures without infection = **NO**

🩺 **Clinical Case 2: Suspicion of Endocarditis**

"A previously healthy 45-year-old gentleman presents with 3–4 days of malaise and fever to 38.8°C."

- The patient has **nonspecific symptoms**: malaise and fever for a few days.
- His temperature is **38.8°C**, so that's definitely a **fever** (≥38°C is considered fever in clinical medicine).

"His primary provider detects a diastolic murmur."

- A **diastolic murmur** is new — and that's a red flag 🚩 for something like **aortic regurgitation**, especially if not present before.

"TTE shows a tricuspid aortic valve with moderate-severe aortic regurgitation."

- Echo confirms that the aortic valve is:
- **Tricuspid** (normal morphology)
- But there is now **moderate-to-severe aortic regurgitation**—a significant valve lesion, likely new.

"A TTE 3 years prior showed only trivial AR."

- Old echo showed **trivial (barely present)** aortic regurgitation.
- So now he has **progression** to **moderate-severe**, which is suspicious and **new**.

"TEE confirms the AR but shows no vegetation or abscess."

- **Transesophageal echo (TEE)** was done to look deeper.
- It **confirmed the regurgitation**, but:
- **No vegetations** (infected masses)
- **No abscess** (no pus pocket or destruction)

"Blood cultures remain negative."

- So far, blood cultures didn't grow any organisms—this happens sometimes if antibiotics were started early, or in culture-negative organisms like Coxiella.

"Exam demonstrates no embolic or immunological sequelae."

- No clinical signs of:
- Embolic events (Janeway lesions, infarcts, stroke)
- Immunologic findings (Osler's nodes, Roth spots)

❓ **Question: What is the diagnosis?**

1. **Definitive infective endocarditis**
2. **Possible infective endocarditis** ✅
3. **Unlikely infective endocarditis**
4. **Rejected infective endocarditis**

✅ **Correct Answer: #2 — Possible infective endocarditis**

Let's break it down using the **Modified Duke Criteria**:

🧠 **Modified Duke Criteria — Clinical Diagnosis**

Major Criteria:

- Positive blood cultures → ❌ NEGATIVE
- Endocardial involvement → ❌ No vegetations, but **new regurgitation** = ✅ MAJOR

Minor Criteria:

- Fever → ✅ (38.8°C)
- New murmur or valve disease → already counted as major
- No immunologic or vascular phenomena → ❌
- No known predisposing heart disease → ❌
- Negative cultures → ❌

So total = 🟥 **1 major** 🟨 **1 minor**

→ That's exactly the definition of **Possible IE**

🩺 **Clinical Case 3: Stroke + Mechanical Valve + Endocarditis**

"A 50-year-old lady, 3 years status post mechanical mitral valve replacement (MVR), presents with fever and malaise."

- She had a **mechanical mitral valve** placed 3 years ago (that's important).
- Now she presents with **fever** and **malaise**—classical nonspecific signs of infection or inflammation.

"She is hospitalized after blood cultures x2 grow viridans group streptococci."

- Two blood cultures are **positive** for **viridans streptococci** 🦠 — this is a common bug in **subacute infective endocarditis**, often from dental sources.

"TEE shows a small vegetation on the mechanical mitral valve."

- There is a **confirmed vegetation** on the prosthetic valve → now this is **definite infective endocarditis** by Duke criteria:
- ✓ Positive blood cultures
- ✓ Echocardiographic evidence of vegetation

"She receives appropriate antibiotics."

- Treatment is started—good.

"On the 3rd hospital day, she develops transient left-sided visual loss that resolves after 7 minutes."

- This is called **amaurosis fugax** — sudden, **transient monocular blindness**.
- It indicates **embolic phenomenon**—most likely a **septic embolus** from the vegetation traveled to her occipital lobe.

"MRI shows a small focus of occipital ischemia."

- Imaging confirms a **stroke** (small area of brain ischemia).
- So now this is a **neurological complication of IE**.

"She is on warfarin. INR is 2.9."

- Warfarin is used because she has a **mechanical valve**, and her INR is therapeutic.

