Heart Rhythms Made Clear: Dysrhythmias for Nursing Students

Nov 21, 2026 · @Dr. R

About This Book

Hey, I'm Dr. R. Before I was teaching NCLEX prep, I spent years in the ER and the ICU running codes, and I've been an EMT since 2004. I've watched a lot of good nursing students freeze when somebody hands them a rhythm strip. I get it. Those squiggly lines look scary.

Here's my promise to you: by the end of this book, you're going to look at a strip, name it, and know exactly what to do for your patient. Not because you memorized 30 rhythms, but because you learned one way to read every strip and you learned to **look at the patient first.**

We do it the Dr. R way. **Recognize** the pattern. **Connect** it to your patient. **Decide** what the nurse does. That's it.

Author: Dr. Michael J. Rietscha, DNP, MSN, AAS, RN, LNC, EMT-B, TECC, TMP. Coach Nurse Academy (Dr. Rietscha Legal Nurse Consultant, LLC), Greensburg, PA.

NCLEX Domination: Strategies to Pass Your Nursing Program and Your NGN.

The fine print (read it, it matters)

- This book is here to help you learn and pass your exams. It does not replace your nursing program, your hospital's policies, your provider's orders or your judgment at the bedside.
- This is not an official American Heart Association (AHA) book, and it does not replace the AHA ACLS Provider Manual. The treatment content follows the 2025 AHA Guidelines for CPR and Emergency Cardiovascular Care. In an AHA course, always use the current AHA materials.
- Drug doses are here so you can learn them. Check every dose against a current drug reference, the order, and your pharmacist. Every time.
- The rhythm strips in this book are teaching drawings built to real ECG timing. Real strips are messier. Always look at your patient.

- I used OpenStax *Medical-Surgical Nursing* and *Pharmacology for Nurses* (CC BY-NC-SA 4.0) as a checklist to make sure I covered the right topics. No OpenStax text is copied here. Every word is mine.

How to get the most out of this book

1. Read each chapter once for the big picture. The bold sentence at the top of every chapter is the whole idea in a nutshell.
2. Study the strips. Cover the caption and call the rhythm out loud before you read the answer. Yes, out loud.
3. Do the NCLEX-style questions at the end of each chapter before you peek at the answers.
4. Use the **Dr. R Rule** and **Dr. R pearl** boxes as your night-before review.
5. Use the **Bridge to ACLS** box at the end of each chapter, so when you take ACLS you're not starting from scratch.

Two books that work together

	Heart Rhythms Made Clear (this book)	ACLS Prep Companion
Who it's for	Nursing students and new grads	Nurses, physicians, ACLS students
The goal	Name the rhythm, act like a nurse, pass the NCLEX	Lead and run a code
Rhythm depth	Full: how each rhythm forms and what it looks like	Quick review, then the algorithms
Treatment	What the nurse does and when to call for help	Drugs, doses, energy, team roles, megacode
Videos	A Rhythm of the Week video for every chapter	One video for every algorithm

The 5 steps we use on every single strip

1. **Rate:** is it 60 to 100?
2. **Rhythm:** are the R-to-R spaces the same?

3. **P waves:** is there one upright P in front of every QRS?
4. **PR interval:** is it 0.12 to 0.20 seconds, and the same every beat?
5. **QRS:** is it skinny (less than 0.12 seconds)?

Then the question that matters more than all five: **is my patient stable or unstable?** Alright. Let's get to work.

Chapter 1: The Heart's Electrical System

Alright, let's start at the beginning. Every rhythm strip you will ever see is a picture of one electrical path. Learn that path, and every rhythm in this book comes down to two questions: where did the signal start, and where did it get stuck?

What you'll be able to do after this chapter:

1. Trace the signal from the SA node all the way down to the Purkinje fibers.
2. Tell me how fast each backup pacemaker fires.
3. Explain the four things heart cells can do.
4. Match every wave on the strip to what the heart is doing.
5. Name the electrolytes and nerves that mess with the rhythm.

1.1 The heart's wiring

Your heart has its own electrical wiring, kind of like the wiring in your house. The signal starts up top in the SA node, spreads across both atria, takes a quick pause at the AV node, then races down into the ventricles.

Stop on the path	Where it is	How fast it fires on its own	What it does
SA node	Upper right atrium	60-100	The boss. Starts every normal beat.
Atrial pathways	Both atria	Not a backup	Spread the signal so the atria squeeze
AV node and junction	Floor of the right atrium	40-60	Holds the signal about 0.1 second so the ventricles can fill

Stop on the path	Where it is	How fast it fires on its own	What it does
Bundle of His	Top of the septum	40-60	Carries the signal from the AV node down to the ventricles
Right and left bundle branches	Down the septum	20-40	Split the signal to each ventricle
Purkinje fibers	Ventricle walls	20-40	Fire the ventricles from the inside out

So if the SA node quits, the junction steps up at 40 to 60. If the junction quits, the ventricles take over at 20 to 40. Every level down is a backup generator, and every backup is weaker than the one above it.

Dr. R Rule: lower is slower. The further down the path a beat starts, the slower and weaker it is. If you see a rate of 35 with a wide, ugly QRS, the ventricles have taken over, and your patient is running out of backups.

1.2 Four things heart cells can do

- **Automaticity:** the cell can fire all by itself, no nerve needed. That's why the SA node can be the pacemaker, and why other spots can take over.
- **Excitability:** the cell responds when a signal hits it. Too excitable (think low potassium or a heart that isn't getting enough oxygen) and you get extra beats.
- **Conductivity:** the cell passes the signal to the next cell. When this breaks down, you get heart blocks.
- **Contractility:** the muscle actually squeezes. Electricity without a squeeze is pulseless electrical activity (PEA, Chapter 8).

1.3 From electricity to the strip

Depolarization is the heart firing. Repolarization is the heart resetting. The strip shows both. Now here's the thing I want you to remember forever: **the monitor shows electricity, not pumping.** Only a pulse tells you the heart is actually pumping.

Wave or interval	What the heart is doing	Normal
P wave	Atria firing	Upright in lead II, one in front of every QRS
PR interval	Signal traveling from the SA node to the ventricles, including the AV pause	0.12-0.20 second
QRS complex	Ventricles firing	Less than 0.12 second
ST segment	Ventricles finishing up and starting to reset	Flat
T wave	Ventricles resetting	Upright in most leads
QT interval	The whole ventricle fire-and-reset	Depends on rate; usually less than half the R-to-R

You never see the atria reset. That happens during the QRS, so it's hidden.

The danger zone. From the QRS to the top of the T wave, the ventricles can't fire again no matter what (absolute refractory). On the downslope of the T wave, a strong enough signal can fire them (relative refractory). A PVC that lands right there, called **R-on-T**, can throw your patient into V-tach or V-fib.

1.4 What messes with the rhythm

- **The vagus nerve (parasympathetic):** slows everything down. Bearing down, vomiting and suctioning can drop the heart rate fast.
- **Fight or flight (sympathetic):** speeds it up. Pain, fear, fever, blood loss and stimulants all push the rate up.
- **Potassium:** too high gives you peaked T waves, then a wide QRS and a slow rate. Too low gives you U waves, PVCs and V-tach.
- **Magnesium:** too low stretches out the QT and sets up torsades.
- **Calcium:** too low stretches the QT; too high shortens it.
- **Oxygen and blood flow:** a heart that isn't getting enough oxygen is a cranky, irritable heart.
- **Meds:** beta blockers (the "-ololS"), calcium channel blockers (diltiazem, verapamil) and digoxin all slow the rate and the AV node.

Dr. R pearl. A new rhythm on the monitor is a symptom, not a diagnosis. Before you pick up the phone, go look at your patient. Then check the potassium, magnesium, oxygen sat and the med list. Trust me, the provider is going to ask.

Chapter 1 NCLEX-style practice

Alright, let's see what you've got.

1. The nurse sees a regular rhythm at 38 with a wide QRS and no P waves. Which spot is most likely pacing the heart?
    - A. SA node
    - B. Atrial pathways
    - C. AV junction
    - D. Ventricles (Purkinje fibers)
2. Which part of the strip includes the pause at the AV node?
    - A. QRS complex
    - B. PR interval
    - C. T wave
    - D. QT interval
3. A patient's potassium is 2.9 mEq/L. Which rhythm change should the nurse watch for?
    - A. Peaked T waves
    - B. PVCs and U waves
    - C. A short QT
    - D. Sinus bradycardia only
4. During suctioning, the heart rate drops from 82 to 44. What does the nurse do first?
    - A. Give atropine
    - B. Keep suctioning to clear the airway
    - C. Stop suctioning and oxygenate the patient
    - D. Get ready to pace
5. **NGN matrix.** For each one, does it raise (R) or lower (L) the heart rate? Pain; vomiting; fever; metoprolol; blood loss; bearing down.
6. Which student statement shows they understand the ECG?
    - A. "A normal ECG means the heart is pumping well."
    - B. "The T wave shows the atria resetting."
    - C. "The ECG shows electricity. I still need to check a pulse."

- D. "The QRS shows the SA node firing."

