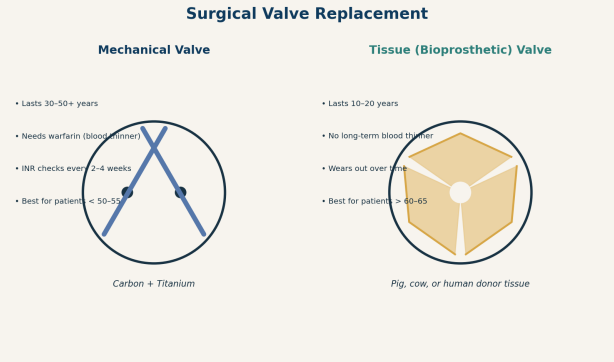
Understanding Surgical Valve Replacement

SAVR · Repair vs Replace · Mechanical vs Tissue

The Heart Team's Gold Standard — Still Chosen for Good Reasons.



Online: https://go.riasalimd.com/valve-surgery-guide

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Last Updated: August 2026

Names & Terms You Will Hear

Term	Meaning
SAVR	Surgical Aortic Valve Replacement — the open-heart operation for the aortic valve
SMVR	Surgical Mitral Valve Replacement — open-heart replacement of the mitral valve
Mitral valve repair	Preferred over replacement when feasible; preserves your own tissue
Open-heart surgery	Surgery performed with a heart-lung (cardiopulmonary bypass) machine
Sternotomy	The incision through the breastbone to access the heart
Cardiopulmonary bypass (CPB)	The heart-lung machine that does the heart's work during surgery
Mechanical valve	A durable artificial valve (carbon + titanium) that needs lifelong warfarin
Bioprosthetic / tissue valve	A valve made from animal or donor tissue; wears out in 10–20 years
Structural valve deterioration (SVD)	Gradual wear and tear of a tissue valve over years
Valve-in-valve (ViV)	Placing a new transcatheter valve inside a failed tissue valve — avoids redo surgery
STS score	Society of Thoracic Surgeons risk score — estimates your surgical risk before the operation
Heart Team	The group of cardiologists, surgeons, and specialists who decide together which treatment fits you

Quick-reference mechanical vs tissue valve decision guide

Decision Factor	Choose Mechanical	Choose Tissue
Age (general guideline)	< 50–55 years	> 60–65 years
Anticoagulation tolerance	Acceptable / already on warfarin	Prefer to avoid warfarin
Bleeding risk	Low	High (falls, GI bleed history)
Durability priority	Yes — want 1 valve for life	Less concern — ViV plan acceptable
Lifestyle with INR checks	Comfortable with frequent monitoring	Prefer less monitoring burden
50–60 years — gray zone	Shared decision with cardiologist + surgeon	Shared decision

The Central Decision: If you need a new valve, you and your Heart Team choose between a **mechanical valve** (lasts decades, needs lifelong warfarin) and a **tissue valve** (no long-term blood thinner, wears out in 10–20 years). Neither is always better. The right choice depends on your age, bleeding risk, and lifestyle.

What Is Surgical Valve Replacement?

- SAVR (surgical aortic valve replacement) is open-heart surgery to repair a damaged valve.
- You are asleep under anesthesia. A heart-lung machine runs your heart while the surgeon works.
- The surgeon usually opens the chest through the breastbone. Smaller cuts are an option at some centers.
- Any of the four heart valves can be fixed or replaced. The aortic and mitral valves are most common.
- Repair is always tried first. It saves your own tissue and avoids long-term blood thinners.
- If repair fails, the old valve is removed. A new valve — mechanical or tissue — is sewn in.
- SAVR is still the top choice for many patients. It is best for younger patients, those needing bypass, and those with more than one valve problem.

