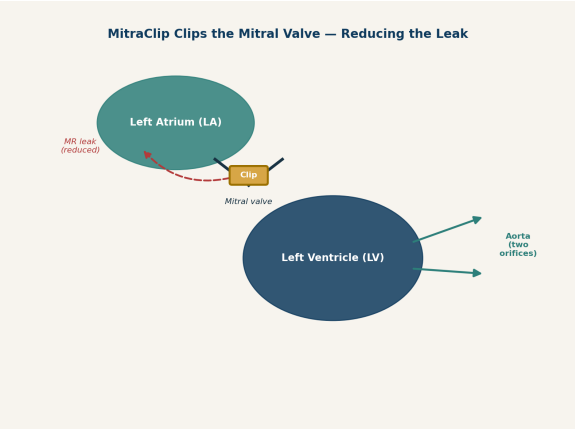
Understanding MitraClip / TEER

Transcatheter Edge-to-Edge Repair of the Mitral Valve

A catheter clips your leaky mitral valve — no open-heart surgery needed.



Online: https://go.riasalimd.com/mitraclip-guide

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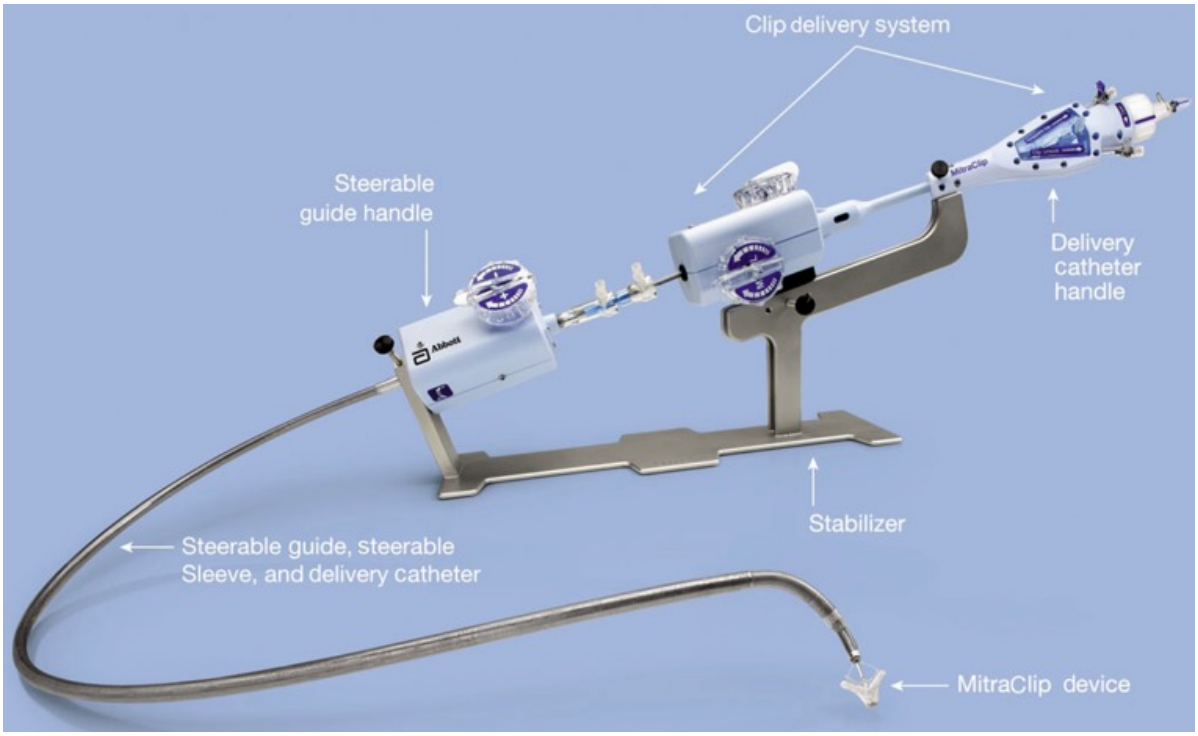
Names & Terms You Will Hear