❓ **Question: How do you manage her anticoagulation now?**

1. **Continue warfarin uninterrupted**
2. **Stop warfarin, start aspirin 81 mg daily**
3. **Stop warfarin, bridge with IV unfractionated heparin**
4. **Stop warfarin, start rivaroxaban**
5. ✅ **Stop warfarin**

✅ **Correct Answer: #5 — Stop warfarin**

🧠 **Clinical Reasoning:**

📌 This patient has:

- **Prosthetic valve IE**
- A **confirmed embolic stroke**
- **On warfarin with INR 2.9**

So what do guidelines say?

🔴 In **infective endocarditis with CNS embolic event**, continuing anticoagulation may increase the risk of:

- **Hemorrhagic transformation** of the stroke
- **Intracranial bleeding** from fragile infected vessels or mycotic aneurysms

📜 **Guideline Recommendation:**

"**Discontinue all forms of anticoagulation in patients with mechanical valve infective endocarditis and a CNS embolic event for at least 2 weeks.**"

- That's why we **STOP warfarin** entirely here.

- We **don't bridge** with heparin or switch to DOACs (e.g., rivaroxaban).
- We **don't use aspirin** either — not beneficial and might worsen bleeding.

⚠️ **Clinical Pearl:**

In prosthetic valve endocarditis complicated by a stroke:

- 🔻 Temporarily **stop anticoagulation**
- 🕐 Wait **at least 2 weeks** before restarting — depending on recovery and bleeding risk

🩺 **Clinical Case 4: Pacemaker + Infection + Vegetation**

"A 75-year-old lady underwent pacemaker implantation for complete heart block 2 years ago."

- She had a **permanent pacemaker (PPM)** placed 2 years ago for **complete AV block** — so she's pacing dependent.

"She presents with fever and malaise."

- Nonspecific symptoms, but this is always suspicious in someone with cardiac hardware.

"Blood cultures x2 grow *Staphylococcus aureus*."

- 🔴 This is **very serious**: *S. aureus* bacteremia + cardiac device → assume **infective endocarditis** or device infection until proven otherwise.

"TEE reveals a small vegetation on the aortic valve with minimal aortic regurgitation and normal device leads."

- She has a **small vegetation** on the **native aortic valve**.
- **Minimal regurgitation** only.
- Most importantly: **The pacemaker leads look normal** (no visible vegetations), and...

"Exam of the device pocket is normal."

- No signs of **pocket infection** (e.g., redness, swelling, drainage).

"The patient receives antibiotics, her symptoms resolve, and blood cultures clear."

- So she responds to treatment.
- But the key question: **what do we do with the pacemaker?** Leave it? Remove it?

❓ **Question: How should you manage her pacemaker?**

1. **Complete antibiotics and retain the device as long as blood cultures remain negative**
2. ✅ **Completely remove the device generator and leads**
3. **Exchange the device generator and retain the leads**
4. **Observe for development of device lead vegetations with serial TEE's**

✅ **Correct Answer: #2 — Remove generator and leads completely**

🧠 **Why?**

Even though:

- The **leads look clean**
- The **pocket is clean**
- The **infection is on the valve**, not the device...

⚠️ Because she has **S. aureus bacteremia**, the guidelines are **very strict**:

If there's any cardiac device present + S. aureus bacteremia, REMOVE the device — even if you don't see lead involvement.

This is because:

- **S. aureus adheres easily** to hardware
- There is a **high relapse risk** if hardware remains
- TEE can **miss small vegetations** on leads

👩‍⚕️ **Clinical Rule:**

"**If there's a cardiovascular implantable electronic device (CIED) + *Staph aureus* bacteremia, always remove the device—even if leads and pocket appear uninvolved.**"

———————————————————————————————————

Infective Endocarditis – Prophylaxis

🟨 **1. Which patients need prophylaxis?**

Only **high-risk patients** — memorize this list like it's a Bible verse 🙏:

🔴 **Patients at highest risk of complications from IE:**

- **Prosthetic cardiac valves** (mechanical or bioprosthetic)
- **Transcatheter valves** (like TAVI)
- **Prosthetic material used for valve repair** (rings, clips)
- **History of infective endocarditis**
- **Heart transplant** patients who developed **valvulopathy**
- **Certain congenital heart diseases**:
- Unrepaired **cyanotic lesions**
- **Palliative shunts/conduits (right to left)**
- Repaired lesions **<6 months ago** if prosthetic material was used (a device for a patient after ASD)
- Repaired lesions **with residual defects**

🎯 This is your **"YES prophylaxis" group**.