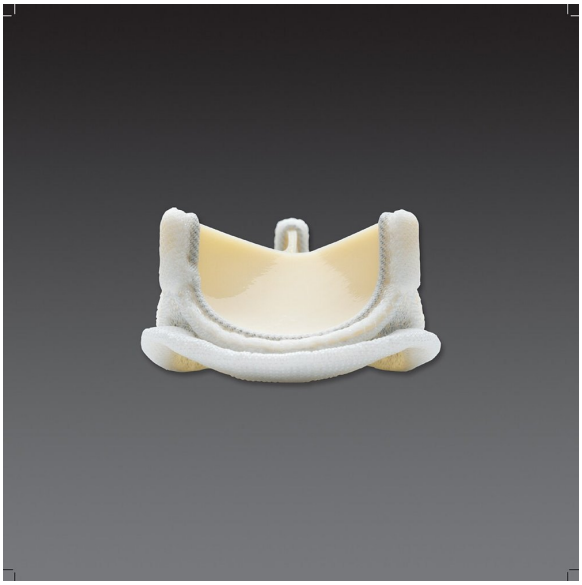
Mechanical vs Tissue Valve — At a Glance

Feature	Mechanical Valve	Tissue (Bioprosthetic) Valve
Durability	30–50+ years	10–20 years (aortic) 12–15 years (mitral)
Long-term anticoag	Warfarin for LIFE (target INR 2.0–3.5)	Not needed (short course after surgery)
INR monitoring	Every 2–4 weeks forever	None after 3 months
Bleeding risk	~1–2%/yr warfarin- related bleeding	Lower (no warfarin)
Redo surgery risk	Very low (valve rarely wears out)	~30–50% at 15–20 yrs (structural degeneration)
Valve-in-valve option	Limited	Yes — TAVR/TMVR into failed tissue valve
Clicking sound	Yes — audible in quiet environments	No
Best candidate age	< 50–55 years (long life ahead)	> 60–65 years OR anticoag contraindicated

Mechanical valves (left) last decades but need lifelong warfarin. Tissue valves (right) need no long-term blood thinner but wear out in 10–20 years. Age and bleeding risk guide the choice.

Why It Matters

- Severe valve disease can be fatal without treatment. About 50% of patients with severe aortic stenosis die within 2 years of symptoms.
- Surgery fixes the problem. Pills alone cannot cure a stiff or leaky valve.
- The right valve type protects you for decades. A mechanical valve at age 45 can last a lifetime. A tissue valve at age 72 with a valve-in-valve plan is just as smart.
- Repair keeps your own tissue. It avoids blood thinners and lowers the chance of a second surgery.
- SAVR can fix several problems at once: multiple valves, blocked arteries, and abnormal heart rhythm.
- See the catheter option: TAVR Guide. Also: Aortic Stenosis Guide and Mitral Regurgitation Guide.



A real tissue (bioprosthetic) heart valve, the type most often sewn in during surgical replacement today. Its leaflets are made from treated animal tissue and open and close like a natural valve. Image: public domain, Wikimedia Commons.

