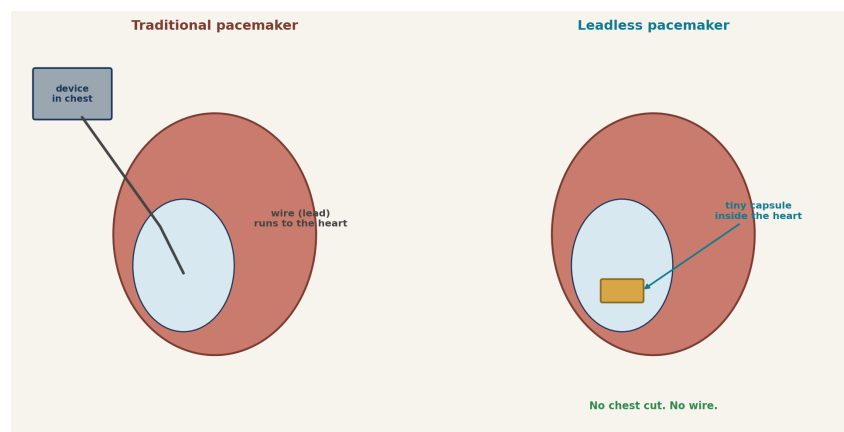


# Understanding the Leadless Pacemaker

A Tiny Wireless Pacemaker Placed Inside the Heart

No chest cut. No wires. A pacemaker the size of a large vitamin pill.



Online: <https://go.riasalimd.com/leadless-pacer-guide>

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Last Updated: August 2026



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## Names & Terms You Will Hear

| Term                     | Meaning                                                                    |
|--------------------------|----------------------------------------------------------------------------|
| Leadless pacemaker       | A small pacemaker with no wires, placed inside the heart itself.           |
| Micra                    | A common brand of leadless pacemaker (Medtronic). Paces the lower chamber. |
| Aveir                    | Another brand (Abbott). Comes in single- and dual-chamber types.           |
| Transcatheter pacemaker  | Placed through a soft tube (catheter) up a leg vein.                       |
| Capsule pacemaker        | A nickname for its small, pill-shaped capsule.                             |
| Single-chamber pacemaker | Paces one chamber, usually the right lower chamber.                        |
| Dual-chamber pacemaker   | Paces the upper and lower chambers so they beat in time.                   |

**A slow heart can be an emergency.** If someone faints and is not breathing normally, **call 911 and start Hands-Only CPR.** Push hard and fast in the center of the chest, about 100 to 120 pushes a minute - the beat of the song *Stayin' Alive*. Send someone for an AED (a heart-shock box). An AED checks the heart first and will not shock a normal rhythm, so it is safe to use. The free PulsePoint app shows the nearest AED.



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## What Is the Leadless Pacemaker?

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- A pacemaker is a small device that keeps your heart from beating too slowly.
- A leadless pacemaker is a tiny capsule, about the size of a large vitamin pill.
- It sits inside your heart. There is no wire and no device pocket under the skin.
- A traditional pacemaker has two parts: a box placed in a chest pocket and one or more wires (called leads) that run to the heart. The leadless type removes both.
- It is placed through a vein in your leg, not through a cut in your chest.
- Once in place, you cannot see or feel it. Most people forget it is there.
- It does the same main job: it watches your heartbeat and gives a gentle pace when your heart is too slow.



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## Why It Matters

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- A slow heartbeat can make you tired, dizzy, short of breath, or cause fainting.
- Pacing keeps your heart rate steady so blood reaches your brain and body.
- Most pacemaker problems over the years come from the wires or the chest pocket. Removing both removes those risks.
- There is no bump under the skin and no chest scar to heal.
- There are fewer limits on arm movement after the procedure.
- Wound and pocket infections are very rare because there is no pocket.
- It is a good fit when the skin or veins in the chest are not ideal for a traditional device.