Answers and why

1. **D.** Lower is slower. 20 to 40, wide QRS, no P waves means the ventricles are running the show. A junctional rhythm would usually be skinny at 40 to 60.
2. **B.** The PR interval includes that little pause at the AV node that lets the ventricles fill.
3. **B.** Low potassium makes the heart cells cranky: PVCs and U waves. Peaked T waves go with high potassium.
4. **C.** Suctioning hits the vagus nerve. Stop the trigger, give oxygen, and the rate usually comes right back. Atropine and pacing are for slow rates that stick around and cause symptoms.
5. **Raises:** pain, fever, blood loss. **Lowers:** vomiting, metoprolol, bearing down.
6. **C.** Electricity is not a pulse. PEA proves it.

Bridge to ACLS. ACLS Prep Companion Chapter 1 runs through these same stops in 10 minutes, then asks you one question on every strip: is the patient stable or unstable? Video: *Episode 1: The Heart's Wiring in 6 Minutes*.

Chapter 2: Reading the Strip

Here's a secret: you don't need to memorize 30 rhythms. You need one method, and you use it the exact same way on every strip. Rate, rhythm, P waves, PR interval, QRS. Then look at your patient.

What you'll be able to do after this chapter:

1. Measure time and height on ECG paper.
2. Put 3-lead and 5-lead electrodes in the right spots.
3. Measure the PR, QRS and QT.
4. Figure out a heart rate three different ways.
5. Use the 5 steps on any strip I put in front of you.

2.1 The paper

ECG paper runs at 25 millimeters per second. That means every little box and every big box always equals the same amount of time. Always.

Box	Size	Time	Height
Small box	1 mm	0.04 second	0.1 mV
Big box (5 small)	5 mm	0.20 second	0.5 mV
5 big boxes	25 mm	1 second	—
30 big boxes	150 mm	6 seconds	—

Dr. R Rule: 4, 20, 1, 6. Small box, 0.04. Big box, 0.20. Five big boxes, 1 second. Thirty big boxes, 6 seconds. Say it with me: 4, 20, 1, 6. Most monitor strips you print are 6 seconds long, so this one gets used every day.

2.2 Leads and where the stickers go

A lead is just a camera angle. It looks at the heart's electricity from one direction. Lead II looks from the right shoulder down toward the left leg, the same way the normal signal travels. So in lead II, your P waves and QRS complexes stand up nice and tall. That's why it's the go-to monitoring lead.

3-lead: white on the right upper chest, black on the left upper chest, red on the left lower chest. Remember it like this: "white on the right, smoke over fire." Black smoke goes over the red fire.

5-lead: add green on the right lower chest, and brown in the V1 spot (4th space, just right of the breastbone).

Before you call a code, look at the patient. I can't say this enough. Shivering, tremors, brushing teeth, a loose sticker or dried-out gel can all make a strip look like a deadly rhythm. If your patient is sitting up talking to you, they are not in V-fib.

2.3 Measuring the intervals

- **PR interval:** from the start of the P wave to the start of the QRS. Normal is 0.12 to 0.20 (3 to 5 small boxes). Longer than 0.20? Traffic is backed up at the AV node. That's a first-degree block (Chapter 6).
- **QRS:** from start to finish of the QRS. Normal is less than 0.12 (under 3 small boxes). Wide means the beat started down in the ventricles, or the signal is crawling through them.

- **QT:** from the start of the QRS to the end of the T wave. It should be less than half the R-to-R. A long QT sets your patient up for torsades. A lot of drugs stretch it out, like haloperidol, ondansetron and some antibiotics.

2.4 Figuring out the heart rate

Method	How	Best for
6-second method	Count the QRS complexes in 6 seconds, times 10	Any rhythm, especially irregular ones
Big box method	300 ÷ the number of big boxes between two R waves	Regular rhythms
Small box method	1,500 ÷ the number of small boxes between two R waves	Regular rhythms, most exact

For the big box method, memorize this countdown: 300, 150, 100, 75, 60, 50. Find an R wave on a dark line. If the next R wave lands two big boxes away, that's 150. Four boxes away, 75.

And count your P waves separately too. When the P rate and the QRS rate don't match? Think heart block.

2.5 The 5 steps

1. **Rate:** count the atria and the ventricles. Slow (under 60), normal (60 to 100) or fast (over 100)?
2. **Rhythm:** are the R-to-R spaces the same? Grab some calipers, or mark three R waves on the edge of a piece of paper and slide it down the strip.
3. **P waves:** are they there? Upright? One in front of every QRS? Do they all look alike?
4. **PR interval:** normal (0.12 to 0.20)? Same every beat? Getting longer?
5. **QRS:** skinny (under 0.12) or wide?

Then the Dr. R question: stable or unstable? Unstable means the rhythm is causing low blood pressure, a change in mental status, signs of shock, chest pain or acute heart failure. Unstable patients get action now, not more staring at the strip.

Dr. R pearl. Treat the patient, not the monitor. A heart rate of 45 in a sleeping marathon runner? Normal. A heart rate of 45 in a confused patient with a pressure of 78/40? That's an emergency.

Chapter 2 NCLEX-style practice

Let's put those 5 steps to work.

1. A PR interval measures 6 small boxes. What is it?
    - A. 0.12 second
    - B. 0.20 second
    - C. 0.24 second
    - D. 0.30 second
2. On a 6-second strip, the nurse counts 7 QRS complexes. What's the heart rate?
    - A. 42
    - B. 60
    - C. 70
    - D. 84
3. The R-to-R is 4 big boxes. What's the heart rate?
    - A. 50
    - B. 75
    - C. 100
    - D. 150
4. The monitor alarms for V-fib. The patient is sitting up, talking and brushing his teeth. What does the nurse do first?
    - A. Call a code
    - B. Defibrillate
    - C. Assess the patient and check the electrodes
    - D. Start chest compressions
5. **NGN highlight.** A patient on haloperidol has this note: "HR 88, QT 0.52 sec, K 3.1, Mg 1.4, alert and oriented." Highlight the findings that raise the risk of torsades.
6. Which lead is the standard for routine monitoring?
    - A. Lead I
    - B. Lead II
    - C. aVR
    - D. V6

Answers and why

1. **C.** 6 × 0.04 = 0.24. That's over 0.20, so you've got a first-degree block.

2. **C.** 7 × 10 = 70.
3. **B.** 300 ÷ 4 = 75. Remember the countdown: 300, 150, 100, 75.
4. **C.** He's talking and brushing his teeth. He's perfusing. That's artifact until proven otherwise.
5. **QT 0.52, K 3.1, Mg 1.4** (and the haloperidol). Long QT plus low potassium plus low magnesium is a setup for torsades.
6. **B.** Lead II follows the normal path of the signal, so everything stands up tall and easy to see.

Bridge to ACLS. In ACLS you use these same 5 steps, just faster: name it, decide stable or unstable, then jump to the right algorithm. Video: *Episode 2: Read Any Strip in 5 Steps*.

Chapter 3: Sinus Rhythms

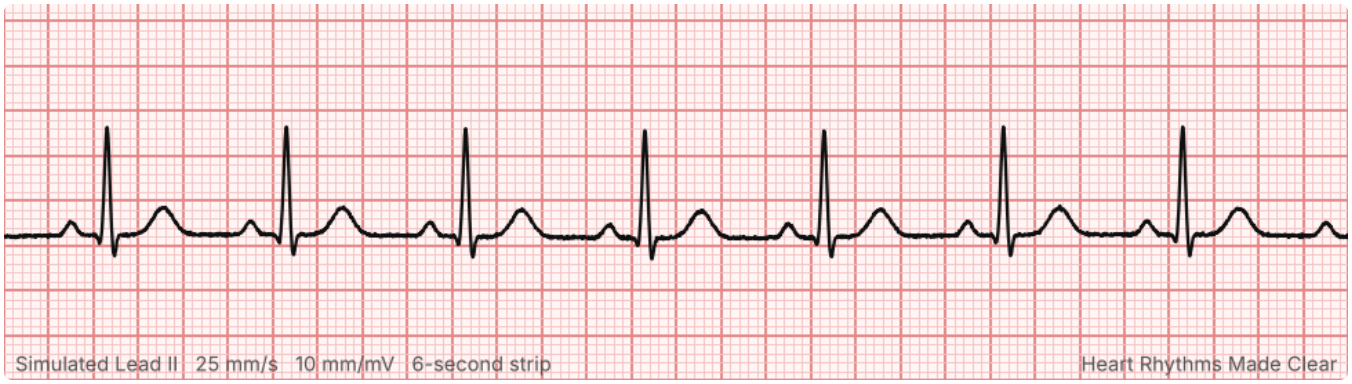
Every sinus rhythm signs its name the same way: an upright P wave in front of every QRS, a normal PR, and a skinny QRS. The only things that change are the speed and the spacing. So your question is always the same: why is the rate off, and is my patient handling it?

What you'll be able to do after this chapter:

1. Name normal sinus rhythm, sinus brady, sinus tach, sinus arrhythmia and sinus pause or arrest.
2. Tell me what causes each one.
3. Know when a sinus rhythm is making your patient unstable.
4. Pick the first thing the nurse does for each.

3.1 Normal sinus rhythm (NSR)

Figure 3-1. Normal sinus rhythm.



Rate	Rhythm	P waves	PR	QRS
60-100	Regular	Upright, one in front of every QRS	0.12-0.20	Less than 0.12

Let's take a look. P, QRS, T. P, QRS, T. P, QRS, T. Everything measures normal, everything is evenly spaced. Boring, right? Good. Boring is beautiful. This is your home base. Learn this strip so well that anything different jumps right off the page at you.