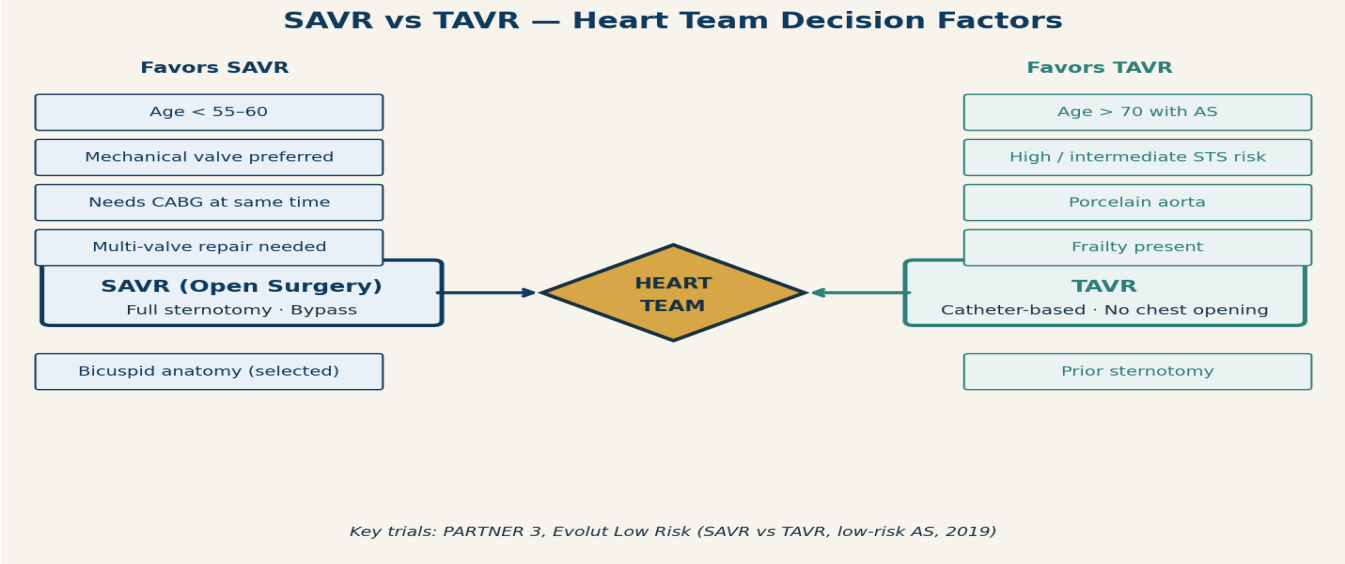
Risk Factors

Some patients are more likely to develop this condition. Knowing your risk helps your care team take extra precautions.

Risk Factor	Why It Increases Risk
Age > 65	Tissue valves more appropriate; higher baseline operative risk; TAVR increasingly considered
Prior sternotomy	Re-do surgery is higher risk; may favor TAVR or alternative access
Severe obesity or frailty	Higher surgical risk; Heart Team evaluates risk-benefit carefully
Low ejection fraction (< 30%)	Higher perioperative risk; timing and support (e.g., Impella) considered
Renal insufficiency	Contrast dye risk; worsened by CPB; higher post-op complication rate
Diabetes	Wound infection risk; slower healing; affects coagulation management
Atrial fibrillation (AF)	Often requires Maze procedure or ablation at same surgery; affects anticoagulation choice
Endocarditis	Active infection raises surgical risk; requires complete debridement
Bicuspid aortic valve	Often has aortic root involvement; may need aortic root repair or replacement at same time

Treatment Options

- The Heart Team reviews your echo, CT scan, and STS risk score before recommending surgery.
- Repair is always the first goal — especially for the mitral valve. Repair has better long-term results than replacement.
- If you need a new valve, you choose: mechanical (lasts longer, needs warfarin) or tissue (no long-term blood thinner, wears out).
- The surgery takes 2–6 hours. You are asleep. A heart-lung machine runs your blood flow.
- Other fixes can be done at the same time: bypass grafts, tricuspid repair, Maze procedure for AFib, or aortic root repair.
- Smaller cuts are an option. Mini-sternotomy or mini-thoracotomy are offered at some centers. Some offer robot-assisted mitral repair.
- After surgery, cardiac rehab (6–12 weeks of supervised exercise) is strongly recommended. It speeds recovery and saves lives.
- Catheter option: TAVR Guide. Clip option: MitraClip/TEER Guide.



The Heart Team weighs age, anatomy, STS risk score, and patient preference. PARTNER 3 and Evolut Low Risk trials showed TAVR was as good as SAVR for low-risk patients at 2 years.

Mechanical Valve — Who Should Consider It

- Age under 50–55 years: mechanical valves last 30–50+ years. This avoids a second surgery during your lifetime.
- Already on warfarin for another reason (e.g., atrial fibrillation): no extra anticoagulation burden.
- Low bleeding risk: no history of GI bleed, brain bleed, or frequent falls.
- Target INR: 2.0–3.0 for aortic valve; 2.5–3.5 for mitral position (ACC/AHA 2021).
- DOACs such as apixaban are NOT approved for mechanical valves. Only warfarin is proven safe.
- Freedom from structural wear: over 95% at 20 years. This is the mechanical valve's main advantage.