Term	Meaning
TEER	Transcatheter edge-to-edge repair. A catheter clips your leaky valve. No chest cut needed.
MitraClip	Abbott's clip device. The most-used TEER system. Two sizes: NTR and XTR.
PASCAL	Edwards Lifesciences clip device. The second FDA-approved TEER option.
Mitral regurgitation (MR)	A leaky mitral valve. Blood flows backward. Graded mild, moderate, or severe.
Primary MR	The valve itself is broken. Causes: floppy leaflet, torn cord, or infection.
Secondary MR	The valve is normal. A weak, stretched heart pulls it open.
Double-orifice valve	The result after TEER. The clip joins the leaflets. This creates two small openings instead of one big leak.
Transseptal puncture	Crossing the wall between the two upper heart chambers. This is how the catheter reaches the valve.
TEE	A small camera placed in your throat. It guides the clip with live pictures.
GDMT	Your full set of heart-failure medicines. These are taken before any procedure is tried.
Heart Team	Your cardiologist, heart surgeon, and imaging doctor. They review your case together before any decision.

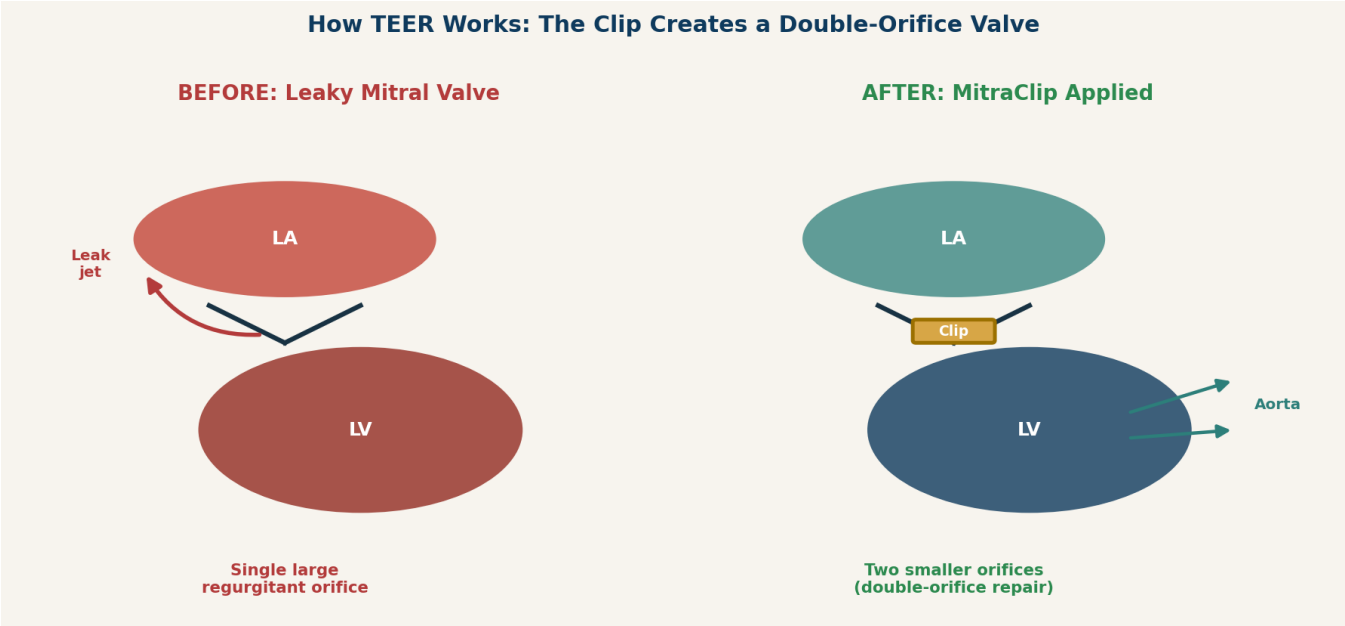
Two devices — same idea: Abbott **MitraClip G4** (NTR and XTR clip sizes; most data) and Edwards **PASCAL** (broader clasper). Both are FDA-approved for TEER. Your Heart Team picks based on your valve anatomy. Both create a **double-orifice valve** — one clip, two openings, less leak.