3.2 Sinus bradycardia

Figure 3-2. Sinus bradycardia.



Rate	Rhythm	P waves	PR	QRS
Less than 60	Regular	Normal	Normal	Skinny

Everything looks just like normal sinus. It's just slow. Count it: 1, 2, 3, 4, 5 complexes in 6 seconds. That's 50.

What causes it? Sleep, athletes, the vagus nerve (vomiting, bearing down, suctioning), being cold, low thyroid, rising pressure in the brain, an inferior MI, and meds: beta blockers, calcium channel blockers, digoxin and opioids.

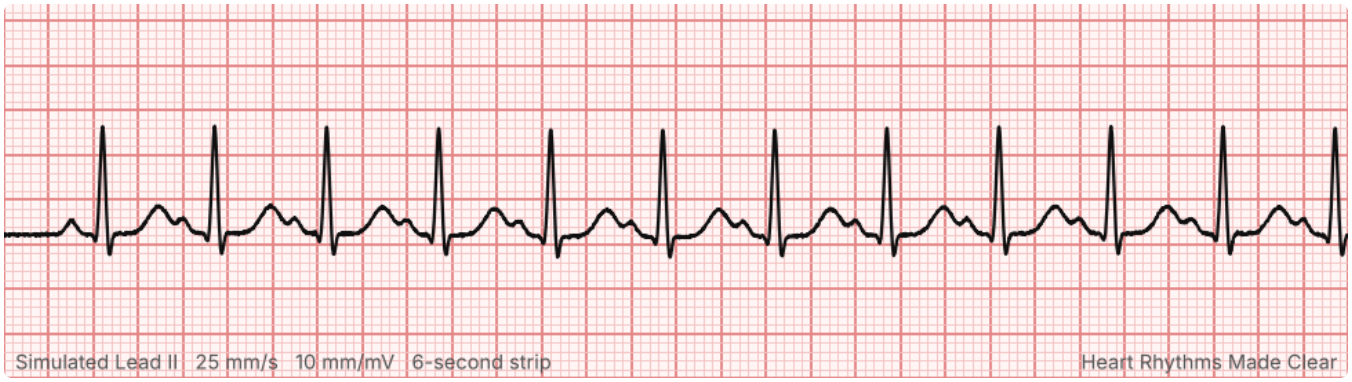
What do you do?

- **Patient feels fine:** watch it, find the cause, and if the rate or BP is below your hold parameters, hold the next slowing drug and call the provider.
- **Patient has symptoms** (low BP, dizzy, confused, chest pain, signs of shock): now we're in the bradycardia algorithm. Airway and oxygen, IV access, a 12-lead, and get the atropine and the pacing pads ready.

Dr. R pearl. Slow heart rate plus high blood pressure plus weird breathing in a patient with a head injury? That's Cushing's triad. The pressure in the brain is going up. That's a neuro emergency. Call it in.

3.3 Sinus tachycardia

Figure 3-3. Sinus tachycardia.



Rate	Rhythm	P waves	PR	QRS
101-150 (rarely higher in adults)	Regular	Normal; can run into the T wave when it's fast	Normal	Skinny

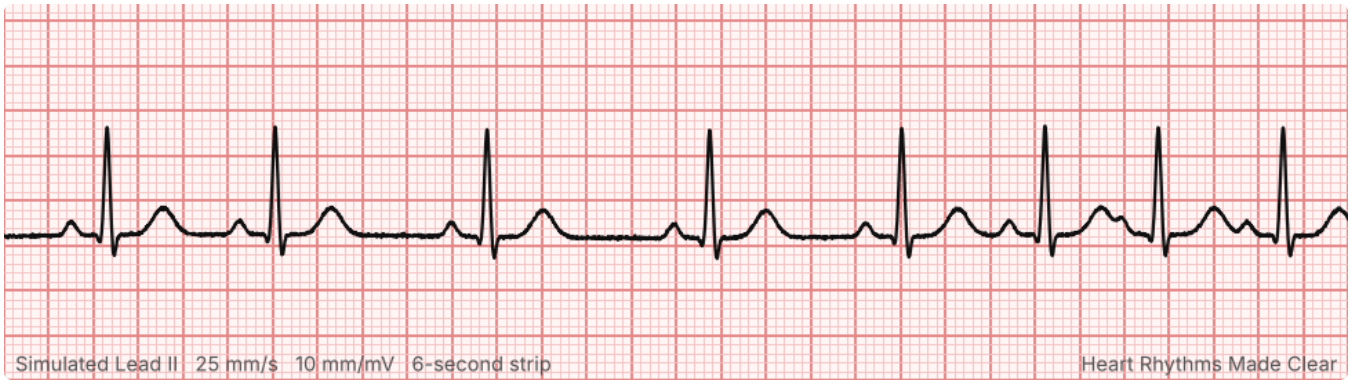
What causes it? Pain, fever, anxiety, dehydration, blood loss, low oxygen, infection and sepsis, a PE, heart failure, an overactive thyroid, caffeine, nicotine, stimulants, and drugs like albuterol and epinephrine.

Dr. R Rule: sinus tach is the messenger, not the problem. You treat the cause, not the number. Never, ever give a drug to slow down a heart that's racing to make up for blood loss or sepsis. That heart is trying to save your patient's life.

What do you do? Go hunting for the cause. Pain? Fever? Fluid loss? Low oxygen? Anxiety? Check the vitals, the sat, the I&O, and the recent labs (hemoglobin, glucose, potassium).

3.4 Sinus arrhythmia

Figure 3-4. Sinus arrhythmia.

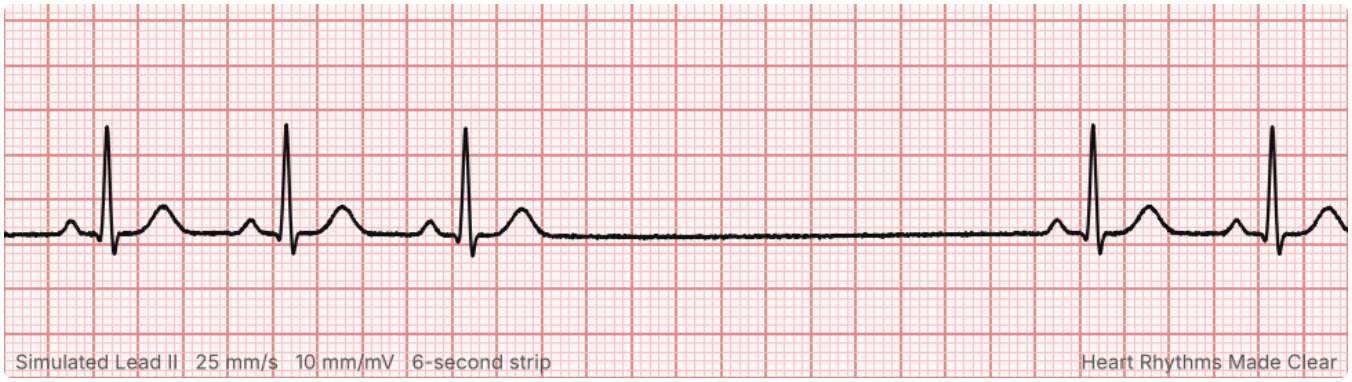


Rate	Rhythm	P waves	PR	QRS
Usually 60-100	Irregular: speeds up when they breathe in, slows down when they breathe out	Normal	Normal	Skinny

This one's common and harmless, especially in kids and young adults. No treatment. Just tell the patient it's normal. Want to prove it? Have them hold their breath. Watch the rhythm even right out.

3.5 Sinus pause and sinus arrest

Figure 3-5. Sinus arrest.



Let's walk it. P, QRS, T. P, QRS, T. P, QRS, T. Then... uh-oh. Flat line. No P, no QRS, nothing. Then the beats come back (or a backup spot kicks in). The SA node just didn't fire.

- **Pause:** a short gap. The gap doesn't line up with the normal R-to-R spacing.
- **Arrest:** a longer gap. Pauses longer than 3 seconds can make your patient dizzy or drop them to the floor.
- **Causes:** sick sinus syndrome, ischemia, the vagus nerve, digoxin, beta blockers, high potassium.

- **What do you do?** Ask about dizziness, fainting and falls. Measure the pause and write it down. Look at the meds. Call the provider. If they're having symptoms, they may need pacing now and a permanent pacemaker later.

Quick comparison

Rhythm	Rate	Regular?	What you focus on first
NSR	60-100	Yes	Nothing. Enjoy it.
Sinus brady	Less than 60	Yes	Symptoms? Meds? Vagus nerve?
Sinus tach	101-150	Yes	Find the cause and fix it
Sinus arrhythmia	60-100	Changes with breathing	Reassure
Sinus pause or arrest	Varies	No; gaps	How long is the pause, symptoms, meds

Chapter 3 NCLEX-style practice

Alright, your turn.