❌ **Who does NOT require prophylaxis?**

These are **common traps** in exams — people **assume** they're high-risk, but they're not!

⚠️ **NO prophylaxis needed for:**

- **Mitral valve prolapse** (even with regurgitation)
- **Acquired valve disease** (rheumatic, etc.)
- **Hypertrophic cardiomyopathy**
- **Low-risk congenital defects**, like:
- Bicuspid aortic valve
- Patent ductus arteriosus (PDA)
- VSD
- Primum ASD
- Aortic coarctation

🟧 **2. Which procedures require prophylaxis?**

✅ **YES Prophylaxis:**

- **Dental procedures** that:
- Involve **gingival manipulation**
- Involve **perforation of oral mucosa**
- Include **root canals, cleaning, extraction**
- **Incision/biopsy** in the:
- **Respiratory tract**
- Areas with **active skin/soft tissue infection**

❌ **Procedures that do NOT require prophylaxis:**

Don't fall into the "but it's invasive" trap!

- Routine **dental X-rays** or **orthodontics**
- Shedding baby teeth
- **GI/GU procedures** unless infection is present (e.g., colonoscopy, cystoscopy)
- **Bronchoscopy without biopsy**

🟠 Even if your patient has a mechanical valve, **colonoscopy does NOT require prophylaxis**, unless there's **infection**.

🟦 **3. Which drugs are used for prophylaxis?**

🎯 **Main target = Viridans group streptococci (mouth flora)**

🧪 **Regimen:**

- **Give a single dose 30–60 minutes before the procedure**
- Common options:
- **Amoxicillin 2g PO**
- If allergic to penicillin: **Clindamycin 600 mg PO**

🔷 **"When should you suspect infective endocarditis?"**

Risk Factors

- **Valvular heart disease**
- **Prosthetic valves**
- **IV drug use**
- **Congenital heart disease**
- **Immunocompromised state**

PLUS :

✅ **1. New left-sided valvular regurgitation**

- Any **new murmur** in the aortic or mitral valve area—especially **regurgitation** (not stenosis)—should make

Why left-sided?

- **Aortic** and **mitral valves** are **more prone to damage** from systemic bacteremia.
- Also, **embolic complications** from left-sided IE go to the **brain, kidneys, spleen**, etc.

🧠 Clinical clue: **New AR or MR = suspect IE** until proven otherwise.

ORRRR

✅ **2. Fever ≥ 48 hours without a clear cause**

Evaluation of Suspected IE:

🔬 **Blood Cultures**

🧪 **"2–3 sets >1 hour apart if acute"**

- If the patient looks sick (e.g., high fever, unstable), draw **2–3 sets of cultures** quickly — at least **1 hour apart**, to improve yield and identify **bacteremia pattern**.

🧪 **"3 sets >6 hours apart if subacute"**

- If it's a **slower course** (e.g., weight loss, fatigue), spread out cultures over **6+ hours** to catch intermittent bacteremia (typical of viridans strep).

💡 **Always get cultures BEFORE giving antibiotics!**

🖥️ **TTE – Transthoracic Echo**

- First-line imaging.
- **Non-invasive** and quick.
- Can detect large vegetations, new regurgitation, or abscesses.
- But it's **less sensitive**, especially in:
- Obese patients
- Mechanical valves
- Small vegetations

🚻 **TEE – Transesophageal Echo**

You go to TEE when:

✅ **"TTE is non-diagnostic"**

- If you don't see a vegetation or regurgitation but **still suspect IE**, you need to go deeper.

✅ **"Complications suspected"**

- Like abscess, prosthetic valve dehiscence, or perforation — TEE is better at spotting these.

✅ **"Intra-cardiac lead"**

- Pacemakers, ICDs — TEE is the best to evaluate for **lead-associated vegetations**.

✅ **"*S. aureus* bacteremia"**

- Even without symptoms, TEE is **mandatory** — because *S. aureus* is aggressive and causes **occult vegetations**.

✅ **"Prosthetic valve + persistent fever"**

- Can easily miss vegetations on prosthetic valves with TTE → do TEE for sure.