What Is MitraClip / TEER?

- **TEER** stands for transcatheter edge-to-edge repair. It clips your two mitral valve leaflets together. This stops the backward leak without opening your chest.
- A thin tube enters a vein in your groin. No chest cut is needed.
- The tube crosses the wall between the upper heart chambers. It reaches the valve from above. Live echo images guide every move.
- **MitraClip** (Abbott G4) is the most-used device. **Edwards PASCAL** is the second FDA-approved option. Both work the same way.
- The procedure takes 1 to 3 hours. You sleep under general anesthesia in a cath lab.
- Most patients go home in 1 to 2 days. No chest cut. No heart-lung machine.



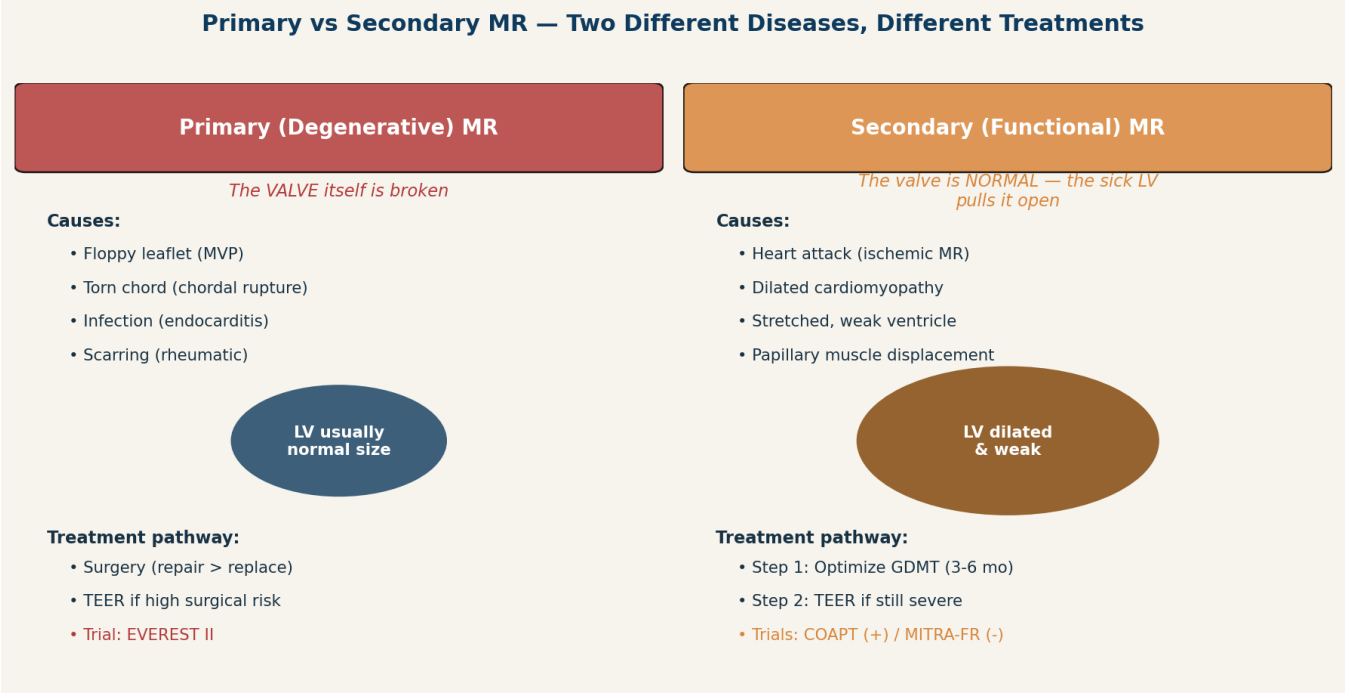
The real MitraClip delivery system: a steerable guide catheter carries the clip delivery system to the valve, with a stabilizer and handles the operator uses to steer, open, and close the clip under live imaging. Image adapted from Sherif et al., Neth Heart J 2016 (CC BY 4.0).