1. A patient's heart rate is 48 after his morning metoprolol. BP 104/66, alert and oriented, no complaints. What does the nurse do first?
    - A. Give atropine 1 mg IV
    - B. Put on the pacing pads
    - C. Assess the patient and call the provider per parameters before the next dose
    - D. Call a rapid response
2. A post-op patient is in sinus tach at 128. What's the priority assessment?
    - A. Pain level only
    - B. Blood pressure, dressing and drain output, and hemoglobin
    - C. Bowel sounds
    - D. Last bowel movement
3. Which finding in a 19-year-old is expected and needs no treatment?
    - A. Sinus arrhythmia that changes with breathing
    - B. A sinus pause of 4 seconds

    - C. Sinus tach at 140 at rest
    - D. Sinus brady at 38 with dizziness
4. **NGN bowtie.** A patient is in sinus brady at 38, BP 78/44, and confused. Pick the **condition** (symptomatic bradycardia, sinus arrhythmia, artifact), **two actions** (get atropine ready; get pacing ready; give metoprolol; have the patient bear down) and **two things to monitor** (BP and mental status; heart rate response; bowel sounds; urine color).
5. A patient with a head injury has HR 46, BP 188/94 and irregular breathing. What does the nurse suspect?
    - A. Hypovolemic shock
    - B. Increased intracranial pressure
    - C. Sepsis
    - D. Low blood sugar

Answers and why

1. **C.** He's stable. Your hold parameters guide the next dose. Atropine and pacing are for slow rates that are causing symptoms.
2. **B.** Bleeding is the most dangerous reason for tach after surgery. Pain matters, but rule out blood loss first.
3. **A.** Sinus arrhythmia with breathing is normal in young people.
4. **Condition:** symptomatic bradycardia. **Actions:** get atropine ready; get pacing ready. **Monitor:** BP and mental status; heart rate response.
5. **B.** Slow heart, wide pulse pressure, weird breathing. That's Cushing's triad, and the brain pressure is climbing.

Bridge to ACLS. Sinus brady with symptoms takes you to the ACLS Bradycardia Algorithm (ACLS Prep Companion Chapter 6). Sinus tach takes you to the Tachycardia chapter, where you'll learn why you never shock sinus tach. Video: *Episode 3: Sinus Rhythms and the Why Behind the Rate*.

Chapter 4: Atrial Rhythms

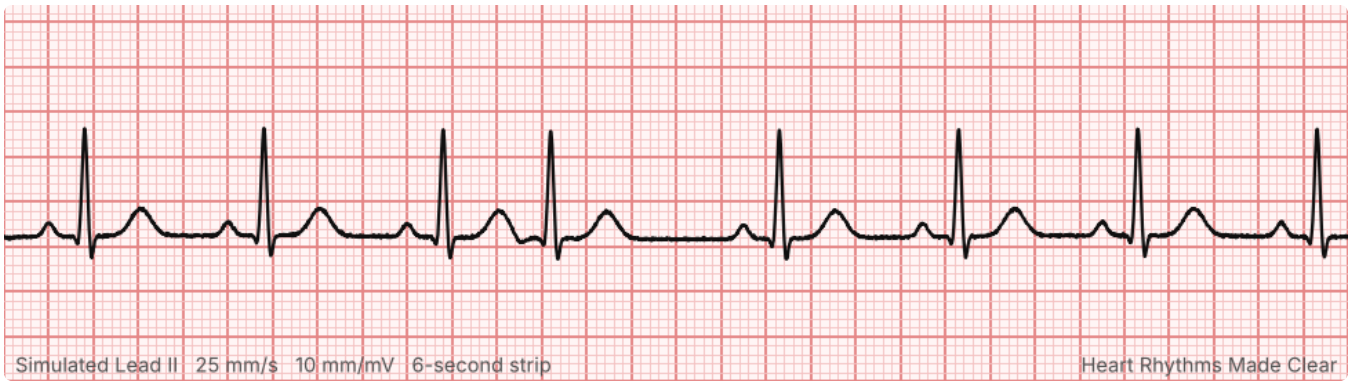
Atrial rhythms start up above the ventricles, so the QRS stays skinny. What changes is the P wave: it shows up early, looks funny, turns into a sawtooth, or disappears completely. And the two big dangers I want you watching for are a heart going too fast to fill, and a clot that leaves the atria and causes a stroke.

What you'll be able to do after this chapter:

1. Name PACs, SVT, atrial flutter and atrial fib.
2. Explain why A-fib causes strokes.
3. Walk through vagal maneuvers and how to push adenosine the right way.
4. Know the nursing priorities for rate control and blood thinners.

4.1 Premature atrial contractions (PACs)

Figure 4-1. Sinus rhythm with a PAC.

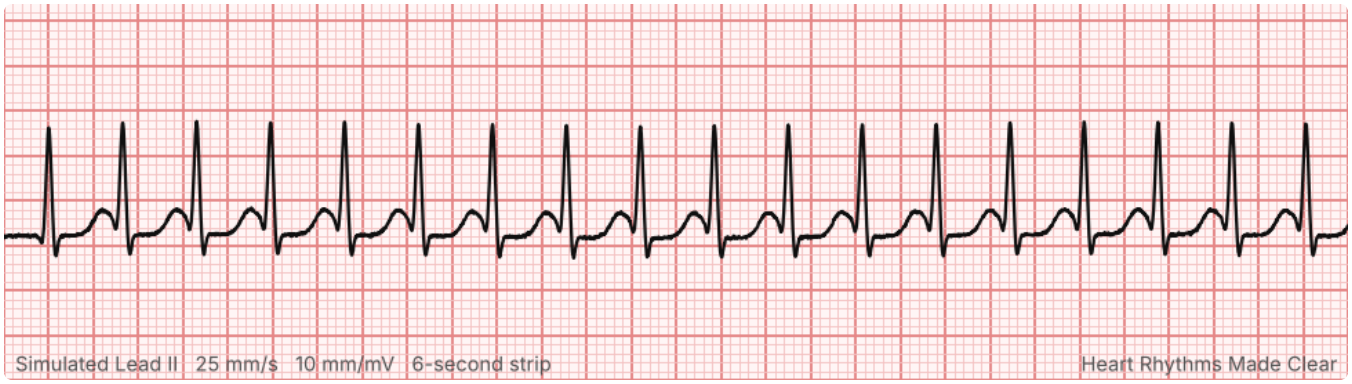


Let's walk it. P, QRS, T. P, QRS, T. P, QRS, T. Then, whoa, a beat shows up early. Look at that P wave. It looks different from the others because it started somewhere else in the atria. The QRS is still skinny. And usually there's a little pause after it.

- **Causes:** caffeine, nicotine, alcohol, stress, being worn out, low oxygen, electrolytes off, heart failure.
- **Why it matters:** usually harmless. But a whole bunch of PACs can be the heart warning you that A-fib is coming.
- **What do you do?** Cut back the triggers, check the electrolytes, and keep an eye out for a new irregular rhythm.

4.2 Supraventricular tachycardia (SVT)

Figure 4-2. Supraventricular tachycardia.



Rate	Rhythm	P waves	PR	QRS
150-250	Very regular	Usually hiding in the T wave	Can't measure it	Skinny

Look at how fast and how even that is. Boom, boom, boom, like a machine gun. SVT usually comes from a short circuit near the AV node. It turns on suddenly and turns off suddenly. Your patient will tell you their heart is pounding, they feel lightheaded, short of breath or anxious.

What do you do (stable patient)?

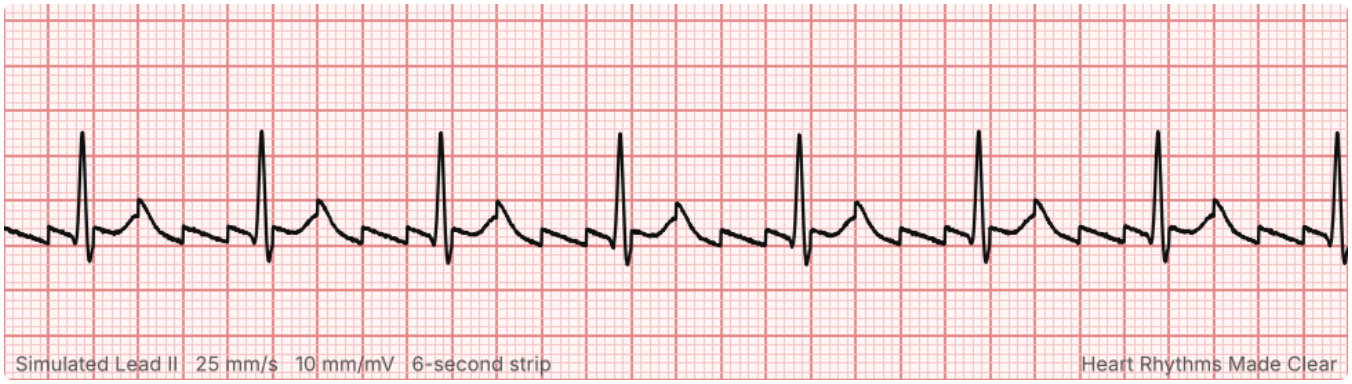
1. Monitor, oxygen if they need it, IV access, 12-lead.
2. **Vagal maneuvers first.** The modified Valsalva works better than just bearing down: have them bear down hard for about 15 seconds, then lay them flat and lift their legs up. Carotid massage is for the provider, not you.
3. **Adenosine** 6 mg rapid IV push in the port closest to the patient, chased right away with a 20 mL saline flush. Didn't work? 12 mg. Adenosine is gone in about 10 seconds, so it's got to get to the heart fast.