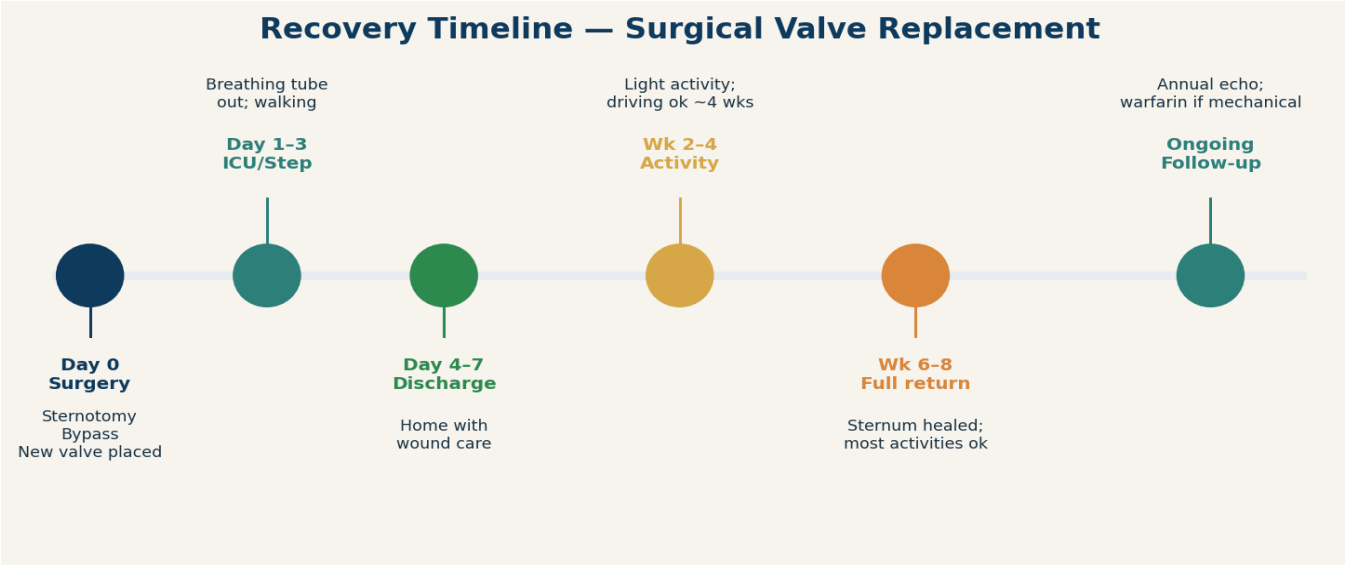
Tissue Valve — Who Should Consider It

- Age over 60–65 years: a tissue valve is expected to last through most of the patient's remaining life.
- Cannot take warfarin, or strongly prefer to avoid it.
- High bleeding risk: history of GI bleed, brain bleed, frequent falls, or strict INR monitoring is not possible.
- Tissue valves come from pig, cow, or human donor tissue.
- When the tissue valve wears out, valve-in-valve TAVR (aortic) or TMVR (mitral) can place a new valve by catheter. No redo sternotomy is needed at many centers.
- Structural wear rates: about 10–15% need redo by 10 years. About 30–50% need redo by 15–20 years. Younger patients wear out valves faster.

Risks, Benefits, and Alternatives

Every choice has trade-offs. Use this table to start the shared decision conversation.