Left panel: before TEER — one large gap lets blood leak backward into the left atrium. Right panel: after TEER — the clip holds the leaflets together. This creates two smaller openings. Blood still flows forward. The backward leak is sharply reduced.

Why It Matters

- A severe leak forces your heart to pump extra blood each beat. Over time, this weakens the heart muscle.
- Untreated severe MR can cause **heart failure, atrial fibrillation, and high lung pressure**. These can shorten your life. This can happen before you feel very sick.
- TEER fixes the valve without open-heart surgery. It is a much lower-risk option for patients who cannot safely have surgery.
- The COAPT trial tested TEER in secondary MR. TEER cut heart-failure hospital stays by 47% at 2 years. It also reduced death at 2 years.
- Most patients feel less short of breath within weeks. They can do more without getting tired.



Primary MR: the valve is broken. Surgery (repair) is the gold standard. TEER is used for high surgical-risk patients (EVEREST II trial). Secondary MR: the valve is normal but the weak LV stretches it open. Optimize GDMT first, then consider TEER if MR stays severe (COAPT positive; MITRA-FR neutral).

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
Mitral valve prolapse (MVP)	Most common cause of primary MR. A floppy leaflet can break a cord over time.
Prior heart attack	Damage to heart muscle can pull the leaflets apart. This causes secondary MR.
Dilated cardiomyopathy / heart failure	A stretched, weak heart pulls the valve open.
Older age	Wear and tear on valve cords is more common after age 60.
Connective tissue disease	Marfan or Ehlers-Danlos syndrome. Cord and leaflet tissue is weaker.
Rheumatic heart disease	Old strep infection scars the valve. Still common in many countries.
Prior valve infection (endocarditis)	Infection can destroy a leaflet. This can cause sudden, severe MR.