Dr. R pearl: warn your patient first. Adenosine makes people feel flushed, tight in the chest, and like something terrible is about to happen. And the monitor may show a short pause or even a flat line for a second. Tell them before you push. And run a strip while you push it.

Unstable SVT (low BP, change in mental status, chest pain, shock, acute heart failure): synchronized cardioversion.

4.3 Atrial flutter

Figure 4-3. Atrial flutter with 4:1 conduction.



Atrial rate	Ventricular rate	Rhythm	Waves	QRS
250-350	Depends on the ratio (2:1 is about 150; 4:1 is about 75)	Usually regular	Sawtooth "flutter waves"	Skinny

Look at the baseline. See those little teeth? Sawtooth, sawtooth, sawtooth. That's one big electrical circuit spinning around and around the right atrium. The AV node blocks some of those signals, so you count how many flutter waves come before each QRS and call the ratio: 2:1, 3:1, 4:1. Count them on this strip: 1, 2, 3, 4, QRS. That's 4:1.

Dr. R Rule: a regular, skinny rhythm at exactly 150? That's atrial flutter with 2:1 block until you prove it isn't. Go looking for that hidden flutter wave.

4.4 Atrial fibrillation (A-fib)

Figure 4-4. Atrial fibrillation.



Atrial rate	Ventricular rate	Rhythm	P waves	QRS
350-600 (total chaos)	Controlled under 100; rapid (RVR) over 100	**Irregularly irregular**	None; just a wiggly baseline	Skinny

This strip is a mess, right? No two R-to-R spaces are the same. There's no pattern to it at all. That's what we mean by irregularly irregular. And where are the P waves? Gone. Just a wiggly line. The atria aren't squeezing anymore. They're quivering like a bowl of Jell-O.

That causes two big problems:

1. **You lose the atrial kick.** Normally the atria top off the ventricles with an extra 20 to 30 percent of the blood. Lose that, add a fast rate, and the blood pressure can drop.
2. **Stroke.** Blood just sits there in the left atrium and clots. If that clot breaks loose, where's it going? Straight to the brain.

Treatment, the Dr. R way: rate, rhythm, clot.

- **Rate:** beta blockers (metoprolol) or calcium channel blockers (diltiazem); digoxin for some heart failure patients. Apical pulse and BP before every dose.
- **Rhythm:** antiarrhythmics (amiodarone) or cardioversion. If the A-fib has been going more than 48 hours (or nobody knows when it started), the patient needs a blood thinner or a scan to rule out a clot first. Shock that heart back into rhythm with a clot sitting there, and you can throw it.
- **Clot:** stroke risk is scored with CHA_2DS_2-VASc. Blood thinners include apixaban, rivaroxaban, dabigatran and warfarin (goal INR usually 2 to 3).

What do you do? Apical pulse for a full minute (and check for a pulse deficit), BP, watch for stroke signs (FAST), bleeding precautions, and teach about the blood thinner: soft toothbrush, electric razor, tell us about black stools, and keep vitamin K steady with warfarin.

Unstable A-fib with RVR: synchronized cardioversion.

Quick comparison

Rhythm	The giveaway	The big danger	Focus first
PAC	Early beat, funny P	Can lead to A-fib	Triggers, electrolytes

Rhythm	The giveaway	The big danger	Focus first
SVT	Regular, 150-250, sudden start	Heart can't fill	Vagal maneuver, adenosine
Atrial flutter	Sawtooth waves	Fast rate; clots	Rate control, blood thinner
Atrial fib	Irregularly irregular, no P	Stroke; low output	Rate, rhythm, clot

Chapter 4 NCLEX-style practice

Alright, let's see what you've got.

1. A patient in stable SVT is ordered adenosine 6 mg IV. Which technique is right?
    - A. Give over 2 minutes in an IV in the hand
    - B. Rapid push in the port closest to the patient, then a 20 mL saline flush
    - C. Mix in 50 mL and run it over 15 minutes
    - D. Give it IM in the deltoid
2. A patient with new A-fib asks why she needs a blood thinner. What's the best answer?
    - A. "It slows your heart rate."
    - B. "It prevents clots that form when the upper chambers quiver, which could cause a stroke."
    - C. "It puts your rhythm back to normal."
    - D. "It lowers your blood pressure."
3. Which strip finding best identifies A-fib?
    - A. Sawtooth waves
    - B. An irregularly irregular rhythm with no P waves
    - C. A regular rhythm at 150
    - D. Wide QRS complexes
4. Before giving diltiazem to a patient in A-fib, the nurse checks:
    - A. Temperature
    - B. Apical pulse and blood pressure
    - C. Blood sugar
    - D. Urine output

5. **NGN matrix.** Match each patient to the first treatment you'd expect: (a) stable SVT, HR 186; (b) A-fib RVR, HR 160, BP 76/40, confused; (c) A-fib, HR 84, CHA_2DS_2-VASc 4. Options: vagal maneuver; synchronized cardioversion; blood thinner.

Answers and why

1. **B.** Adenosine is gone in seconds. It has to hit the heart fast.
2. **B.** Stroke is the whole reason for the blood thinner.
3. **B.** Irregularly irregular with no real P waves is A-fib. Sawtooth is flutter.
4. **B.** Diltiazem slows the heart and drops the pressure. Hold it per your parameters.
5. **(a)** vagal maneuver; **(b)** synchronized cardioversion, because she's unstable; **(c)** blood thinner.

Bridge to ACLS. SVT, flutter and A-fib with RVR are the skinny-QRS side of the ACLS Tachycardia Algorithm (ACLS Prep Companion Chapter 7), with the adenosine doses and cardioversion energies. Video: *Episode 4: SVT, Flutter and A-Fib in 7 Minutes*.

Chapter 5: Junctional Rhythms

When the SA node goes quiet, the AV junction steps up and takes over. The QRS stays skinny, but look at the P wave: it's upside down, hiding, or showing up after the QRS. That's because the signal is traveling backward up into the atria.

What you'll be able to do after this chapter:

1. Explain why the P wave flips upside down, and the three places it can show up.
2. Name junctional escape, accelerated junctional and junctional tach just by the rate.
3. Name the big causes, especially digoxin toxicity.
4. Know what the nurse does for each.

5.1 Why the P wave looks wrong

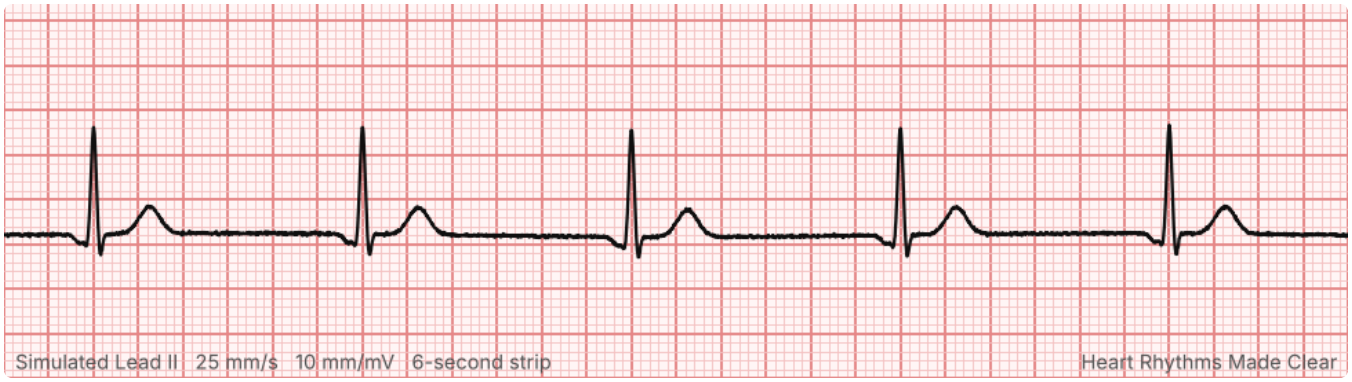
A junctional beat starts right in the middle of the heart. The signal goes down to the ventricles the normal way, so the QRS stays skinny. But it also goes backward, up into the atria. That backward trip shows up as an **upside-down P wave in lead II.** And where that P lands depends on which trip finishes first:

- **In front of the QRS**, with a short PR (under 0.12)
- **Hiding inside the QRS**, so you don't see a P at all
- **After the QRS**, sitting in the ST segment

Dr. R Rule: skinny QRS + upside-down or missing P = think junction.