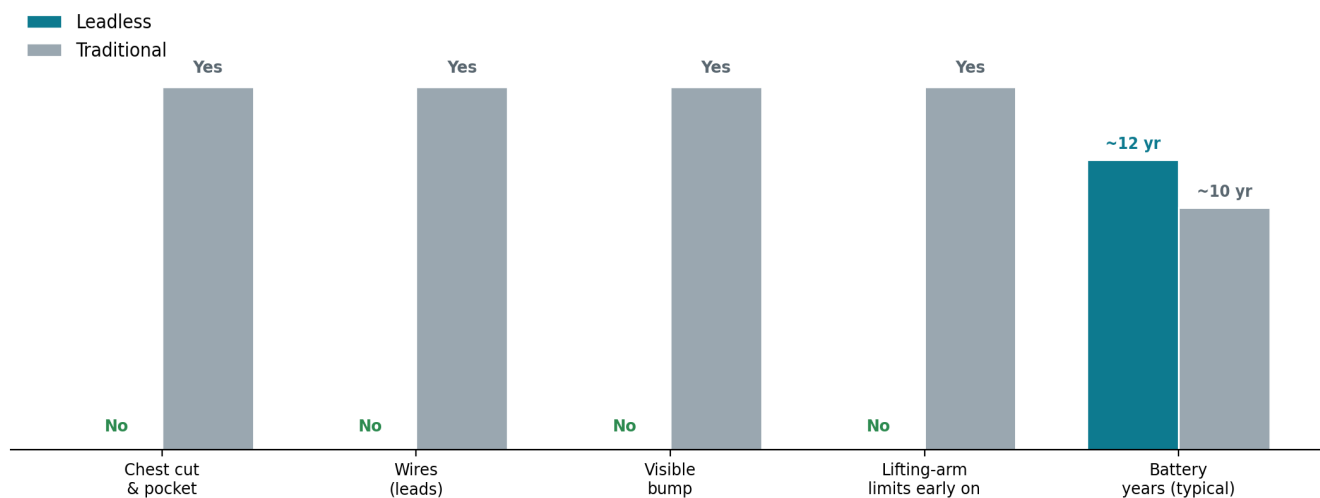
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## Leadless vs Traditional Pacemaker — At a Glance



*How a leadless pacemaker compares with a traditional one. 'No' marks an advantage of the leadless type.*



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## Who Is a Good Candidate for a Leadless Pacemaker

- People who need pacing mainly in the lower chamber, such as atrial fibrillation with a slow pulse.
- People with a past pocket or wire infection who need to avoid those parts.
- People with blocked or scarred chest veins, where the usual lead route is hard.
- People at higher infection risk, such as those on dialysis.
- People who want no chest scar or bump, or who need fewer arm-motion limits.
- With the newer dual-chamber type, more people who need both chambers paced can now choose leadless.



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## Who May Be Better With a Traditional Pacemaker

- People who need special pacing of both lower chambers to help a weak heart (called CRT).
- People who also need a defibrillator (ICD) to stop dangerous fast rhythms.
- Very small leg veins that cannot safely fit the delivery tube.
- Some people who may need the device removed or revised later, which is simpler with leads.
- Your care team weighs your rhythm, heart function, and anatomy to pick the safest fit.



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## Risk Factors

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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                                                |
|---------------------------------------|----------------------------------------------------------------------|
| Slow heart rate (bradycardia)         | The heart's natural pacemaker fires too slowly to meet your needs.   |
| Heart block                           | The signal from the top of the heart does not reach the bottom well. |
| Atrial fibrillation with a slow pulse | A common reason for a single-chamber leadless device.                |
| Fainting from a slow rhythm           | Pacing can prevent blackouts caused by long pauses.                  |
| Prior pocket or lead infection        | A leadless device avoids the parts that got infected before.         |
| Poor or blocked chest veins           | When chest veins are scarred or blocked, the leg-vein route helps.   |
| Higher infection risk                 | Dialysis or a weak immune system can make a pocket riskier.          |



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## Treatment Options

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- The device is placed in a cath lab, not an operating room. You are awake with light sedation.
- A soft tube goes up a vein in your leg to the heart. The capsule is set inside the right lower chamber and hooked to the heart wall.
- We test it on the spot to be sure it paces well, then release it. The whole procedure often takes about an hour.
- Named devices: Micra (Medtronic) and Aveir (Abbott). Micra AV and Aveir DR can sense the upper chamber, so the heart beats more naturally.
- Single-chamber leadless paces only the lower chamber. Dual-chamber leadless (Aveir DR) paces the upper and lower chambers together.
- Battery life is long. Micra studies project about 12 to 16 years for newer models; the device is checked at clinic visits.
- When the battery runs low, a new capsule can be placed. The old one is usually left in place safely, or some newer devices can be retrieved.
- Most people go home the same day or the next morning.