🖼️ **Cardiac CT**

Used if:

- You suspect **perivalvular extension** (like an abscess or fistula)
- You're planning **surgery** and want to assess anatomy

💣 Clinical Pearl:

If your patient has a **prosthetic valve, cardiac device, or S. aureus bacteremia**, always go straight to **TEE**— even if the TTE looks okay.

Diagnosis of Infective Endocarditis – Modified Duke Criteria

🔬 **Definite IE by Pathological Criteria**

You **100% confirm** IE if any of the following is found in surgery or autopsy:

- **Microorganisms** seen or cultured from:
- Excised **valve**, **vegetation**, or **intracardiac abscess**
- **Histologic evidence** of active **endocarditis** (inflammation, tissue destruction, bacterial colonies)

🧠 This is considered **gold standard**, but it requires tissue — so it's only available after **valve surgery** or death.

🩺 **Definite IE by Clinical Criteria**

You meet this diagnosis if you fulfill **specific combinations** from the Duke Criteria:

- ✅ **2 Major**, OR
- ✅ **1 Major + 3 Minor**, OR
- ✅ **5 Minor**

⚠️ **Possible IE by Clinical Criteria**

Used when evidence is **suggestive but not strong enough** to say "definite." You meet this if:

- ✅ **1 Major + 1 Minor**, OR
- ✅ **3 Minor**

This category triggers **close monitoring, more imaging, or empiric antibiotics**.

❌ **Rejected IE**

You rule out the diagnosis if:

- Another clear diagnosis explains the symptoms
- Symptoms resolve quickly with antibiotics **in <4 days**
- There's no pathological evidence after valve surgery or autopsy

📌 *For example*: A patient improves in 2 days on ceftriaxone and was misdiagnosed → not IE.

Modified Duke Criteria – MAJOR & MINOR Criteria

🔴 **MAJOR CRITERIA**

🧠 **1. Positive Blood Cultures**

To count as major, you need:

- **Typical organisms**:
- *Viridans streptococci*
- *Streptococcus bovis*
- *HACEK group*
- *Staphylococcus aureus*
- *Enterococcus* (from two separate cultures)

OR

- **Persistently positive** cultures:
- At least **2 positives**, **12 hours apart**, or
- **3/4 positive** cultures drawn at different times

🧠 **2. Evidence of Endocardial Involvement (via echo)**

This means:

- **Vegetation**: mass of bacteria on valve
- **Abscess**: pocket of pus in heart tissue
- **Dehiscence of prosthetic valve**: it's coming loose
- Seen on **TTE or TEE**.

This is one of the strongest signs.

🧠 **3. New Valvular Regurgitation**

🗣️ If your patient has a **new murmur** and echo confirms **new AR or MR**, that's a **major criterion** — even if you **don't see a vegetation**.
This is 🔥 high-yield and easy to test.

🧠 **4. Single Positive Blood Culture for *Coxiella burnetii***

This bug causes **Q fever endocarditis** — often culture-negative on routine media, but diagnosed via **serology**.
✅ Even just **1 positive serologic test** for this → counts as **major**.

🟡 **MINOR CRITERIA**

1. Clinical Predisposition

- IV drug use
- Preexisting **valve disease**, prosthetic valves
- Congenital heart disease

2. Fever ≥38°C

- Simple but key — **fever alone counts**!

3. Vascular Phenomena

- **Janeway lesions** (painless on palms/soles)
- **Emboli** to brain, kidneys, spleen
- **Mycotic aneurysms**
- **Splinter hemorrhages**
- **Conjunctival hemorrhages**

4. Immunological Phenomena

- **Osler's nodes** (painful nodules on fingers/toes)
- **Roth spots** (retinal hemorrhages with white center)
- **Glomerulonephritis**
- Elevated **rheumatoid factor**

These result from **immune complex deposition**.

5. Positive blood culture NOT meeting major criteria

- Like only 1 out of 3 positive
- Or wrong bug (e.g., skin flora, contaminant)

🎓 **Summary Table**

🔴 **Major Criteria**	🟡 **Minor Criteria**
Typical positive cultures (x2)	Fever ≥38°C
Echo showing vegetation, abscess	Risk factors (IVDU, prosthetic valve)
New valvular regurgitation	Vascular phenomena (Janeway, emboli)
Single culture for *Coxiella*	Immunologic phenomena (Osler, Roth)
	Non-major blood culture

Infective Endocarditis – Complications

1. Local

2. Systemic
3. Immunological

🔴 1. Local Complications

This means **damage to the heart itself**, especially valves and nearby structures.