5.2 The three junctional rhythms: you name them by the rate

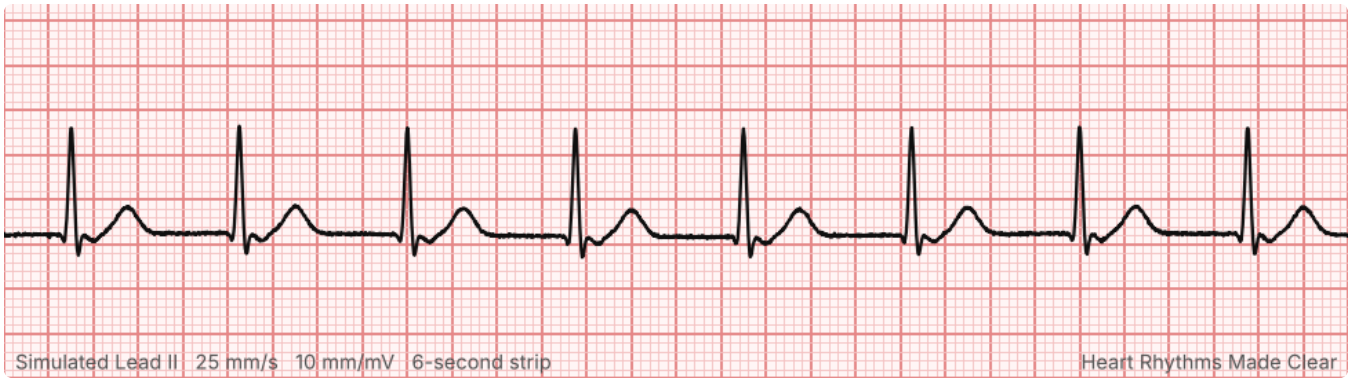
Figure 5-1. Junctional escape rhythm.



Let's look. Skinny QRS. Skinny QRS. Skinny QRS. Nice and regular. Now look right in front of each one. See that little dip? That's your upside-down P. Count the complexes: 1, 2, 3, 4, 5 in 6 seconds. About 50. That's the junction doing its job as the backup generator.

Rhythm	Rate	Regular?	What it means
Junctional escape	40-60	Yes	The SA node quit; the junction is the backup
Accelerated junctional	61-100	Yes	The junction is cranky and firing faster than it should
Junctional tachycardia	Over 100	Yes	The junction is really cranky

Figure 5-2. Accelerated junctional rhythm.



Same skinny QRS, same regular rhythm, but faster, about 80. No upright P in front. If you look closely, there's a little upside-down P sitting right after each QRS. Remember: the junction's normal speed is 40 to 60. At 80, it's speeding.

5.3 What causes it?

- SA node disease (sick sinus syndrome) and an inferior wall MI
- **Digoxin toxicity.** This is the classic one. If you see accelerated junctional or junctional tach, your brain should go straight to digoxin.
- Heart surgery (especially after valve surgery)
- Low oxygen, electrolytes off, rheumatic heart disease
- Beta blockers and calcium channel blockers that knock the SA node down

5.4 What do you do?

1. **Check perfusion.** A junctional escape at 42 with no atrial kick can drop that pressure.
2. **Think digoxin.** Check the level (the safe range is narrow, often 0.5 to 2.0 ng/mL; many references use 0.5 to 0.9 for heart failure), check the potassium (low potassium makes toxicity worse), and ask about symptoms: nausea, vomiting, not wanting to eat, confusion, and vision changes like yellow-green halos.
3. **Hold the drug** that's causing it and call the provider.
4. **Slow junctional with symptoms?** Follow the bradycardia approach: atropine and pacing.
5. **Do not try to get rid of an escape rhythm.** It's the backup keeping your patient alive.

Dr. R pearl. Never give a drug to "get rid of" a slow escape rhythm. Think about it: if you knock out the backup generator, what's left? Nothing. Find out why the SA node stopped, and support the rate if your patient is unstable.

Chapter 5 NCLEX-style practice

Alright, your turn.

1. A strip shows a regular rhythm at 52, a skinny QRS and upside-down P waves after each QRS. What is it?
    - A. Sinus bradycardia
    - B. Junctional escape rhythm
    - C. Idioventricular rhythm

    - D. Atrial fibrillation
2. A patient on digoxin goes into accelerated junctional rhythm and complains of nausea and blurry yellow vision. Besides the digoxin level, which lab does the nurse check?
    - A. Sodium
    - B. Potassium
    - C. Calcium
    - D. Glucose
3. Why shouldn't the nurse give an antiarrhythmic to get rid of a junctional escape rhythm?
    - A. It's the heart's backup pacemaker
    - B. It always goes away on its own
    - C. Antiarrhythmics don't affect the junction
    - D. It's just artifact
4. **NGN cloze.** A junctional rhythm has a (normal / short) PR interval, a (narrow / wide) QRS, and P waves that are (upright / inverted) in lead II.

Answers and why

1. **B.** 40 to 60, skinny QRS, backward P waves. That's your junctional escape.
2. **B.** Low potassium cranks up the risk of digoxin toxicity.
3. **A.** Knock out the escape rhythm and there may be nothing left.
4. **Short; narrow; inverted.**

Bridge to ACLS. A junctional escape rhythm that's causing symptoms gets treated with the ACLS Bradycardia Algorithm (ACLS Prep Companion Chapter 6). Video: *Episode 5: The Junction, the Heart's Backup Generator*.

Chapter 6: Heart Blocks

Alright, welcome back. I'm glad you're sticking with me, because this is the chapter where a lot of nursing students start to sweat. Heart blocks. Here's the good news: there are only four of them, there's a poem that does most of the work for you, and by the end of this chapter you're going to spot them every time.

▶ **Watch me first:** How Nurses Really React To Hearing About Heart Blocks (10 min). Then come back and we'll break each one down.

SCAN TO WATCH DR. R

How Nurses Really React To Hearing About Heart Blocks

10 min · youtu.be/e2olb75b_PE

What you'll be able to do after this chapter:

1. Name all four heart blocks off a 6-second strip.
2. Tell me which ones are "keep an eye on it" and which ones are "get the pads on now."
3. Answer the NCLEX question about what the nurse does first.

6.1 Think of it like a traffic jam

The SA node sends the signal down. The AV node is the toll booth. In a heart block, something is slowing traffic down at that toll booth, or stopping it completely. That's it. That's all a heart block is.

So every time you see a strip, you're asking me two questions:

1. **How long is the PR interval?** (How long is traffic waiting at the toll booth?)
2. **Does every P wave get a QRS?** (Does every car make it through?)

6.2 The heart block poem

I want you to know this poem cold. Say it out loud. Write it on a sticky note. Put it on your bathroom mirror.

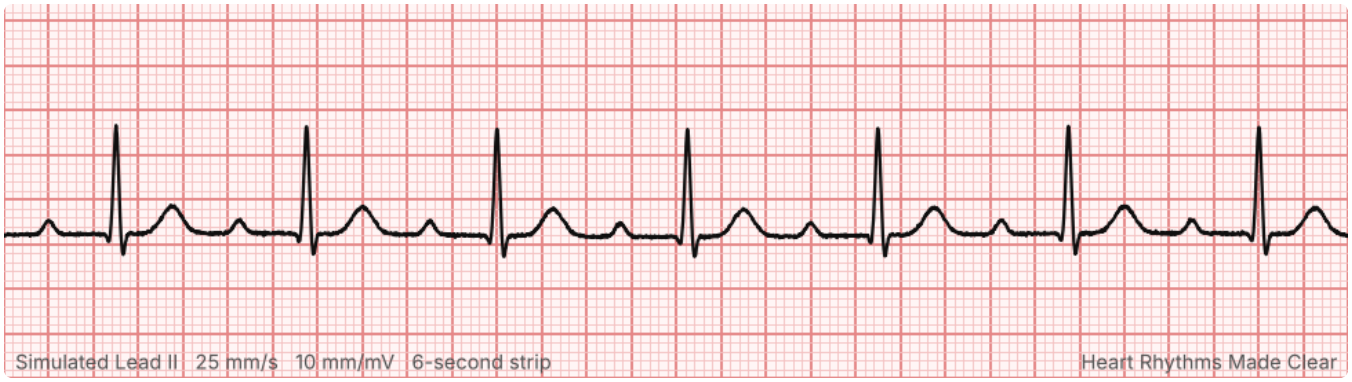
> *If the R is far from P, then you have a first degree. Longer, longer, longer, drop, then you have a Wenckebach. If some P's don't get through, then you have a Mobitz II. If P's and Q's don't agree, then you have a third degree.*

Block	PR interval	Every P gets a QRS?	Dr. R's read
First degree	Long (more than 0.20), same every beat	Yes	Green light. Watch it.
Second degree type I (Wenckebach)	Gets longer, longer, longer... then drop	No, in a pattern	Yellow light. Usually stable.

Block	PR interval	Every P gets a QRS?	Dr. R's read
Second degree type II (Mobitz II)	Same every time, then uh-oh, no QRS	No, out of nowhere	Red light. Pads on.
Third degree (complete)	No rhyme or reason	They're not even talking	Red light. This patient needs a pacemaker.

6.3 First-degree AV block: "If the R is far from P"

Figure 6-1. First-degree AV block.



