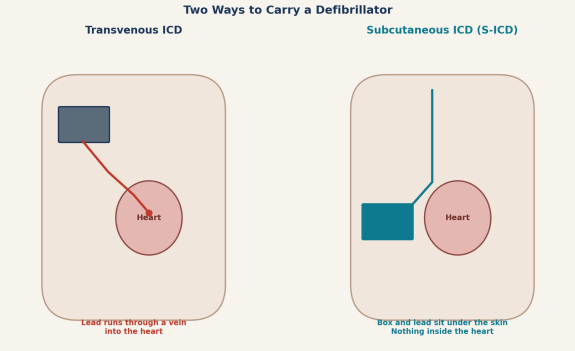
Understanding the Subcutaneous ICD

A defibrillator with no wires inside your heart — how it guards against sudden death, and who it fits

The box and the wire sit under the skin. Nothing touches the inside of your heart.



Online: https://go.riasalimd.com/s-icd-guide

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Names & Terms You Will Hear

Term	Meaning
S-ICD	Subcutaneous implantable cardioverter-defibrillator. A defibrillator placed under the skin, with no wire inside the heart.
Subcutaneous	Under the skin. This is where both the device and its wire sit.
ICD	Implantable cardioverter-defibrillator. A device that watches the heart rhythm and shocks a dangerous fast rhythm back to normal.
Transvenous ICD (TV-ICD)	The older, standard type. Its wire runs through a vein into the heart. The S-ICD avoids this.
Lead	The wire that carries the shock. In an S-ICD the lead runs under the skin near the breastbone, not in the heart.
Sudden cardiac arrest (SCA)	The heart suddenly stops pumping because of a dangerous rhythm. It is fatal in minutes without a shock. This is what an ICD guards against.
Ventricular fibrillation (VF)	A chaotic, fast heart rhythm. The heart quivers and cannot pump. An ICD treats it with a shock.
Ventricular tachycardia (VT)	A very fast rhythm from the lower heart chambers. It can be deadly. An ICD shocks it back to normal.
Defibrillation	Delivering a strong shock to reset a dangerous fast rhythm. This is the S-ICD's main job.
Pacing	Sending tiny signals to speed up a slow heart. The S-ICD does NOT do this. A patient who needs pacing needs a different device.

If someone collapses and is not breathing normally:

1. **Call 911** right away (or have someone else call).
2. **Start Hands-Only CPR** — push hard and fast in the center of the chest, about 2 inches deep, 100 to 120 pushes a minute. Push to the beat of the song "Stayin' Alive."
3. **Send someone for an AED** and use it as soon as it arrives. An AED will NOT shock a normal heart, so it is safe to use. The PulsePoint app helps you find the nearest one.

An ICD protects the person who has one — but bystander CPR keeps blood flowing until help arrives.

What Is the Subcutaneous ICD?