- **Valvular destruction** → leads to **acute regurgitation → heart failure**
- **Perivalvular abscess** → infection spreads around the valve
- **Valve dehiscence** → prosthetic valve comes loose
- **Chordae rupture** → especially in mitral valve

💣 This is how IE leads to **rapid hemodynamic collapse**.

🟠 2. Systemic Complications

This is when septic material **breaks off** and travels through the bloodstream.

- **Septic emboli** to:
- Brain → stroke, hemorrhage
- Kidney → infarcts, hematuria
- Spleen → infarcts
- Lungs → in right-sided IE (IVDU)
- **Distant metastatic infections**:
- Osteomyelitis
- Abscesses (psoas, epidural, soft tissue)

🟡 3. Immunological Complications

These result from **immune complex deposition**:

- **Osler's nodes**
- Painful, tender nodules on fingers/toes
- **Roth spots**
- Retinal hemorrhages with pale centers
- **Glomerulonephritis**
- Hematuria, proteinuria, RBC casts
- **Positive rheumatoid factor**

This is more common in **subacute cases**, especially **viridans strep**.

Valvular destruction → Heart failure

This is the **#1 cause of death** in patients with IE: 💣 The **infected valve breaks down**, causing **acute, severe regurgitation** → the heart **fails fast**.

* complications 8

Diagnosis – Rejected Infective Endocarditis

🔸 1. Alternative diagnosis

If another clear explanation for the patient's symptoms appears — and fits better than IE — then:

❌ It's not IE

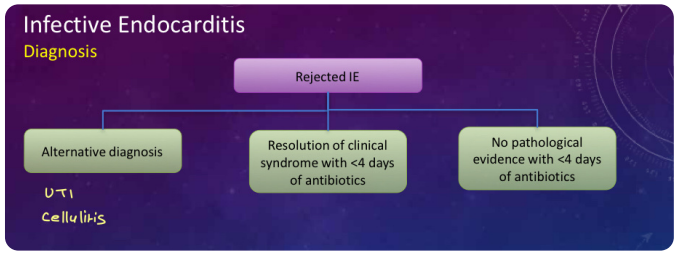
Examples:

- Cellulitis → fever + murmur? Maybe IE, but if blood cultures are clean and rash improves on antibiotics → that's it.
- Pneumonia with clear infiltrate and response to abx
- Drug fever, vasculitis, etc.

🔸 2. No pathological evidence with <4 days of antibiotics

If you do **valve surgery** or autopsy **before 4 days of antibiotics**, and there's:

- ❌ No visible vegetations



- ❌ No bacterial growth
- ❌ No histologic inflammation

→ IE = rejected
This is rare but critical in post-op patients.

🔶 **3. Resolution of symptoms in <4 days of antibiotics**

This is **super important**:
If the fever, murmur, and symptoms **fully resolve within 4 days of empiric antibiotics**, and cultures remain **negative**, IE is unlikely.
IE usually takes **longer to improve**, especially with vegetations.

📝 **Summary Table:**

Reason to Reject IE	Example
Another diagnosis explains it	Cellulitis, pneumonia
No signs on valve pathology	Surgery/autopsy after <4 days abx
Full symptom resolution <4 days	Fever gone, cultures negative

Infective Endocarditis – Antimicrobial Therapy

🩹 **1. Which organisms?**

These are the **3 most common bugs** in IE, and you treat based on which one is growing in blood cultures:
✅ **Viridans group streptococci**
- Source: **oral flora**, common in **subacute IE**
- Common after dental work

✅ **Staphylococcus species**
- Especially **S. aureus** (most virulent)
- Found in:
- IV drug users (right-sided)
- Prosthetic valve infections
- Skin source

✅ **Enterococcus species**
- From **GI or GU procedures**
- More resistant — harder to treat

🧪 **2. Therapy should be…**

🔷 **Prolonged**
- Usually **4–6 weeks IV antibiotics**
- Because vegetations are **avascular** → hard for drugs to penetrate

🔷 **Parenteral**
- Always **IV**, not oral
- Oral drugs don't achieve high enough levels in vegetations

🔷 **Bactericidal**
- Must **kill** the bacteria (not just stop growth)
- So you **never use bacteriostatic agents** like macrolides or tetracyclines

