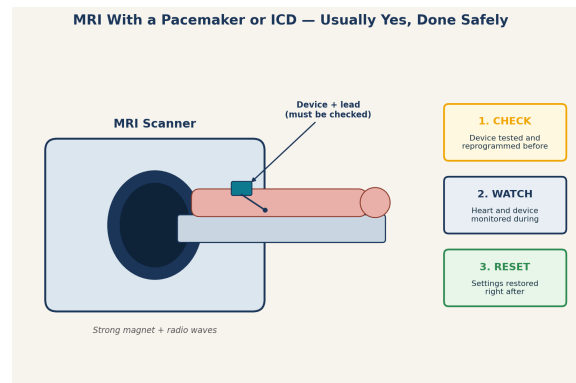


MRI Safety With a Pacemaker or ICD

Can I have an MRI with my heart device? In most cases today — yes, done as a planned, supervised scan

A pacemaker or ICD almost never means 'no MRI' anymore. The scan is just planned ahead, with your device checked before and reset after.



Online: <https://go.riasalimd.com/device-mri-guide>

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Names & Terms You Will Hear

Term	Meaning
MRI (Magnetic Resonance Imaging)	A scan that uses a strong magnet and radio waves — not X-rays — to make detailed pictures of the body. The strong magnet is the reason heart devices need special handling.
CIED (Cardiac Implantable Electronic Device)	The medical term for all heart devices. It covers pacemakers, ICDs, CRT devices, leadless pacemakers, and loop recorders.
MRI-conditional (MR Conditional)	A label that means a device is cleared for MRI when set rules are followed. The rules cover magnet strength, body area, and settings. It does NOT mean 'no rules.' It means 'safe under set conditions.'
Non-conditional / legacy device	An older device (or a mix of old and new parts) that was never tested and labeled for MRI. Many of these can still be scanned safely at an experienced center under a protocol.
Generator (the box / IPG)	The small battery-and-computer box under the skin, usually below the collarbone. For MRI, the box is only half the story — the leads matter just as much.
Leads (the wires)	The thin insulated wires that connect the box to the heart. The whole system — box AND every lead — must be MRI-conditional for a 'routine' conditional scan.
Abandoned (capped) lead	An old lead that was left in place but disconnected and capped when a device was changed. Abandoned leads are a special situation for MRI and need an experienced team's judgment.
Device interrogation	A quick painless check of your device with a programmer. It is done before and after an MRI to set a safe mode and then restore your normal settings.
Safe mode / MRI mode	A temporary setting used during the scan. For a pacemaker, it may pace at a steady rate; for an ICD, shock therapy is paused so the scanner does not trigger a false shock. Normal settings are restored after.



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Term	Meaning
Device ID card	The wallet card that lists your exact device and lead model numbers. The MRI team uses it to confirm whether your system is MRI-conditional. Always bring it.

Always tell the MRI team about your device — every time.

When you book ANY MRI, and again when you arrive, say plainly: **"I have a pacemaker"** or **"I have an ICD."** Bring your **device ID card** — it lists the exact box and lead model numbers the team needs to confirm your system is MRI-conditional. Records can be incomplete, so do not assume the staff already know. Speaking up is the single most important safety step — it is expected and never an annoyance.