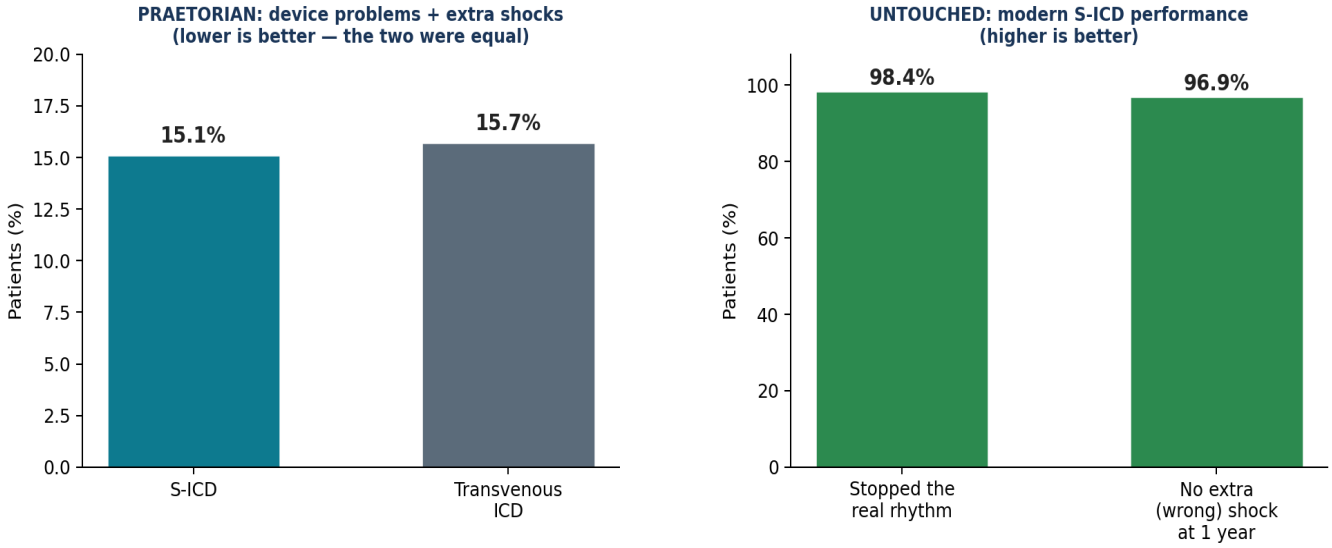
- The subcutaneous ICD (S-ICD) is a defibrillator placed completely under the skin. The box sits on the side of the chest. A single wire runs under the skin alongside the breastbone.
- Its one job is to stop sudden cardiac death. It watches your heart rhythm without stopping. If it sees a dangerous fast rhythm, it delivers one strong shock to reset the heart.
- The key difference from the older ICD: no wire goes through a vein into your heart. The whole system stays under the skin. The heart and the veins are left untouched.
- Because nothing touches the inside of the heart, there are no lead-in-the-heart problems — no vein scarring and a lower chance of a dangerous lead infection reaching the bloodstream.
- The trade-off: the S-ICD cannot pace a slow heart, and it cannot give the special fast pacing (called ATP) that can sometimes stop a rhythm without a shock.
- Before the device is placed, we do a simple skin-surface test (screening EKG) to make sure the device can read your heart clearly. Most people pass this test.

S-ICD vs Transvenous ICD — Side by Side

Feature	Subcutaneous ICD (S-ICD)	Transvenous ICD
Where the wire goes	Under the skin, near the breastbone	Through a vein, into the heart
Stops a fatal fast rhythm	Yes — by shock	Yes — by shock
Can pace a slow heart	No	Yes
Painless fast pacing (ATP)	No	Yes
Lead-in-heart problems	None — no heart wire	Possible over the years
Bloodstream infection risk	Lower	Higher

Why It Matters

- Sudden cardiac arrest kills within minutes. A working defibrillator is the only reliable way to stop it once it starts. For the right patient, an ICD is lifesaving.
- The wire inside the heart is the weakest part of the older ICD. Over years, those wires can crack, fail, or get infected. Removing a wire from the heart is risky.
- The S-ICD removes that weak point. In the PRAETORIAN trial of 849 patients, the S-ICD had fewer wire-related problems than the older type.
- The chart below shows the headline trial numbers. The two device types were equal for the combined rate of device problems plus extra shocks. The S-ICD won on lead safety.
- Modern S-ICDs rarely give a wrong shock. In the UNTOUCHED trial of 1,116 patients, wrong shocks happened in only about 3 of every 100 patients in the first year.
- Choosing the right device up front matters. The S-ICD is a great fit for many younger patients and those at higher infection risk — but only if they do not need pacing.



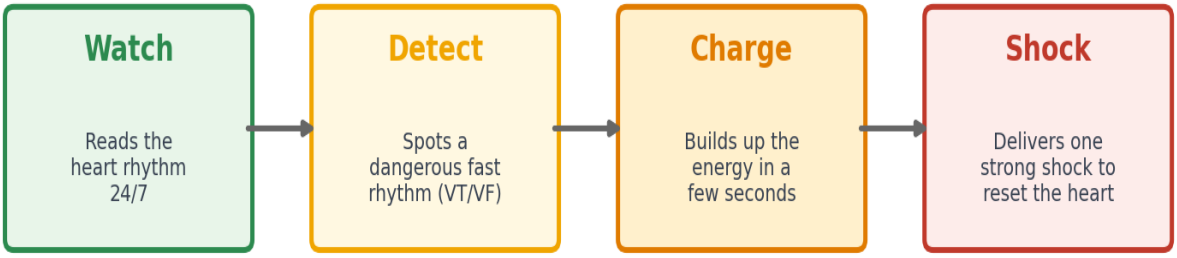
Headline trial numbers. PRAETORIAN: the S-ICD and the older ICD were equal for device problems plus extra shocks. UNTOUCHED: modern S-ICDs stop the real rhythm almost every time and rarely give a wrong shock.