Option	Risks	Benefits	Alternatives
SAVR (surgery)	Death: 1–3% (STS registry, low-risk). Complex or redo: 3–8%. Stroke: 1–2%. AFib after surgery: ~30%. Blood transfusion: ~20%. Pacemaker: 3–5%.	Fixes the valve fully. Decades of data. Can do bypass and other valves in the same trip. Top choice for patients under 65 with severe valve disease.	TAVR (no chest opening for aortic); MitraClip/TEER (clip for mitral); wait and watch if disease is mild and no symptoms.
Mechanical valve	Warfarin for life (INR 2.0–3.5). Bleeding risk ~1–2% per year. INR check every 2–4 weeks forever. Clicking sound in quiet rooms.	Lasts 30–50+ years. No redo surgery for valve wear. Best for younger patients (under 50–55).	Tissue valve if you prefer no warfarin. DOACs are not yet approved for mechanical valves.
Tissue valve	Wears out in 10–20 years. About 10–15% need a redo by 10 years; 30–50% by 15–20 years.	No long-term blood thinner after 3 months. No clicking. When it wears out, a new valve can often be placed by catheter (valve-in-valve).	Mechanical valve if you need lifelong durability; TAVR for aortic if anatomy fits.
No surgery	Severe symptomatic aortic stenosis: ~50% die within 2 years without treatment. Severe mitral regurgitation causes heart damage if delayed too long.	Avoids surgery risk when all treatment is truly too risky.	SAVR or TAVR for the aortic valve; SAVR or MitraClip for the mitral valve — almost always the better choice.



Recovery after valve surgery. Sternum healing takes 6–8 weeks for everyone. Cardiac rehab begins at week 4–6.

SAVR vs TAVR — Understanding the Modern Choice

- TAVR (transcatheter aortic valve replacement) replaces the aortic valve by catheter — no chest opening for most patients.
- PARTNER 3 (2019) and Evolut Low Risk (2019) trials showed TAVR was as good as SAVR for death or stroke at 1–2 years in low-risk patients.
- SAVR is still preferred when the patient is younger (under 60–65), needs multi-valve surgery, needs CABG at the same time, or wants a mechanical valve.
- TAVR has a higher pacemaker rate (about 10–15%). SAVR has a higher AFib rate (about 30%) and a longer recovery (6–8 weeks vs 1–2 weeks).
- Both SAVR and TAVR use tissue valves. Mechanical valves are not available through a catheter (TAVR).
- ACC/AHA guidelines require a Heart Team decision — a cardiologist and cardiac surgeon together. Sometimes an imaging specialist joins the team.

Common Misconceptions

Myth	Reality
Mechanical valves are always better — they last forever.	Mechanical valves do last longer. But you must take warfarin for life. That means INR checks every 2–4 weeks and a ~1–2% yearly bleed risk. A tissue valve at age 65 with a valve-in-valve plan is equally smart.
Tissue valves need no follow-up.	Tissue valves wear out — usually in 10–20 years. You still need a yearly echo. When it fails, a new valve can often be placed by catheter (valve-in-valve TAVR).
Open-heart surgery is outdated now that TAVR exists.	TAVR is great for many patients. But SAVR is still the top choice when you are young, need bypass surgery, need more than one valve fixed, or when TAVR anatomy does not fit.
I will need blood thinners no matter what.	Only mechanical valves need warfarin for life. Tissue valves need a blood thinner for just 3 months. After that, you may only need aspirin — or nothing at all.
Repair and replacement are the same.	Repair saves your own valve leaflets. It is better than replacement when it can be done. Replacement removes the old valve and sews in a new one.
Minimally invasive means no bypass machine.	A smaller cut does NOT mean no bypass machine. The heart-lung machine is still used. The only difference is the cut size and recovery time.
The 6–8 week recovery is only for older patients.	The breastbone takes 6–8 weeks to heal for everyone. Age and fitness do not speed up bone healing. Protect your sternum for the full 6–8 weeks.
I do not need to tell my dentist about my valve.	All valve patients must tell their dentist — for life. The AHA recommends antibiotics before certain dental work. This prevents a serious infection called prosthetic valve endocarditis.

Possible Complications

Knowing what can go wrong helps you spot problems early. Most complications are uncommon, especially with treatment.