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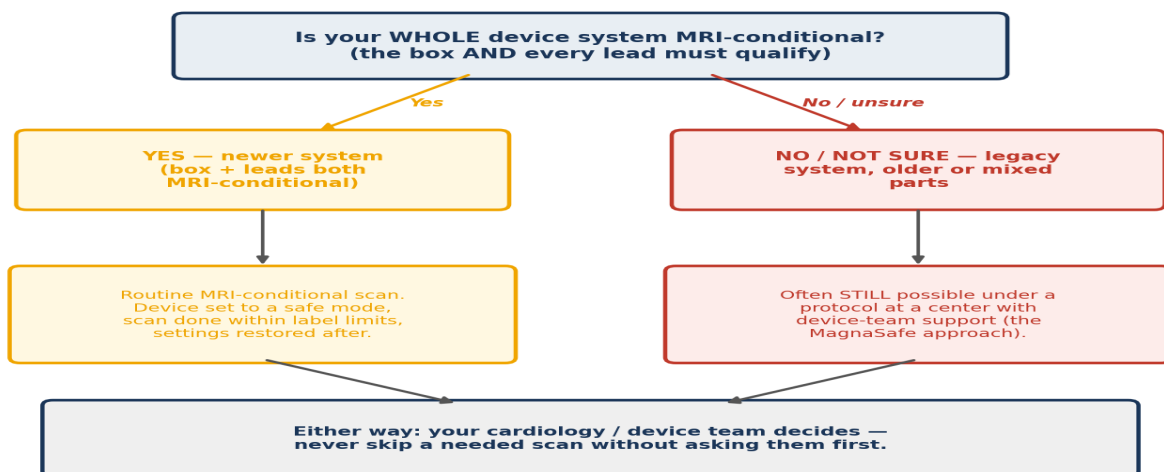


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MRI Safety With a Pacemaker or ICD?

- MRI uses a strong magnet and radio waves to take clear pictures. Because of the magnet, heart devices used to be a reason to avoid MRI. That has changed.
- Today most pacemakers and ICDs are MRI-CONDITIONAL. That means they are cleared for MRI as long as set rules are followed. The rules cover scanner strength and device settings.
- Here is the key point many people miss: BOTH the box AND the leads (wires) must be MRI-conditional. A new box with an old, non-conditional lead is NOT a safe system on its own.
- Even OLDER, non-conditional (legacy) devices can usually still be scanned safely. This is done at a center with a device team and a set plan. A large study (the MagnaSafe Registry, over 1,500 patients) found no device or lead failures when the plan was followed.
- A safe scan is planned, not an emergency. Your device is checked and set to a safe mode before. Your heart is watched during. The device is reset to normal after.
- Leadless pacemakers (such as Micra) and loop recorders are usually MRI-conditional too. Your team checks the exact model before any scan.
- Other scans are FINE with any heart device. CT scans, X-rays, ultrasound, and mammograms do not use a strong magnet.

Can You Have an MRI? — Conditional vs Legacy Devices



*Can you have an MRI? It starts with one question: is your **WHOLE** system MRI-conditional — the box AND every lead? If yes, it is a routine conditional scan. If no or unsure (a legacy or mixed system), an MRI is often still possible under a protocol at an experienced center. Either way, your device team decides — never skip a needed scan without asking.*



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What Has to Be MRI-Conditional — and What Is Always Fine

Part / Test	Must be MRI-conditional?	What it means for you
Generator box (IPG)	YES	The box itself must be labeled MR Conditional.
Every lead (wire)	YES	All leads must qualify too — not just the box.
Abandoned / capped lead	SPECIAL CASE	Experienced team decides case by case.
Leadless pacemaker (Micra)	USUALLY YES	Most models are MR Conditional — team confirms.
Loop recorder	USUALLY YES	Most are MR Conditional — team confirms the model.
CT scan / X-ray	NOT NEEDED	No magnet — always safe with any device.
Ultrasound / echo	NOT NEEDED	No magnet — always safe with any device.
Mammogram	NOT NEEDED	No magnet — always safe with any device.



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MRI-Conditional vs Legacy (Non-Conditional) Devices

- MRI-conditional means your device was tested and labeled safe for MRI as long as set rules are followed — usually a 1.5-Tesla scanner and specific device settings during the scan.
- Most pacemakers and ICDs placed in recent years are MRI-conditional. Your device ID card and your records show whether yours is.
- The whole system counts: the box AND every lead must be MRI-conditional. A newer conditional box paired with an older non-conditional lead is NOT a conditional system on its own.
- Legacy (non-conditional) devices were never tested and labeled for MRI — often because they are older, or because old and new parts were mixed over the years.
- Legacy does NOT mean 'never.' Large studies have looked at this. The MagnaSafe Registry covered over 1,500 patients. When the safe steps were followed, there were no device or lead failures at 1.5 Tesla.
- The difference is mainly WHERE and HOW. A conditional system can be scanned more routinely. A legacy system is best scanned at a center with a device team and a set plan.