Who Is a Good Fit — and Who Is Not

Strong Fit	Maybe — Discuss	Not a Fit
• Needs an ICD but NOT pacing	• Borderline screening EKG	• Needs pacing for a slow heart
• Younger patient (decades of leads ahead)	• Possible future pacing need	• Needs CRT for heart failure
• Higher infection risk	• Very thin or very large body shape	• Has VT best treated by ATP
• Hard or risky vein access	• Heart Team review helps here	• Fails the screening EKG
• Passes the screening EKG		

Treatment Options

- The procedure is done under sedation or light anesthesia. It usually takes 1 to 2 hours. Most people go home the same day or the next morning.
- There are two or three small cuts: one for the box on the side of the chest, and one or two near the breastbone to place the wire under the skin. No vein is entered.
- Before you leave, we may test the device once while you are asleep to confirm it senses and shocks correctly.
- Expect soreness for a week or two. Avoid raising the arm fully overhead or lifting heavy objects for a few weeks while the area heals.
- The device checks itself and sends reports to our office automatically, often through a small bedside or phone monitor. You will still come in for regular checks.
- The battery lasts about 5 to 7 years. When it runs low, we replace the box in a short procedure. The under-skin wire usually stays in place.
- The flow below shows what the device actually does in an emergency: it watches, detects, charges, and shocks — all on its own, in seconds.



Most episodes are stopped by the first shock. The S-ICD does not pace a slow heart — it treats fast, dangerous rhythms.

What the device does in an emergency: it watches the rhythm, detects a dangerous fast rhythm, charges, and delivers one strong shock — all on its own, in seconds.

The one big trade-off, in plain terms: the S-ICD shocks a dangerous fast rhythm, but it cannot speed up a slow heart and it cannot give the painless fast pacing (ATP) that the older device can. If your team thinks you may need pacing now or later, a transvenous ICD or another device may suit you better.

Comfort Measures at Home (No Medication Needed)

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

- Wear loose clothing over the device site while it heals. A soft pillow against the seatbelt eases car rides.
- Keep the incisions clean and dry as instructed. Do not soak in a bath or pool until we clear you.
- Carry your device ID card. Show it at airport security — walk through, do not linger in the scanner, and never let anyone place a magnet over the device unless your team says so.
- Keep cell phones and strong magnets at least 6 inches from the device. Normal household electronics, microwaves, and airport scanners are safe to pass.
- Learn what a shock feels like (a sudden strong thump or kick) so it does not frighten you. One shock, then feeling fine, usually means the device did its job.
- Ask your family to learn Hands-Only CPR and how to use an AED. The device protects you, but loved ones who can act add another layer of safety.

Risks, Benefits, and Alternatives

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

Option	Risks	Benefits	Alternatives
Subcutaneous ICD (S-ICD)	Cannot pace a slow heart or give painless ATP. Slightly higher chance of a wrong shock than newest transvenous devices. Box is felt more on the chest.	No wire in the heart or veins. Fewer lead problems over time. Lower risk of a bloodstream infection. Good for younger patients and those at infection risk.	Transvenous ICD. Leadless pacemaker plus future modular options. Wearable vest (short term).
Transvenous ICD (TV-ICD)	Wire runs through a vein into the heart. Over years the wire can fail or infect. Removing a heart wire is a higher-risk procedure.	Can pace a slow heart. Can give painless ATP to stop some rhythms without a shock. Smaller box, less felt on the chest.	Subcutaneous ICD (if no pacing need). CRT device (if heart failure with delay). Leadless pacemaker (pacing only).
Wearable defibrillator vest	Must be worn nearly all day. Only a short-term bridge. Not a permanent answer. Can be uncomfortable.	No surgery. Useful while a decision is pending or risk may improve (for example, after a new diagnosis).	S-ICD or transvenous ICD once a permanent device is chosen. Close monitoring.
No device (medicines and monitoring only)	No protection from a sudden fatal rhythm. Highest risk if you truly qualify for an ICD.	Avoids surgery and device risks. May be right if the risk of sudden death is low or other illness limits benefit.	Reassess over time. Wearable vest as a bridge. ICD if risk rises.