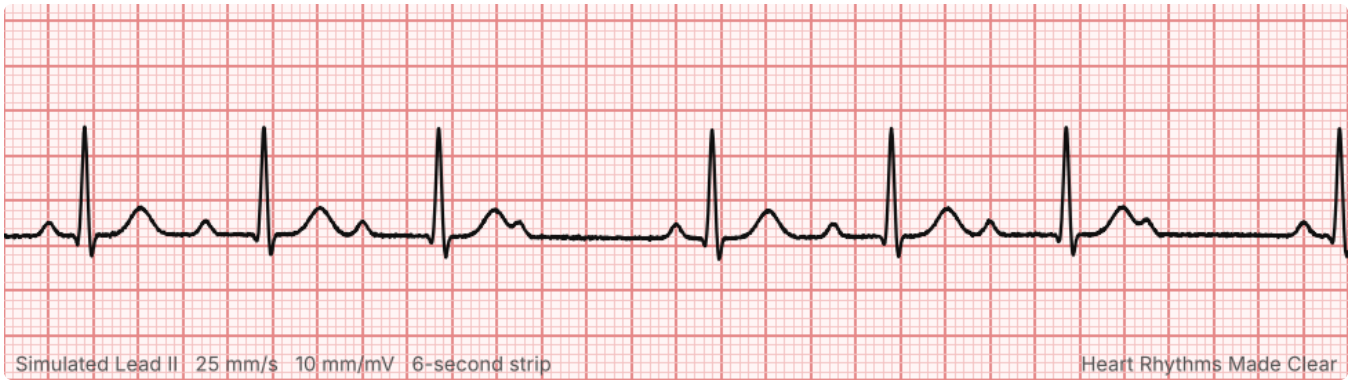
Look at this strip. P, QRS, T. P, QRS, T. Every P wave gets through. Nothing is dropped. But measure that PR interval. It's long, over 0.20 seconds, and it's long the same amount every single beat. Traffic is slow at the toll booth, but every car still makes it through.

What causes it? Think about your meds first: beta blockers, calcium channel blockers, digoxin. Also an inferior MI, an athlete's slow heart, or just getting older.

What do you do? Most of the time, this patient feels fine. Watch the PR on every strip, look at the med list, and tell the provider if that PR keeps getting longer or if you start seeing dropped beats.

6.4 Second-degree type I (Wenckebach): "Longer, longer, longer, drop"

Figure 6-2. Second-degree AV block type I (Wenckebach).



This one is my favorite, because the strip tells you exactly what's happening. Watch the PR interval. A little longer. A little longer. A little longer. Then there's a P wave sitting all by itself with no QRS after it. Drop. Then the whole thing starts over.

The toll booth is getting tired, tired, tired, then it takes a break, then it resets. The problem is usually right at the AV node, so this patient is usually stable.

What do you do? Check on your patient. Are they dizzy? What's the blood pressure? Look at the meds. Keep watching for it to get worse. If they're symptomatic, atropine usually works here, because the problem is at the AV node.

▶ **Watch me walk it:** Mobitz Type 1 vs Type 2: Don't Confuse These on Your Boards (1 min)

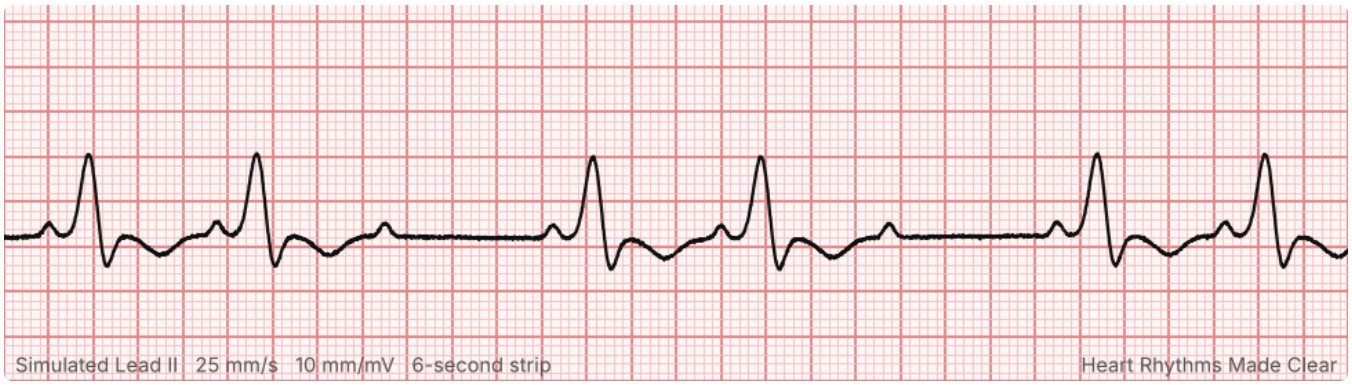
SCAN TO WATCH DR. R

Mobitz Type 1 vs Type 2: Don't Confuse These on Your Boards

1 min · youtu.be/jE4smEjH1hE

6.5 Second-degree type II (Mobitz II): "If some P's don't get through"

Figure 6-3. Second-degree AV block type II (Mobitz II).



Now, remember: **no Wenckebach here.** Let's walk the strip. P, QRS, T, everything measures normal. P, QRS, T, normal. P, QRS, T, normal. Then we come to our P wave and… uh-oh. No QRS. No T. Nothing.

The PR doesn't stretch out first. There's no warning. The P wave went through, the signal headed down, and something below the AV node just didn't let it through. You'll have more P waves than QRS complexes. Count them: that atrial rate is going to be higher than your ventricular rate.

Here's why I want you to respect this one: **Mobitz II can turn into complete heart block with no warning at all.**

What do you do?

1. Go look at your patient. Blood pressure, mental status, chest pain, dizziness.
2. Call the provider.
3. **Get the pacing pads on the patient now**, even if they look okay, so you can start pacing in seconds if you need to.
4. Hold the beta blockers, calcium channel blockers and digoxin, and clarify with the provider.
5. Expect cardiology and, a lot of the time, a permanent pacemaker.

Dr. R pearl. Don't count on atropine here. The block is below the AV node, so atropine often doesn't help, and it can actually make things worse. Pacing is your fix. Don't sit around waiting for atropine to work.

▶ **Watch me walk it:** The Secret to Spotting Mobitz II Heart Block Every Time (4 min)

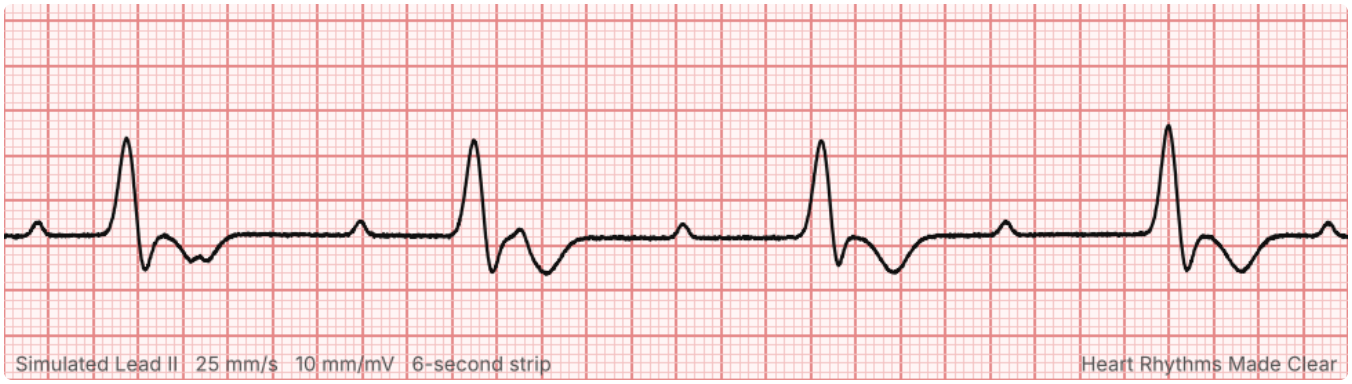
SCAN TO WATCH DR. R

The Secret to Spotting Mobitz II Heart Block Every Time

4 min · youtu.be/Qrx0y1O9ux8

6.6 Third-degree (complete) heart block: "If P's and Q's don't agree"

Figure 6-4. Third-degree (complete) AV block.



This strip is just ugly, right? Look at it. There's a P. Another P. Then a QRS shows up wherever it wants to. There's a P hiding in a T wave. There's no rhyme or reason. Nothing is matching.

That's because the atria and the ventricles have stopped talking to each other completely. The P waves are marching along at their own rate, usually 60 to 100. The ventricles are doing their own thing way down at 20 to 40 with a wide QRS (or 40 to 60 if the backup pacemaker is up in the junction). Count your P waves, then count your QRS complexes. They won't match.

Is this a dangerous rhythm? You better believe it. Nine times out of ten, this patient is getting a pacemaker.

What do you do? This is the patient most likely to crash on you. Assess, call for help, get the pads on and get ready to pace. Oxygen if they're hypoxic, IV access, 12-lead ECG. Expect transvenous pacing and then a permanent pacemaker.

▶ **Watch me walk it:** Why Does Third Degree Heart Block Happen? (4 min)

SCAN TO WATCH DR. R

Why Does Third Degree Heart Block Happen?

4 min · youtu.be/m52HqImW1jI

Chapter 6 NCLEX-style practice

Alright, let's see what you've got.