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Why It Matters

- About half of people with a heart device will need an MRI at some point. MRI is often the best test for the brain, spine, joints, and many cancers. Sometimes no other test shows the problem as well.
- Years ago, a pacemaker or ICD often meant an automatic 'no' to MRI. That old rule made people miss needed scans. It is no longer how care is done.
- In 2017 the Heart Rhythm Society made it clear: with the right steps, MRI can be done for most device patients. This includes many people with older, non-conditional systems.
- An unplanned scan does carry risks, but they are avoidable. The magnet could change device settings, cause unwanted pacing, or make an ICD give a false shock. A planned scan removes these risks by setting a safe mode first.
- Knowing your device matters every day. Carry your device ID card, and tell every MRI or radiology team about your device — even if you assume they already know.
- Never quietly skip a needed MRI because you 'have a device.' Instead, ask your cardiology or device team — there is almost always a safe path.



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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
A legacy (non-conditional) device or a mix of old and new parts	Still usually scannable, but only at a center with a device team and a written protocol — not a routine walk-in scan.
Abandoned or capped leads left in place	Old disconnected leads can heat at the tip during MRI. This needs experienced-team judgment and is decided case by case.
Leads placed in unusual spots, or epicardial (on the heart surface) leads	Some lead positions were never tested for MRI. The device team reviews chest X-rays and records before clearing the scan.
A very recently implanted device or lead	Many protocols prefer to wait about 6 weeks after implant so the leads are well settled before an MRI.
Scanning the chest area itself	Chest MRI is closest to the device and gets extra care. It is still often done, just with closer planning and monitoring.
Being pacemaker-dependent (your heart relies on pacing)	Very manageable — the team sets a steady pacing mode for the scan and watches you closely throughout.



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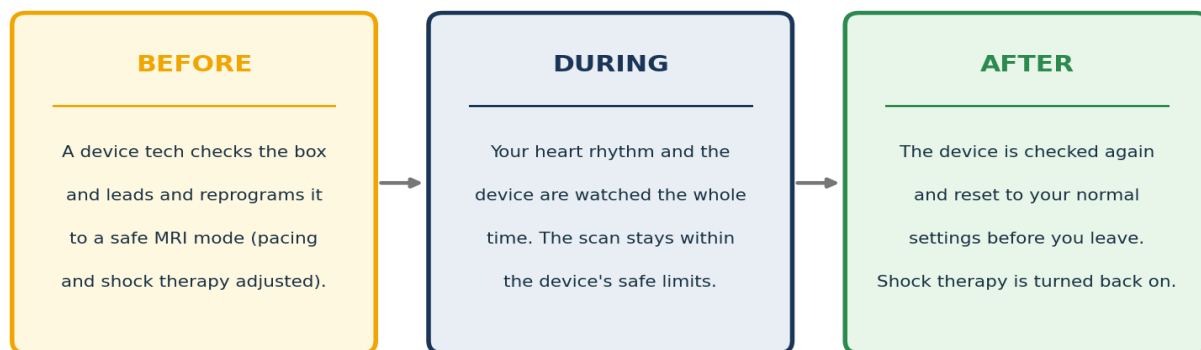


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Treatment Options

- Step one is always the same. Tell the team you have a heart device, and bring your device ID card. The card has the exact box and lead model numbers they need.
- Your cardiology or device clinic checks two things. Is your whole system MRI-conditional? And is the scan you need within the allowed rules?
- **BEFORE** the scan: a device tech checks your device and sets it to a safe MRI mode. For an ICD, shock therapy is paused so the scanner cannot set off a false shock.
- **DURING** the scan: trained staff watch your heart rhythm and oxygen. The scan stays within your device's safe limits (often a 1.5-Tesla scanner).
- **AFTER** the scan: the device is checked again and reset to your normal settings before you leave. For an ICD, shock therapy is turned back on. Never skip this step.
- The whole visit takes longer than a normal MRI because of the device checks before and after. Plan for the extra time.
- Other scans need **NO** special device steps. CT scans, X-rays, ultrasound, echocardiograms, and mammograms are all safe with any heart device.