How the Right Device Gets Chosen (Shared Decision and the Heart Team)

- The first question is simple: do you need pacing? If you need a pacemaker for a slow heart, or CRT for heart failure, the S-ICD is not the right device.
- If you do NOT need pacing, the S-ICD becomes a strong option — guidelines support it as a reasonable choice for these patients.
- Your age and infection risk matter. A younger patient faces decades of device life. Keeping wires out of the heart now can prevent hard wire-removal procedures later.
- A short screening test (a surface EKG with stickers) checks that the device can read your heart clearly in different positions. Most people pass.
- For close calls, a Heart Team — your cardiologist, an electrophysiologist (rhythm specialist), and you — weighs the options together. This is shared decision-making.
- See our companion guides: Pacemakers and ICDs, ICD and CRT for heart failure, and the leadless pacemaker.

Common Misconceptions

Myth	Reality
The S-ICD can do everything the regular ICD does.	Not quite. The S-ICD is excellent at stopping a dangerous fast rhythm with a shock. But it cannot pace a slow heart, and it cannot give painless fast pacing (ATP). If you need pacing, you need a different device.
Having no wire in the heart means it is weaker.	The opposite. Keeping the wire out of the heart removes the part most likely to fail or infect over the years. In trials the S-ICD matched the older device overall and had fewer wire problems.
The shock will hurt the people touching me.	No. The shock stays inside your body. Someone touching you may feel a tiny harmless tingle at most. They should keep doing CPR if you are unresponsive.
If I have an S-ICD, I do not need anyone to learn CPR.	You still do. If your heart stops, bystander CPR keeps blood flowing until the device works or help arrives. CPR and the device work together, not instead of each other.
The S-ICD treats a slow heartbeat too.	It does not. The S-ICD only treats fast, dangerous rhythms. A slow heartbeat that needs treatment requires a pacemaker — a separate device.
Once I have the device, I can never get an MRI or fly.	Modern S-ICDs are built for MRI scans under the right settings, and flying is fine. Just show your device card at airport security and keep moving through the scanner.
A device replacement is open-heart surgery.	No. When the battery runs low, we replace the box through the old small incision. It is a short procedure. The under-skin wire usually stays right where it is.

Possible Complications

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

Where / What	What Can Happen
Wrong (inappropriate) shock	Sometimes the device mistakes a harmless fast rhythm for a dangerous one and shocks. It is uncomfortable but not harmful. Modern programming has made this uncommon — about 3 in 100 patients in the first year.
Device-site infection	Any implant can get infected. Because the S-ICD has no wire in the bloodstream, infections are usually easier to treat than with a heart wire. Watch for redness, swelling, warmth, or fever.
Pain or the box being felt	The S-ICD box sits on the side of the chest and can be felt more than the older type, especially in thin patients. Soreness is common at first and usually settles.
It cannot pace a slow heart	This is the main limitation, not a malfunction. If you later need pacing for a slow rhythm, you would need a separate device, such as a pacemaker or a different ICD.
Failure to sense correctly	Rarely, the device may read the rhythm poorly (for example, with certain body positions or EKG patterns). The screening test before placement is done to prevent this.
Skin erosion	Rarely, the box or wire can press against the skin and start to wear through. This needs a minor revision. Report any spot that feels like it is poking through.

Points to Know

If you remember nothing else, remember these key points.

- The S-ICD is a defibrillator placed entirely under the skin. No wire goes into your heart or veins.
- Its one job is to stop sudden cardiac death by shocking a dangerous fast rhythm back to normal.
- Big trade-off: it cannot pace a slow heart, and it cannot give painless fast pacing (ATP).
- It is a strong fit for younger patients and people at higher infection risk who do NOT need pacing.
- In trials it matched the older ICD overall and had fewer wire-related problems.
- Modern devices rarely give a wrong shock — about 3 in 100 patients in the first year.
- A simple skin-surface test (screening EKG) before placement confirms the device can read your heart.
- Ask your family to learn Hands-Only CPR and how to use an AED. The device and a prepared family are the strongest combination.