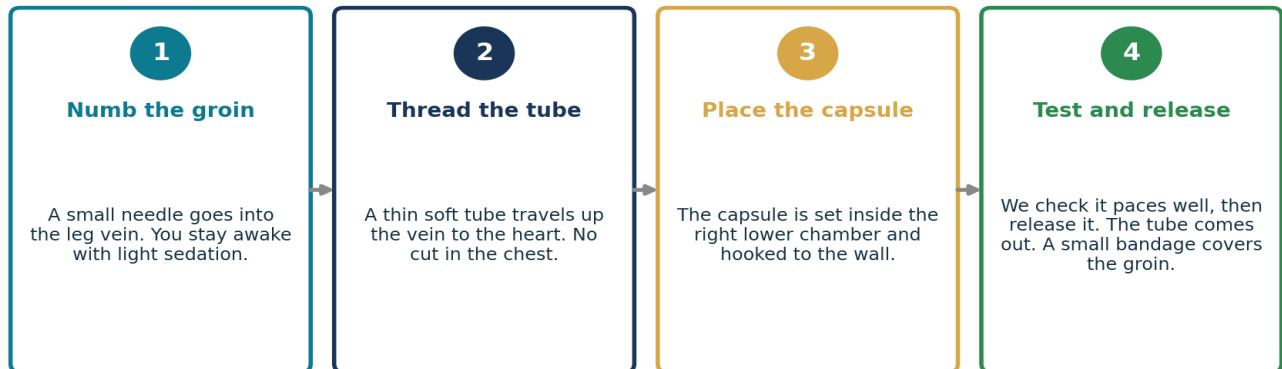
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## How a Leadless Pacemaker Is Placed



*The four steps of placing a leadless pacemaker through a leg vein. No chest cut is needed.*

## Which leadless device fits which need

| Device type                         | What it paces                             | Good fit when                                                              |
|-------------------------------------|-------------------------------------------|----------------------------------------------------------------------------|
| Single-chamber (Micra VR, Aveir VR) | Right lower chamber only                  | Atrial fibrillation with a slow pulse, or pacing needed only now and then. |
| Atrial-sensing (Micra AV)           | Lower chamber, timed to the upper chamber | Heart block when a more natural beat is wanted without a second device.    |
| Dual-chamber (Aveir DR)             | Upper and lower chambers together         | When both chambers need pacing and a leadless option is preferred.         |



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## What to Expect on the Day

- You will not eat for several hours before. Take only the medicines we tell you to take.
- You lie flat in the cath lab. The groin is numbed and you get light sedation. You are not put fully to sleep for most cases.
- You may feel pressure but should not feel sharp pain. Tell the team if you do.
- The procedure often takes about an hour. You rest flat for a short time after so the vein seals.
- Most people go home the same day or the next morning with a small groin bandage.
- You get a device ID card. Keep it with you and show it at airports and new doctor visits.

**What the studies show.** In the first pivotal Micra trial, the capsule was placed successfully in 99.2 percent of people, with no device dislodgements and 96 percent free of major problems at 6 months. Five-year real-world data showed a major-complication rate near 4.5 percent. The newer dual-chamber Aveir DR system had a 98.3 percent success rate and kept the chambers in time in over 97 percent of patients at 3 months.



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## Comfort Measures at Home (No Medication Needed)

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

- Keep the small groin bandage clean and dry for the first day or two.
- Avoid heavy lifting and hard straining for a few days, as your care team advises.
- Short, easy walks help your body recover. Build up slowly.
- Drink fluids and rest the first evening after sedation.
- Watch the groin site for swelling, bruising that grows, or bleeding, and call if you see it.
- Carry your device ID card and bring it to every doctor and airport visit.



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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                                                             |
|------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Leadless pacemaker     | Groin-vein bleeding; rare heart-wall poke; device is harder to remove later; most types pace only the lower chamber. | No chest cut, pocket, or wires; very low infection risk; no visible bump; fewer arm limits; quick recovery. | Traditional pacemaker; medicine review; in some cases, watchful waiting. |
| Traditional pacemaker  | Pocket or wire infection; lead can break or move; chest scar and bump; arm-motion limits early on.                   | Long, proven track record; easy to upgrade; many pacing modes; simple to remove or revise.                  | Leadless pacemaker; biventricular (CRT) device when needed.              |
| No pacemaker (for now) | Slow rhythm may cause fainting, falls, or worsening symptoms.                                                        | Avoids any procedure if symptoms are mild and rare.                                                         | Close monitoring; treat reversible causes; revisit if symptoms grow.     |



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## Common Misconceptions

| Myth                                                | Reality                                                                                                              |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| A leadless pacemaker is experimental.               | It is FDA approved and widely used. The first one was approved in 2016, and a dual-chamber version followed in 2023. |
| It works wirelessly with no power source.           | It still has a tiny battery inside. 'Leadless' means no wires to the device, not no battery.                         |
| It can pace every part of the heart.                | Most leadless devices pace the lower chamber only. The newer dual-chamber type can pace the upper chamber too.       |
| It can never be removed.                            | Older capsules are often left in place safely. Some newer devices are made to be retrieved if needed.                |
| Everyone should get the leadless type.              | It is a great option for many, but not all. Your rhythm, heart needs, and anatomy decide the best fit.               |
| It will set off airport alarms or stop near phones. | Modern devices are safe around phones and most daily electronics. Carry your ID card for airport security.           |
| Recovery takes weeks like surgery.                  | Most people go home the same day or the next morning and return to normal activity quickly.                          |