Primary (Degenerative) MR — Who Benefits from TEER

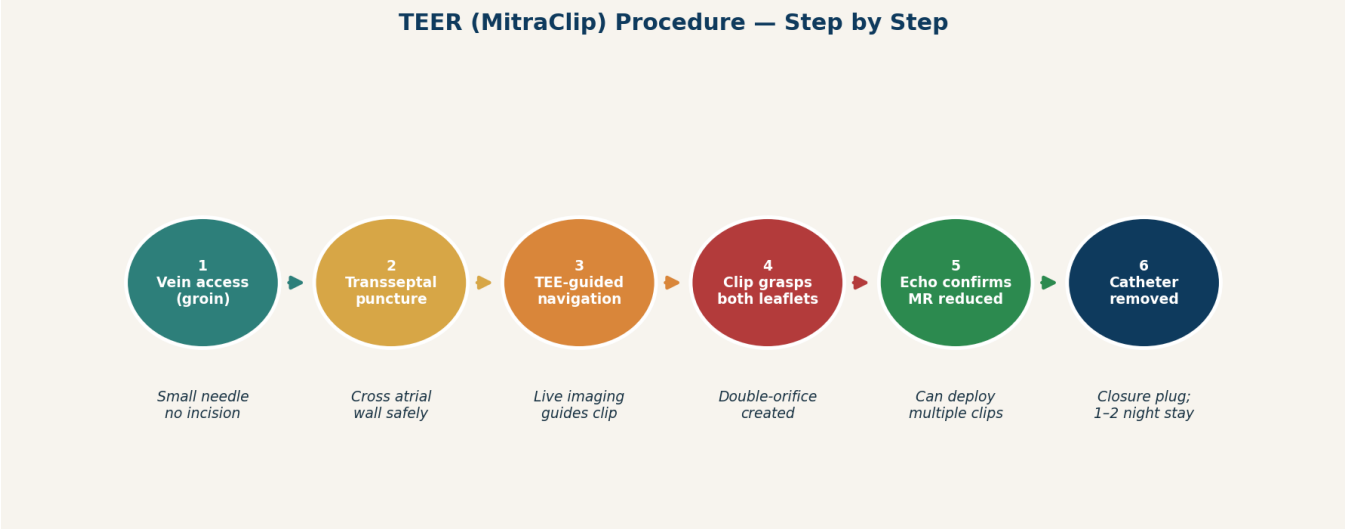
- Primary MR is caused by a broken valve. Causes include mitral valve prolapse (MVP), torn cords, endocarditis, and rheumatic scarring.
- **Surgical repair** is the gold standard. It preserves your own valve. Repair is possible in more than 80% of degenerative MR cases at expert centers.
- TEER is an option (ACC/AHA Class IIa) for severe primary MR when surgery is too risky. Your doctor calls this high or prohibitive surgical risk.
- The EVEREST II trial compared MitraClip to surgery. MitraClip was safer. Surgery removed more MR. Long-term, patients with a lasting benefit from TEER did well.
- Two devices are approved: **Abbott MitraClip G4** (NTR and XTR clip sizes) and **Edwards PASCAL** (broader clasper, different grasp mechanism).
- Heart Team review is required before choosing TEER over surgery for primary MR.

Secondary (Functional) MR — COAPT vs MITRA-FR: Why Selection Matters

- In secondary MR, the valve leaflets are normal. A weak or dilated LV pulls them apart. The problem is the sick heart, not the valve.
- **Step 1 is always GDMT:** ACEi or ARNI plus beta-blocker, MRA, and SGLT2 inhibitor for 3 to 6 months. Many leaks shrink with medicines alone.
- **COAPT trial (NEJM 2018, positive):** Used strict patient criteria (ERO 0.20 cm² or higher, EF 20–50%). At 2 years: HF stays were 35.8% with TEER vs 67.9% with medicines. Death was 29.1% vs 46.1%. Benefits lasted at 3 years.
- **MITRA-FR trial (NEJM 2018, neutral):** Enrolled patients with larger, more dilated hearts. The leak was smaller relative to LV size. The primary endpoint was neutral. The LV was too dilated for TEER to help.
- The key lesson: **disproportionate MR** (leak too big for the LV size) benefits from TEER. **Proportionate MR** (LV very dilated, leak fits the size) does not benefit as reliably.
- ACC/AHA 2020 criteria for TEER in secondary MR: ERO 0.20 cm² or higher, coaptation depth 11 mm or less, coaptation length 2 mm or more, and anatomy suited for clip grasping.

Treatment Options

- **Step 1 for secondary MR: take your heart-failure medicines first.** This means beta-blocker, ARNI or ACEi, MRA, and SGLT2 inhibitor for 3 to 6 months. The leak often shrinks with medicines alone.
- **TEER / MitraClip** clips the valve from the inside. No open surgery is needed. It works best for primary MR when surgery is too risky. It also works for secondary MR that stays severe after full medicine treatment.
- **Surgical repair** is the best option for patients who can safely have surgery. Repair keeps your own valve. It lasts for decades.
- **Surgical valve replacement** is used when repair is not possible. A tissue valve needs no blood thinner. A metal valve needs a blood thinner every day for life.
- **Watch and wait with yearly echo** is for mild or moderate MR with no symptoms. Your doctor tracks your heart size and valve grade each year.
- **Heart Team review is required.** A cardiologist, heart surgeon, and imaging doctor meet. They choose the best plan for you.