How a Safe Scan Is Done — Before, During, and After



*A safe scan is a planned 3-step process. **BEFORE**: the device is checked and switched to a safe MRI mode (for an ICD, shock therapy is paused). **DURING**: your heart and the device are monitored. **AFTER**: the device is checked again and reset to your normal settings, with ICD shock therapy turned back on before you leave.*



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Abandoned or Capped Leads — A Special Situation

- When a device is changed, an old lead is sometimes left in place but disconnected and capped, because removing it is a bigger procedure than leaving it.
- These abandoned leads are not connected to anything, so they cannot be reprogrammed. The concern is that the scanner's energy could cause heating at the old lead tip.
- This does NOT automatically rule out an MRI. The 2017 Heart Rhythm Society consensus treats abandoned leads as a case-by-case decision for an experienced team.
- Your device team weighs the value of the scan against a small theoretical risk, reviews your chest X-rays, and uses careful settings and monitoring if the scan goes ahead.
- Tell every imaging team if you have ever had a device replaced or a lead left behind — even from many years ago. It changes how they plan the scan.

Leadless Pacemakers, Loop Recorders, and Other Devices

- Leadless pacemakers (such as Micra) are tiny capsules placed inside the heart with no wires and no chest box. Most current models are MRI-conditional.
- Implantable loop recorders are small monitors placed under the skin to record your heart rhythm. Most are MRI-conditional as well.
- Because these devices have no traditional leads, some of the lead-related MRI concerns do not apply — but your team still confirms the exact model and sets up the scan properly.
- To learn more about your specific device, see our companion guides: Pacemakers and ICDs (<https://go.riasalimd.com/pacer-icd-guide>), ICD and CRT devices (<https://go.riasalimd.com/icd-crt-guide>), Leadless pacemakers (<https://go.riasalimd.com/leadless-pacer-guide>), Loop recorders (<https://go.riasalimd.com/loop-recorder-guide>), and Cardiac MRI of the heart (<https://go.riasalimd.com/cmr-guide>).
- Whatever your device, the rule is the same: tell the imaging team, bring your card, and let your cardiology team plan a safe scan.



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Comfort Measures at Home (No Medication Needed)

These simple steps support healing and ease symptoms. Use them alongside any medication your doctor prescribes.

- Keep your device ID card in your wallet and bring it to every imaging visit — even for non-MRI tests, it answers questions fast.
- When you schedule any MRI, say up front: 'I have a pacemaker' or 'I have an ICD.' Say it again when you arrive. It is normal and expected — never an annoyance.
- Ask whether the scan will be done at a center set up to handle heart devices, with a device tech available. Larger hospitals and many imaging centers do this routinely.
- Take a photo of your device card on your phone as a backup, and add your device type to your phone's medical ID.
- If you feel any unusual sensation during the scan, use the squeeze-ball or call button to tell the technologist right away.
- After the scan, confirm with staff that your device was checked and reset before you go home — especially that ICD shock therapy is back on.



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Risks, Benefits, and Alternatives

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

Option	Risks	Benefits	Alternatives
MRI in a patient with an MRI-conditional device system	Very low risk when the rules are followed. Possible but uncommon issues: a temporary settings change, brief unwanted pacing, or mild warmth. These are minimized by the safe-mode setup and monitoring.	You get the best possible pictures of the brain, spine, joints, or a tumor — often when no other test can show the problem as clearly. The scan is done within the device's tested limits.	CT scan (uses X-rays — fine with any device but less detail for soft tissue and nerves). Ultrasound (no magnet — good for some questions). A non-contrast or limited study if appropriate.
MRI in a patient with a legacy (non-conditional) device	A bit more care is needed, so it is done at an experienced center with a set plan. Studied in over 1,500 patients (MagnaSafe) with no device or lead failures when the plan was followed.	Lets you have a needed MRI even with an older device, instead of missing an important answer. Your device team decides based on your exact system.	CT or ultrasound when they can answer the question. Referral to a center experienced with device MRI. In rare cases, a different test plan if MRI truly cannot be done safely.
Scanning with an abandoned (capped) lead in place	The main concern is heating at the old lead tip. This is judged case by case by an experienced team, weighing the value of the scan against a small theoretical risk.	Still allows MRI in many people who have an old lead left behind. The team uses careful settings and monitoring to keep risk low.	CT or ultrasound if they suffice. A specialized center for the MRI. Lead removal is a much bigger procedure and is not done just to allow a scan.