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.

- You collapse or someone finds you unresponsive and not breathing normally — this is an emergency. A bystander should call 911 and start CPR right away.
- You get a shock and then feel unwell, have chest pain, or pass out — call 911.
- You get a shock but feel completely fine afterward — call our office the same day so we can read the device.
- You get two or more shocks close together — call 911; this needs urgent attention.
- Redness, swelling, warmth, drainage, or fever near the device site — call us today; this could be an infection.
- The device site opens, bleeds, or the box feels like it is poking through the skin — call us today.
- You feel a steady buzzing or repeated small jolts when you feel otherwise well — call us promptly.
- New fainting, near-fainting, or a very slow pulse — call us; the S-ICD does not treat slow rhythms.

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Protecting Each Other: CPR, AEDs, and Family Readiness

- Your S-ICD protects you. But if it is ever not enough, or if someone near you collapses, fast bystander action saves lives.
- Hands-Only CPR is two steps: call 911, then push hard and fast in the center of the chest at 100 to 120 pushes a minute. No mouth-to-mouth is needed.
- An AED (automated external defibrillator) is safe for anyone to use. It checks the rhythm first and will NOT shock a normal heart. Open it and follow the spoken steps.
- Find AEDs ahead of time in your gym, workplace, school, and place of worship. The free PulsePoint app maps nearby AEDs and alerts trained bystanders.
- If your sudden-death risk runs in the family, ask us whether close relatives should be screened.
- To learn more about the emergency itself, see our Sudden Cardiac Arrest and VT and VF guides.

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 — Subcutaneous ICD (S-ICD) - Plain-language overview of the no-wire-in-the-heart defibrillator and who it suits.
- British Heart Foundation — ICDs - Patient explainer of how ICDs work and what life with one is like.
- American Heart Association — Hands-Only CPR - Two-step Hands-Only CPR every family member should learn.
- PulsePoint — Find a nearby AED - App that helps you and bystanders find the nearest AED in an emergency.

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.

- Cleveland Clinic — Subcutaneous ICD (S-ICD) *[Clinical]*
  Patient overview of the no-leads-in-the-heart defibrillator and who it suits.
- PRAETORIAN — Subcutaneous or Transvenous ICD (NEJM 2020) *[Clinical Trial]*
  Pivotal randomized trial of 849 patients showing the S-ICD was non-inferior to the transvenous ICD for the combined rate of device complications and inappropriate shocks (15.1 percent vs 15.7 percent), with fewer lead-related complications.
- UNTOUCHED — S-ICD in Primary Prevention With Low EF (Circulation 2021) *[Clinical Trial]*
  1,116 primary-prevention patients with EF 35 percent or lower: inappropriate shock rate 3.1 percent at 1 year and a 98.4 percent rate of successfully stopping true arrhythmias — the modern programming evidence base.
- PRAETORIAN-XL — Long-Term Device Complications (Circulation 2025) *[Clinical Trial]*
  Extended follow-up of the PRAETORIAN cohort confirming the durable lead-complication advantage of the subcutaneous system over time.
- 2017 AHA/ACC/HRS Guideline for Ventricular Arrhythmias and Prevention of SCD *[Guideline]*
  Guideline framing for ICD indications and the recommendation to use an S-ICD in patients who meet ICD criteria but have no pacing need.
- 2025 ACC/AHA/HRS Appropriate Use Criteria for ICDs, CRT, and Pacing (JACC) *[Guideline]*
  Current multi-society appropriate-use framework that places the S-ICD among device options and clarifies when a pacing-capable device is needed instead.
- British Heart Foundation — ICDs *[Clinical]*
  Patient explainer of ICD function used to contrast subcutaneous vs transvenous systems.

About This Guide

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Reviewer note: Reviewed: Cleveland Clinic, British Heart Foundation, and Boston Scientific patient pages. This guide adds a side-by-side S-ICD vs transvenous diagram, a how-a-shock-works flow, a trial-outcomes chart (PRAETORIAN, UNTOUCHED), a good-fit vs not-a-fit comparison table, and a Call-911 / CPR / AED section for families.

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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