Where / What	What Can Happen
Death (operative)	1–2% for isolated SAVR in low-risk patients (STS registry). 3–8% for complex or redo surgery.
Stroke	1–3%. Risk is lower with smaller incisions and special embolic filters.
Post-op AFib (irregular heart rhythm)	~30% of patients. Usually short-term. Treated with rate-control medicines or short-term blood thinners.
Major bleeding / blood transfusion	~20% of patients need a blood product. Higher risk with kidney disease or warfarin use.
New pacemaker	3–5% for aortic valve replacement. Higher for complex surgery.
Sternal wound infection	~1%. More common in diabetes and obesity. Treated with antibiotics or wound care.
Valve infection (prosthetic valve endocarditis)	Less than 1% per year. Treated with IV antibiotics, sometimes redo surgery.
Tissue valve wear (structural deterioration)	10–15% need redo by 10 years; 30–50% by 15–20 years. Valve-in-valve TAVR is often possible.
Bleeding from warfarin (mechanical valve)	~1–2% per year. Includes risk of brain bleed. INR control reduces this.
Clot on mechanical valve	Less than 0.5% per year with good INR control. Needs urgent care if it happens.
Kidney injury	5–10%. Usually short-term. Risk is higher with kidney disease or long bypass time.

Recovery and Life After Valve Surgery

- Hospital stay: 4–7 days for isolated SAVR. Complex or multi-valve surgery may take longer.
- Breastbone healing: 6–8 weeks. No lifting over 10 lb. No pushing or pulling with arms during this time.
- Driving: usually cleared at 4–6 weeks. Sternal healing must be confirmed. Narcotic pain medicine must be stopped.
- Cardiac rehab: 6–12 weeks of supervised exercise. Strongly recommended by ACC/AHA. It reduces deaths and speeds recovery.
- Blood thinner after surgery: tissue valves need warfarin or aspirin for 3 months (to let the valve seat), then aspirin only. Mechanical valves need warfarin for life.
- Return to work: desk work at 4–6 weeks. Physical labor at 8–12 weeks, based on sternal healing.
- Annual echocardiogram: needed every year for both mechanical and tissue valve patients.
- Dental visits: always tell your dentist you have a valve. AHA guidelines require antibiotics before certain dental work.

Endocarditis Prevention — For Life: Every patient with a valve (mechanical or tissue) must tell their dentist and oral surgeon. AHA/ACC 2021 guidelines require antibiotics before certain dental work — for the life of the valve. Never skip this step. Prosthetic valve endocarditis (PVE) is a life-threatening infection.

Points to Know

If you remember nothing else, remember these key points.

- SAVR is still the first choice for younger patients and anyone needing bypass or multi-valve repair.
- Repair is always tried first. It keeps your own tissue and avoids long-term blood thinners.
- Mechanical valve: lasts decades, but needs warfarin for life. Tissue valve: no long-term blood thinner, but wears out in 10–20 years.
- If you get a tissue valve, plan ahead. When it wears out, a new valve can often go in by catheter — no second chest opening.
- Death risk for isolated SAVR in healthy patients: about 1–2% at experienced centers (STS registry).
- About 1 in 3 patients has AFib after surgery. It is usually short-term and treated with medicines.
- Tell your dentist about your valve — for life. Antibiotics before certain dental work help prevent infection.
- Cardiac rehab is strongly recommended after SAVR. It lowers the risk of future heart events.

When to Call Us - and When to Call 911

If you are not sure, call. We would rather hear from you twice than miss a real problem.

- Face drooping, arm weakness, or speech changes — call 911 right away (stroke).
- Chest pain, severe shortness of breath, or passing out — call 911.
- Fever above 100.4°F more than 48 hours after surgery — call us the same day (may be valve infection).
- Redness, warmth, or drainage at the chest wound — call within 24 hours.
- Leg swelling, redness, or pain — call within 24 hours (possible blood clot).
- Unusual bruising or bleeding, or INR out of range (mechanical valve) — call within 24 hours.
- Fast or irregular heartbeat or pounding in the chest — call within 24 hours.
- New shortness of breath or less energy, years after surgery — call within a few days (may be valve wear).
- Dental work planned — call us at least 1 week ahead so we can plan antibiotic coverage.