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Option	Risks	Benefits	Alternatives
Pausing ICD shock therapy for the scan	Shock therapy is OFF during the scan, so the device cannot stop a dangerous rhythm in that short window. This is why trained staff and monitoring are required throughout.	Prevents a false shock triggered by the scanner — which would be painful and pointless. Therapy is turned back on immediately after the scan.	There is no good way around pausing therapy during the scan. The safeguard is close monitoring, with therapy turned back on right after.



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Common Misconceptions

Myth	Reality
Having a pacemaker or ICD means I can never get an MRI.	Not true anymore. Most modern devices are MRI-conditional. Even many older ones can be scanned safely at the right center. The old 'no MRI' rule is outdated.
If my device box is MRI-conditional, I'm all set.	Not by itself. The leads (wires) must be MRI-conditional too. A conditional box with an old non-conditional lead is NOT a conditional system. The MRI team checks the whole system.
MRI-conditional means there are no rules.	The opposite — it means 'safe UNDER certain conditions.' There are rules about scanner strength, the body area, and the device settings. The team follows those rules for a safe scan.
CT scans, X-rays, and mammograms are dangerous with my device.	False. Those tests do not use a strong magnet. They are safe with any heart device, and need no special steps. Only MRI needs the extra planning.
The MRI staff will already know I have a device, so I don't need to mention it.	Always tell them yourself, every time — and bring your device ID card. Records can be incomplete. Speaking up is the single most important safety step you can take.
An old, capped lead from a past device makes MRI impossible.	It is a special situation, not an automatic 'no.' An experienced device team weighs the small risk against the value of the scan and often can still do it safely.
My leadless pacemaker or loop recorder is too small to matter for MRI.	Size is not the issue — the label is. Leadless pacemakers and loop recorders are usually MRI-conditional. Your team still checks the exact model and sets up the scan the right way.



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Possible Complications

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

Where / What	What Can Happen
Temporary change in device settings	The scanner's energy can occasionally shift a setting (an 'electrical reset'). This is why the device is checked and reset right after the scan — the restore step catches and fixes it.
Brief unwanted or paused pacing	During the scan the device runs in a safe mode, which can feel slightly different. Trained staff monitor your heartbeat the whole time and adjust if needed.
Mild warmth near the device or lead tip	A small amount of heating can occur, more of a concern with abandoned or non-conditional leads. Keeping the scan within tested limits and using a protocol keeps this very low.
False ICD shock if therapy is not paused	If an ICD's shock therapy were left on, the scanner could trigger a needless shock. This is exactly why shock therapy is turned OFF before the scan and back ON after.
Image blur near the device	The metal box can create a shadow or blur on pictures taken close to it. For most scans (brain, spine, knee) this does not matter. For chest images, the team plans around it.
Problems from skipping the after-scan check	The biggest avoidable risk is leaving without the device being reset — for example, ICD shock therapy left off. Always confirm your device was checked and restored before you go home.



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Points to Know

If you remember nothing else, remember these key points.

- In most cases today, YES — you can have an MRI with a pacemaker or ICD. It is planned ahead, not an emergency, and done as a supervised scan.
- BOTH the box AND the leads must be MRI-conditional for a routine conditional scan. A conditional box alone is not enough.
- Even older, non-conditional (legacy) devices can usually be scanned safely. This is done at a center with a device team and a set plan.
- Always tell the MRI / radiology team you have a heart device, and bring your device ID card — every single time.
- A safe scan is a 3-step process: the device is CHECKED and reprogrammed before, you are MONITORED during, and it is RESET to normal after.
- Abandoned or capped leads are a special situation — your experienced device team decides case by case.
- CT scans, X-rays, ultrasound, echocardiograms, and mammograms are all SAFE with any heart device.
- Leadless pacemakers and loop recorders are usually MRI-conditional too — your team confirms the model first.
- Never skip a needed MRI just because you have a device. Ask your care team first. There is almost always a safe path.