Six steps from groin access to catheter removal. The transseptal puncture crosses the atrial wall. TEE guides every step in real time. If needed, a second clip can be added to reduce MR further.

The TEER Procedure — What Happens in the Cath Lab

- **Preparation:** Nothing to eat or drink after midnight. General anesthesia is standard. TEE requires a throat probe. Some centers use deep sedation.
- **Access:** A needle enters the femoral vein in the groin. A wire and sheath are advanced to the right atrium.
- **Transseptal puncture:** The catheter crosses the atrial wall into the left atrium. TEE and X-ray guide the safe crossing point.
- **Clip delivery:** The clip system is steered down through the mitral valve. The cardiologist opens the clip arms. The clip grasps both leaflets from below and closes.
- **Echo check:** TEE confirms the leak is reduced to mild or trace. If not, the clip is moved or a second clip is added.
- **Closure:** The catheter is removed. The groin site is closed with pressure or a plug. Most patients walk within a few hours.
- **Monitoring:** You stay 1 to 2 nights. An echo is done before you go home. A 30-day echo and clinic visit follow.

Risks, Benefits, and Alternatives

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

Option	Risks	Benefits	Alternatives
TEER (MitraClip / PASCAL)	Leak may stay or return (10–20% at 1 year). Clip may miss one leaflet (~1%). Valve may narrow after clipping (<2%). Groin bleeding 1–2%. Stroke ~1%.	No chest cut. No heart-lung machine. Home in 1–2 days. Death risk ~2%. COAPT: 47% fewer HF stays. Survival benefit at 2 years.	Repair for healthy patients. Medicines first for secondary MR.
Surgical valve repair (best for primary MR)	Open-heart surgery. Stroke 1–2%. Blood transfusion possible. New AFib ~30%. Recovery 6–8 weeks.	Lasts decades. Uses your own valve. No implant needed. Best long-term result for operable patients.	TEER if surgery is too risky. Replacement if repair is not possible.
Surgical valve replacement	Same surgery risks. Metal valve: blood thinner for life. Tissue valve: lasts 10–15 years; may need re-op.	Used when repair is not possible. Stops the leak reliably.	Repair if possible. Valve-in-valve TEER if tissue valve wears out later.
Heart-failure medicines (GDMT — secondary MR only)	Can lower blood pressure or change kidney function. Leak may not improve enough.	Can shrink the leak by 30–50%. Must try first before any procedure.	Add TEER if leak stays severe after 3–6 months of medicines.

TEER vs Surgery — Head-to-Head Comparison

Feature	TEER (MitraClip / PASCAL)	Surgical Repair / Replacement
Access	Vein in groin. No chest cut.	Open chest. Sternotomy or mini-thoracotomy.
Heart-lung machine	Not used	Used for surgery
Anesthesia	General (TEE-guided)	General anesthesia

Feature	TEER (MitraClip / PASCAL)	Surgical Repair / Replacement
Hospital stay	1–2 nights	5–7 nights
Recovery	Days to 2 weeks	6–8 weeks
In-hospital mortality	~2% (TVT Registry)	1–3% (elective repair)
Stroke risk	~1%	1–2%
MR reduction	Good: to mild in >90%	Excellent: to none in >95%
Durability	10-yr data growing. ~10–20% re-intervention.	Decades (repair). 10–15 yr (tissue valve).
Best for	High-risk primary MR. COAPT-like secondary MR.	Operable primary MR. Complex anatomy.