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Trusted Resources

The links below are the trusted resources Dr. Ali used to write this guide and that he recommends you visit for more information. Each is a clickable link in the digital version and a Short.io tracked URL on the printed version.

- AHA — Heart Valve Disease - AHA overview of valve disease and surgery options.
- Society of Thoracic Surgeons (STS) — Patient Resources - Cardiac surgery society with patient guides and the STS risk calculator.
- Cleveland Clinic — Heart Valve Surgery - Clear descriptions of valve procedures, recovery, and outcomes.
- Mayo Clinic — Heart Valve Disease Treatment - Plain-language guide to repair and replacement options.
- TAVR Patient Guide — Dr. Ali - Companion guide on catheter-based aortic valve replacement (TAVR).
- Mitral Regurgitation Patient Guide — Dr. Ali - Companion guide on mitral valve disease — repair vs MitraClip vs replacement.
- AHA Dental Prophylaxis for Valve Patients - Why valve patients need antibiotics before certain dental work.

Sources Used to Build This Guide

Every recommendation in this guide is grounded in one or more of the studies, guidelines, or trusted resources below. Short links are tracked so Dr. Ali can see which references patients are reading; nothing personally identifying is captured.

- 2021 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease *[Clinical Guideline]*
  Definitive ACC/AHA 2021 VHD guideline — indications, timing, valve type choice, anticoagulation recommendations.
- PARTNER 3 Trial — TAVR vs SAVR in Low-Risk Patients *[Clinical Trial]*
  PARTNER 3 RCT (Mack et al., NEJM 2019): TAVR non-inferior to SAVR for low-risk AS at 1 and 2 years — key comparator trial.
- Evolut Low Risk Trial — Self-expanding TAVR vs SAVR *[Clinical Trial]*
  Evolut Low Risk RCT (Popma et al., NEJM 2019): self-expanding TAVR non-inferior to SAVR for low-risk patients.
- STS Adult Cardiac Surgery Database — Isolated AVR Mortality *[Registry]*
  STS database operative mortality reference: isolated AVR ~1–2%; SAVR + CABG ~2–4%; mitral repair ~1%; STS score calculator.
- AHA — Heart Valve Disease (Patient Page) *[Patient Resource]*
  AHA patient-facing overview of valve disease and treatment — plain-language framing reference.
- Cleveland Clinic — Heart Valve Surgery *[Patient Resource]*
  Cleveland Clinic patient-education page on surgical valve repair/replacement — competitor benchmark.
- Mayo Clinic — Heart Valve Disease Surgery *[Patient Resource]*
  Mayo Clinic treatment/surgery overview — competitor benchmark for procedure descriptions and recovery framing.
- CTSNET — Minimally Invasive Valve Surgery Overview *[Professional Resource]*
  Cardiothoracic Surgery Network surgical technique overview: mini-sternotomy, mini-thoracotomy, robotic approaches.
- Lancet — Bioprosthetic vs Mechanical Prostheses for Aortic Valve Replacement (ROOBY; Swedish registry data) *[Clinical Trial]*
  Long-term registry and RCT data on mechanical vs bioprosthetic durability and anticoagulation tradeoffs — valve type decision backbone.
- JAMA — Age Thresholds for Mechanical vs Tissue Valve Choice *[Review Article]*
  Contemporary evidence-based age crossover (~50–65) for mechanical vs bioprosthetic choice — key clinical decision content.

About This Guide

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Version: 2026-08-15

Reviewer note: Reviewed against Cleveland Clinic, Mayo Clinic, and AHA valve surgery pages. This guide adds: SAVR vs TAVR data from PARTNER 3 and Evolut trials. It includes a mechanical-vs-tissue decision table with age cutoffs. STS operative mortality numbers are given by type of surgery. Links to the AS, MR, TAVR, and MitraClip companion guides are included.

Disclaimer

This guide is for educational purposes only and does not replace medical advice from your physician. Recommendations may not apply to every patient. Always follow the specific instructions of Dr. Ali and your care team. In an emergency call 911 or go to the nearest emergency department.

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