🧠 **Summary Table:**

Principle	Explanation
Prolonged	4–6 weeks due to protected bacterial nests
Parenteral	IV only — no PO
Bactericidal	Must kill bugs, not just inhibit

Infective Endocarditis – Anticoagulation

🔴 **What's the concern?**

In patients with **infective endocarditis + mechanical valves**, they're already on **anticoagulation** (like warfarin) to prevent valve thrombosis.
But now they have **septic emboli** flying to the brain → which can cause:
- **Ischemic strokes**
- **Hemorrhagic strokes**
- **Mycotic aneurysm rupture**

And if they're on **warfarin** → the risk of bleeding increases even more.

⚠️ **The danger:**
- An embolus blocks a brain vessel → ischemic stroke
- But if you're anticoagulated and there's **bacterial invasion of the vessel**, the wall is fragile
- So you might get a **hemorrhagic transformation** → bleeding into the infarct → **Disastrous if you're still on warfarin**

💣 **Clinical Scenario:**

IE + stroke + mechanical valve → ❌ Continuing anticoagulation could kill the patient → ✓ Guidelines recommend **holding anticoagulation** temporarily

📘 **Key Recommendations (guidelines):**

Situation	Action
IE + CNS embolic event (stroke/bleed)	🛑 **Stop all anticoagulation**
Hold for at least	✅ **≥ 2 weeks**
Start aspirin or DOAC?	❌ **Never**
Restart anticoag?	Only after bleeding risk controlled

🧠 **Bottom line:**

If a patient with a **mechanical valve and IE** develops a **stroke** (especially hemorrhagic): → **You must stop warfarin immediately** → No bridging. No aspirin. → Wait **at least 2 weeks** before considering restart.

Infective Endocarditis – Surgical Management

- Which patients need surgical intervention?

Slide: Surgical Indications

- Extensive stroke or hemorrhage → Delay surgery 4 weeks
- Relapsing prosthetic valve endocarditis: • Exclude alternative portal • Timing of operation unclear
- Device involved → Remove
- Device present but leads and pocket not clearly infected: • *S. aureus* or fungal infection → remove • Valve surgery → remove

Slide: Management Summary

1. Medical • Prolonged, parenteral targeted antibiotics • Withhold anticoagulation with CNS events
2. Surgical • Operate early if complications • Remove any intra-cardiac devices

Slide: Right-sided Endocarditis

1. Medical • Uncomplicated MSSA → β-lactam x2–6 weeks • MRSA → Vancomycin x6 weeks
2. Surgical • RV failure + severe TR + ↓ response to Rx • Prolonged infection + resistant or fungal organism • ≥20 mm vegetation + recurrent PE despite Rx
→ *RV IE = S. aureus + IV drug use*

Slide: Device Infections – Epidemiology

• ~1–5% rate of device infections • Risk higher with ICDs vs. permanent pacemakers • Mortality ~5% at 30 days, ~15% at 1 year

Slide: Device Infections – Risk Factors

1. Immunosuppression
2. Co-morbid conditions
3. Anticoagulant use
4. Operator inexperience
5. Amount of hardware
6. Lack of pre-procedure prophylaxis
7. Device manipulation

Slide: Device Infections – Management

1. Suspect device infection • Fever, WBCs ↑, ESR ↑ • Erythema, swelling and erosion at generator site
2. Hx, physical exam, device interrogation
3. Blood cultures followed by antibiotics → Complete removal of the device

Slide: Device Infections – Management (Cont'd)

1. Superficial infection at incision site 2. No pocket involvement 3. Bacteremia alone with ALL of the following: • Clinical stability, established alternative source • TEE negative for lead involvement • No involvement of pocket or recent manipulation • No valvular involvement or endocarditis • Resolution of bacteremia with antibiotics
→ *When might the device remain?*

Slide: Device Infections – Reimplantation

1. Does the patient need a new device?
2. Select new site, preferably contralateral
3. Wait for negative blood cultures: • 72 hours after device removal • 14 days if valves involved

→ *When can the device be re-implanted?*

Slide: Device Infections – Summary

1. Epidemiology • Device manipulation is a strong risk factor • Staphylococcus sp. are most common bugs
2. Management • Established infection requires device removal • Re-assess candidacy for new device before re-implantation