Common Misconceptions

Myth	Reality
MitraClip replaces the mitral valve.	No. The clip grabs your own leaflets and holds them together. Your valve stays in place. Nothing is removed.
TEER cures heart failure.	TEER reduces the leak. In the right patients, it cuts hospital stays. It also helps people live longer. But it does not fix the heart muscle. Keep taking your heart-failure medicines.
Some MR left after MitraClip means it failed.	A small remaining leak is normal and okay. The goal is to reduce the leak to mild, not zero. The COAPT trial showed big benefits even with some MR remaining.
MITRA-FR proved MitraClip does not work.	MITRA-FR enrolled patients with very dilated hearts and smaller leaks. COAPT enrolled patients with a bigger leak for their heart size. COAPT showed a clear win. Patient selection is the key.
All patients with MR should get MitraClip.	TEER is for specific patients. Younger, healthy patients with primary MR do better with surgery. TEER is best for high-risk patients or those with secondary MR on full medicines.
My heart has to stop for MitraClip.	Your heart keeps beating the whole time. No heart-lung machine is used. This is a key advantage over open surgery.
MitraClip is a quick clinic visit.	TEER requires general anesthesia. You stay 1 to 2 nights for monitoring. It is done in a full cath lab, not a clinic room.

After TEER — what to remember:

- Take aspirin (or your prescribed antiplatelet) every day.
- Keep taking your heart-failure medicines. TEER does not replace them.
- Tell all providers — especially your dentist — about your procedure.
- Get a 30-day and 1-year echo. Call if shortness of breath returns.

Possible Complications

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

Where / What	What Can Happen
Single-leaflet attachment	Clip grabs one leaflet but not both. Needs a repeat clip or urgent surgery. Occurs in about 1% of cases.
Residual or recurrent MR	Leak may not improve enough. It may also return over time. About 10 to 20% need a repeat procedure within 2 years.
Valve too narrow after clip	A very tight clip can slow blood flow across the valve. This is rare — under 2% with careful sizing.
Stroke or mini-stroke	A small clot or air bubble can travel during the procedure. About 1% of cases. Treated with blood thinners.
Groin bleeding	Bruising or swelling at the entry site. Artery injury is rare. Major bleeding occurs in 1 to 2%.
Cardiac tamponade	A small hole can form in the heart wall during catheter crossing. Under 0.5%. Treated right away.
Atrial fibrillation	New or worse AFib may appear after the procedure. This raises stroke risk. Managed with medicines.
Clip moves out of place	Very rare — under 0.1%. The clip shifts and must be retrieved.

Points to Know

If you remember nothing else, remember these key points.

- TEER (MitraClip or PASCAL) clips your mitral leaflets together. No chest cut. No heart-lung machine.
- There are two types of MR. **Primary MR** means the valve is broken. **Secondary MR** means the heart is weak and pulls the valve open. The treatments differ.
- For **secondary MR**, your doctor tries full heart-failure medicines for 3 to 6 months first. The MITRA-FR trial showed that skipping this step leads to no benefit from TEER.
- The COAPT trial showed TEER cut heart-failure hospital stays by nearly half. It also improved 2-year survival in the right patients.
- Your **Heart Team** includes a cardiologist, surgeon, and imaging doctor. They review your case and pick the best plan.
- Most patients go home in 1 to 2 days. Shortness of breath improves within weeks. Yearly echo check-ups are needed.
- After TEER, tell your dentist and other doctors about your procedure. You may need an antibiotic before dental work.

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.

- **Call 911** for sudden severe shortness of breath, especially lying flat.
- **Call 911** for stroke signs: face droop, arm weakness, or slurred speech.
- **Call 911** for chest pain or fainting.
- **Call our office** if the groin site bleeds through your bandage or swells a lot.
- **Call our office** for fever above 100.4°F more than 2 days after the procedure.
- **Call our office** for a new fast or irregular heartbeat.
- **Call our office** if shortness of breath comes back after it was getting better.
- **Call our office** if your weight goes up 3 or more pounds in a day or two, or your ankles swell.
- **Call our office** before any dental or surgical procedure to ask about antibiotics.

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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.