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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.

- Before scheduling ANY MRI — call us first so we can confirm your device system and set up a safe scan.
- If an imaging center tells you that you cannot have a needed MRI because of your device — call us before you give up on the scan. There is usually a safe option.
- If you are not sure whether your device or leads are MRI-conditional — call and we will look it up from your records.
- If you cannot find your device ID card — call us and we will provide your device and lead details for the imaging team.
- Right after any MRI, if you feel a fast or irregular heartbeat, dizziness, or a shock sensation — call us today; if severe, call 911.
- Before any procedure that uses strong energy near the device — surgery with electrocautery, radiation therapy, or shock-wave lithotripsy — call us first to prepare the device.
- If you have an abandoned or capped lead and need an MRI — call us so we can arrange the scan at an experienced center.

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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.

- [Cleveland Clinic — Permanent Pacemaker](#) - Patient-friendly overview of living with a pacemaker, including MRI and everyday safety questions.
- [Mayo Clinic — MRI: Safety and Implanted Devices](#) - Plain-language explanation of MRI safety and what to tell the imaging team if you have an implant.
- [Heart Rhythm Society — Patient Resources](#) - Patient education from the society that wrote the expert consensus on MRI in device patients.
- [American Heart Association — Devices for Arrhythmia](#) - AHA overview of pacemakers, ICDs, and CRT in plain language, with general device precautions.
- [FDA — MRI: Benefits and Risks](#) - Government explanation of MRI safety and what MR-Conditional labeling means for implanted devices.
- [MedlinePlus — Pacemakers and Implantable Defibrillators](#) - Government health resource summarizing device basics, follow-up, and safety.



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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.

- [HRS Expert Consensus Statement — MRI and Radiation Exposure in Patients With CIEDs \(2017\)](#) [Guideline]
Professional consensus on safely scanning patients with pacemakers and ICDs, including legacy (non-conditional) devices and abandoned leads
- [Russo et al. — MagnaSafe Registry \(NEJM 2017\)](#) [Research]
Prospective registry of 1,500 patients showing non-MRI-conditional devices can be scanned at 1.5 T under a protocol with no device or lead failures
- [Nazarian et al. — MRI in Patients With Non-Conditional Cardiac Devices \(NEJM 2017\)](#) [Research]
Prospective study of 1.5 T MRI in patients with legacy (non-conditional) pacemakers and ICDs
- [FDA — MRI: Benefits and Risks \(Implanted Devices\)](#) [Regulatory]
FDA explanation of MR Conditional labeling and what it means for an implanted device system
- [Cleveland Clinic — Permanent Pacemaker \(Living With a Device\)](#) [Patient-Education]
Plain-language living-with-a-device guidance, including MRI considerations
- [Cleveland Clinic — Magnetic Resonance Imaging \(MRI\)](#) [Patient-Education]
Patient explanation of MRI and how it is performed safely with implanted hardware
- [Mayo Clinic — MRI: Safety and Implanted Devices](#) [Patient-Education]
Patient-facing MRI safety overview, including implanted devices and what to tell the imaging team
- [AHA — Devices That May Be Used for Arrhythmia](#) [Patient-Education]
AHA overview of pacemakers, ICDs, and everyday precautions
- [Medtronic — Micra Leadless Pacemaker \(MR Conditional\)](#) [Manufacturer]
Manufacturer confirmation that the leadless pacemaker is labeled MR Conditional
- [MedlinePlus — Pacemakers and Implantable Defibrillators](#) [Patient-Education]
Government plain-language summary of device basics and follow-up



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About This Guide

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Reviewer note: Reviewed against Cleveland Clinic, Mayo Clinic, AHA, and the Heart Rhythm Society patient pages. Ours adds: a plain-language conditional-vs-legacy decision map; an explicit point that BOTH the box AND the leads must be MRI-conditional; a before/during/after safe-scan timeline anchored to the 2017 HRS consensus and the MagnaSafe Registry; a device-part safety table; clear coverage of abandoned/capped leads; and reassurance that CT, X-ray, ultrasound, and mammography are all fine.

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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