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## Possible Complications

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

| Where / What    | What Can Happen                                                                                           |
|-----------------|-----------------------------------------------------------------------------------------------------------|
| Groin vein site | Bleeding, bruising, or a sore lump where the tube went in. Most settle on their own.                      |
| Heart wall      | Rarely, the capsule can poke or irritate the heart wall, which may cause fluid around the heart.          |
| Device position | Very rarely the capsule shifts. In large studies, dislodgement was extremely rare (well under 1 percent). |
| Pacing function | The capsule may need a setting change at a clinic check to pace just right.                               |
| Blood clot      | A clot can form in the leg vein. Staying active and hydrated lowers this risk.                            |
| Infection       | Far less common than with a traditional device because there is no pocket or wire.                        |



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## Points to Know

If you remember nothing else, remember these key points.

- A leadless pacemaker is a tiny capsule placed inside the heart with no wires and no chest pocket.
- It treats a heart that beats too slowly, the same main job as a traditional pacemaker.
- It goes in through a leg vein, so there is no chest cut and no visible bump.
- Named devices include Micra and Aveir. A dual-chamber type (Aveir DR) can pace the top and bottom of the heart.
- In the pivotal trial, the device was placed successfully in 99 of 100 people, with no dislodgements.
- Infection and wire problems are much less likely because there is no pocket and no leads.
- It is not right for everyone. Your care team picks the best device for your rhythm and your body.
- Carry your device ID card and keep your clinic check-ups so we can watch the battery.



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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.

- Call 911 if you faint, have chest pain, or are very short of breath.
- Call 911 for a fast or pounding heartbeat with dizziness or near-fainting.
- Call us if the groin site bleeds, swells, gets hot, or oozes fluid.
- Call us for a fever over 100.4 degrees or chills after the procedure.
- Call us if you feel very tired, lightheaded, or feel your old slow-heart symptoms return.
- Call us if you feel a steady twitching in your chest or belly muscles.
- Bring your device ID card to every visit and tell any new doctor you have a pacemaker.

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## Trusted Resources

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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.

- [Our Pacemakers and ICDs guide](#) - How traditional pacemakers and ICDs work, and how to live with one.
- [Our Bradycardia and Heart Block guide](#) - Why the heart beats too slowly and when pacing is needed.
- [Our Atrial Fibrillation guide](#) - A common reason for a single-chamber leadless pacemaker.
- [Our Fainting \(Syncope\) guide](#) - When a slow rhythm causes blackouts.
- [Cleveland Clinic — Pacemakers](#) - Plain-language overview including the leadless option.
- [British Heart Foundation — Pacemakers](#) - Patient guide on living with a pacemaker.



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## Sources Used to Build This Guide

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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.

- [Cleveland Clinic — Leadless Pacemaker \[Clinical\]](#)  
Patient overview of pacemakers including the wireless/leadless capsule option.
- [Micra Transcatheter Pacing Study \(NEJM 2016\) \[Clinical Trial\]](#)  
Pivotal IDE trial: 99.2% implant success, 96.0% free of major complications at 6 months, zero device dislodgements.
- [Micra Post-Approval Registry, 5-Year Follow-Up \(European Heart Journal 2024\) \[Clinical Trial\]](#)  
Real-world 5-year data: 4.5% major-complication rate and durable pacing performance.
- [AVEIR DR i2i Study — Dual-Chamber Leadless Pacing \(NEJM 2023\) \[Clinical Trial\]](#)  
Pivotal study for the first dual-chamber leadless system: 98.3% implant success and over 97% AV synchrony at 3 months.
- [ACC — FDA Approves First Dual-Chamber Leadless Pacemaker \(2023\) \[Guideline\]](#)  
ACC summary of the FDA approval that expanded leadless candidacy beyond single-chamber pacing.
- [2018 ACC/AHA/HRS Guideline on Bradycardia and Cardiac Conduction Delay \[Guideline\]](#)  
Guideline framing for pacing indications and device selection (leadless vs transvenous).
- [British Heart Foundation — Pacemakers \(incl. leadless\) \[Clinical\]](#)  
Patient-facing explainer of how a leadless pacemaker differs from a traditional one.



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## About This Guide

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**Version:** 2026-08-15

**Reviewer note:** Reviewed Cleveland Clinic, British Heart Foundation, and Medtronic/Abbott patient materials. This guide adds named devices (Micra, Aveir), the dual-chamber advance, trial numbers by name, and a clear candidate-vs-traditional comparison.

### 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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