- ACC CardioSmart — Mitral Valve Regurgitation - Plain-language ACC patient guide for MR and TEER.
- AHA — Heart Valve Problems - American Heart Association overview of valve disease.
- Mayo Clinic — MitraClip Procedure - Who qualifies, how it works, and what to expect.
- Cleveland Clinic — TEER (MitraClip) - Procedure details, risks, and recovery.
- Dr. Ali — Mitral Regurgitation Guide - Companion guide on MR types, grading, and all treatments.
- Society of Thoracic Surgeons — Patient Resources - Patient guide for mitral surgery and risk calculators.

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.

- Stone GW et al. — COAPT Trial (NEJM 2018) *[Clinical Trial]*
  COAPT: MitraClip vs medical therapy in secondary MR (HF with EF 20–50%, ERO ≥ 0.20 cm², strict anatomic criteria). At 2 years: 35.8% vs 67.9% HF hospitalization rate (p<0.001); all-cause mortality 29.1% vs 46.1%.
- Obadia J-F et al. — MITRA-FR Trial (NEJM 2018) *[Clinical Trial]*
  MITRA-FR: MitraClip vs medical therapy in secondary MR — neutral result. Key difference: less anatomic selection (ERO 0.20–0.39 cm² but larger LV); supports GDMT-first and anatomy-nuanced patient selection.
- Feldman T et al. — EVEREST II Trial (NEJM 2011) *[Clinical Trial]*
  EVEREST II: MitraClip vs mitral surgery for primary and secondary MR in patients with surgical risk. MitraClip superior for safety; surgery more effective MR reduction at 12 months; underpins high-surgical-risk indication.
- 2020 ACC/AHA Guideline for Valvular Heart Disease *[Guideline]*
  Current ACC/AHA Class IIa recommendation for TEER in symptomatic severe primary MR at high/prohibitive surgical risk; Class IIa for carefully selected secondary MR (COAPT-like anatomy) on maximized GDMT.
- ACC CardioSmart — Mitral Valve Regurgitation (Patient Resource) *[Patient Resource]*
  ACC CardioSmart patient-facing material for MR, providing plain-language framing for symptoms, diagnosis, and treatment.
- American Heart Association — Heart Valve Problems *[Patient Resource]*
  AHA patient-facing overview of valve disease, treatment options, and recovery.
- Mayo Clinic — MitraClip Procedure *[Patient Resource]*
  Mayo Clinic plain-language description of MitraClip: who it helps, how it works, and what recovery involves.
- Cleveland Clinic — Transcatheter Edge-to-Edge Repair (TEER) *[Patient Resource]*
  Cleveland Clinic TEER page covering procedure details, candidacy criteria, and risks in accessible language.
- Abbott MitraClip G4 System — Device Reference *[Device Reference]*
  Primary device reference for MitraClip G4 system (NTR + XTR clip sizes), used to accurately describe the clip delivery system and double-orifice mechanism.
- Edwards PASCAL TEER System — Device Reference *[Device Reference]*
  Reference for Edwards PASCAL transcatheter edge-to-edge repair system, the second FDA-approved TEER device.
- STS/ACC TVT Registry — MitraClip Procedural Outcomes *[Registry]*
  National TVT Registry source for real-world TEER procedural outcomes: in-hospital mortality ~2%, stroke ~1%, single-leaflet device detachment ~1%, 30-day MR reduction to mild/none in >90%.
- Mack MJ et al. — COAPT 3-Year Follow-Up (Circulation 2021) *[Clinical Trial]*
  COAPT 3-year outcomes: durable mortality benefit and HF hospitalization reduction sustained in TEER vs medical therapy arm for secondary MR.

About This Guide

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Reviewer note: Reviewed against Mayo Clinic MitraClip page, Cleveland Clinic TEER page, and ACC CardioSmart MR resource. Ours adds: clear primary-vs-secondary MR framing, COAPT vs MITRA-FR nuance (patient selection matters), named device comparison (MitraClip G4 vs Edwards PASCAL), specific procedural complication rates from TVT Registry, and a dedicated procedure-step visual.

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.

Take This Guide With You

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