1. The PR interval on a strip goes 0.22, 0.28, 0.34, and then there's a P wave with no QRS. What is this rhythm?
   - A. First-degree block
   - B. Second-degree type I

- C. Second-degree type II
- D. Third-degree block

2. Which rhythm means the nurse puts pacing pads on the patient even if the patient looks stable right now?
   - A. First-degree block
   - B. Wenckebach
   - C. Mobitz II
   - D. Sinus arrhythmia
3. In complete heart block, the nurse expects to see:
   - A. The same PR interval every beat
   - B. P waves and QRS complexes doing their own thing
   - C. An irregularly irregular rhythm with no P waves
   - D. Sawtooth waves
4. **NGN case (select all that apply).** A 68-year-old on metoprolol says he's dizzy. HR 48, BP 88/52. The strip shows the same PR interval every beat, then sudden dropped QRS complexes. What should the nurse do? A. Apply pacing pads. B. Notify the provider. C. Hold the next metoprolol dose. D. Ask the patient to bear down. E. Document Mobitz I and continue routine monitoring. F. Recheck BP and level of consciousness often.
5. A patient's PR interval is 0.26 second on every beat, with no dropped beats. What should the nurse do?
   - A. Get ready to pace right now
   - B. Give atropine
   - C. Keep monitoring and review the medications
   - D. Call a code

Answers and why

1. **B.** Longer, longer, longer, drop. That's your Wenckebach.
2. **C.** Mobitz II can turn into complete heart block with no warning, so the pads go on now.
3. **B.** The P's and Q's don't agree. The atria and ventricles aren't talking.
4. **A, B, C, F.** This is Mobitz II, and he's symptomatic. Bearing down slows the heart even more, and calling it Mobitz I misses the danger.
5. **C.** If the R is far from P, it's first degree. Watch it, check the meds, no panic.

Bridge to ACLS. Symptomatic Mobitz II and third-degree block take you straight to the ACLS Bradycardia Algorithm and pacing (ACLS Prep Companion, Chapter 6). Want to see me walk through these on the monitor? Watch The Secret to Spotting Mobitz II Heart Block Every Time and Why Does Third Degree Heart Block Happen? on my YouTube channel. And if you're serious about passing your NCLEX, book a one-on-one with me. Let's knock it out.

Chapter 7: Ventricular Rhythms

When the ventricles take over, the QRS gets wide and ugly, 0.12 seconds or more. That's because the signal isn't using the fast wiring anymore. It's crawling from muscle cell to muscle cell. And here's the rule I want burned into your brain: wide and fast is V-tach until proven otherwise, and the very first question is always, does my patient have a pulse?

What you'll be able to do after this chapter:

1. Spot PVCs and their patterns: unifocal, multifocal, bigeminy, trigeminy, couplets.
2. Name idioventricular and accelerated idioventricular rhythm.
3. Name V-tach, both the regular kind and torsades de pointes.
4. Know what the nurse does for each, and why a pulse check changes everything.

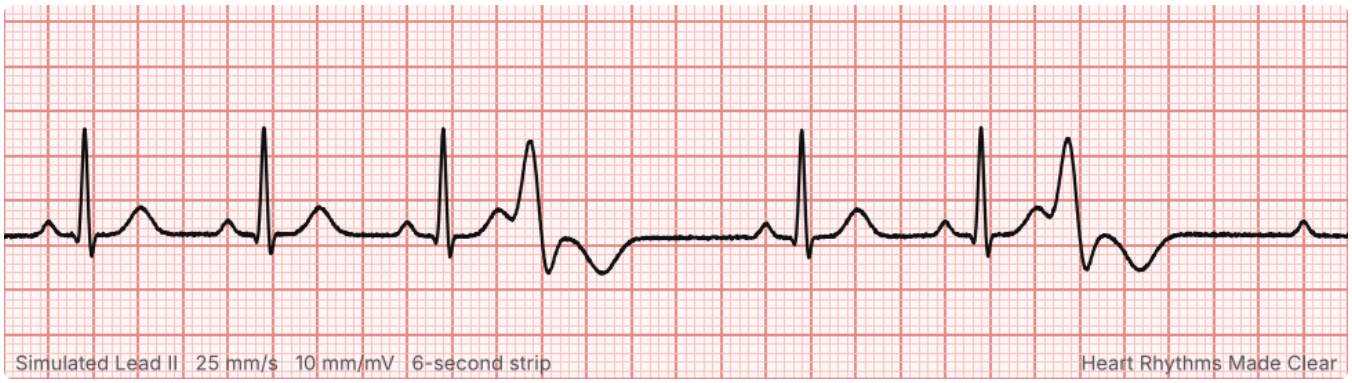
7.1 Ventricular rhythms at a glance

Rhythm	Rate	Rhythm	P waves	PR	QRS
PVCs (on top of another rhythm)	Whatever the underlying rate is	Irregular at the PVC	None in front of the PVC	None for the PVC	Wide (0.12 or more), weird; T wave goes the opposite way
Idioventricular	20-40	Regular	None (or not connected)	None	Wide
Accelerated idioventricular (AIVR)	40-100	Regular	None	None	Wide
V-tach (monomorphic)	100-250	Regular	Usually can't see them	None	Wide, all look alike
Torsades de pointes	150-300	Irregular	None	None	Wide, twisting around the baseline

Dr. R Rule: "Wide and weird came from the ventricle. Wide and fast, check for a pulse. No pulse, start compressions."

7.2 Premature ventricular contractions (PVCs)

Figure 7-1. Sinus rhythm with unifocal PVCs.

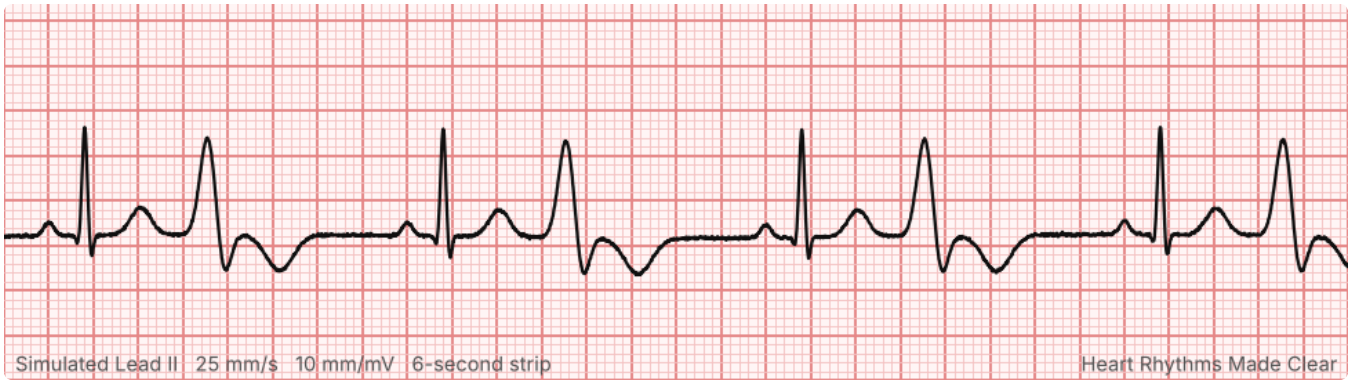


Let's walk this strip. P, QRS, T. P, QRS, T. P, QRS, T. Then, whoa, look at that. A big, wide, ugly beat shows up early, no P wave in front of it, and the T wave is flipped the opposite way. That's a PVC. Then a pause before the next normal beat. Keep going. P, QRS, T. P, QRS, T. And there's another one. Both PVCs look the same, so they're coming from the same cranky spot. We call that **unifocal.** If they all look different, they're coming from several spots. That's **multifocal**, and it worries me more.

The patterns:

- **Bigeminy:** every other beat is a PVC.
- **Trigeminy:** every third beat is a PVC.
- **Couplet:** two PVCs in a row.
- **Three or more in a row?** That's V-tach.

Figure 7-2. Ventricular bigeminy.



Normal, PVC. Normal, PVC. Normal, PVC. Every other beat. That's bigeminy.

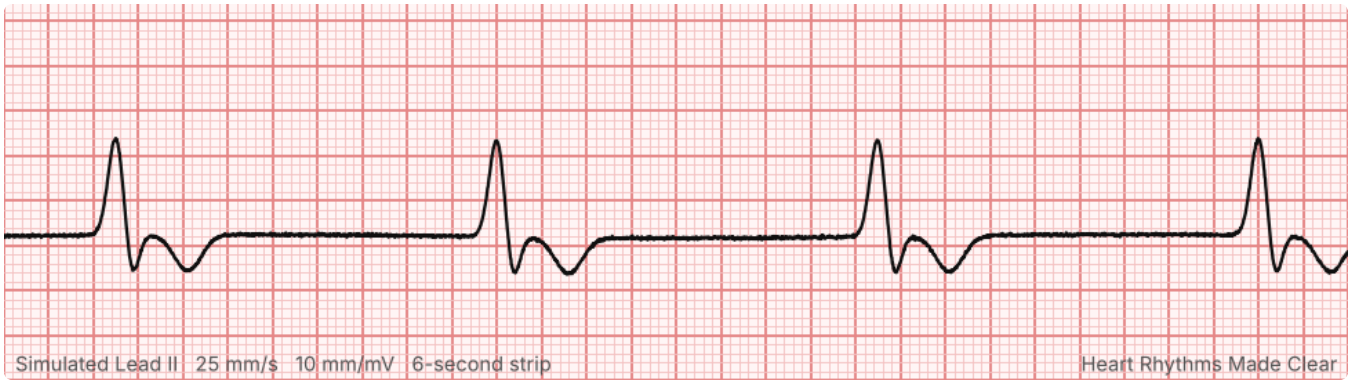
What makes the heart cranky enough to throw PVCs? Low potassium, low magnesium, low oxygen, ischemia or an MI, caffeine, stimulants, heart failure, digoxin toxicity and acid-base problems.

What do you do? Check on your patient: chest pain, BP, oxygen sat. Check the potassium and magnesium. Oxygen if they're low. Look at the meds. Report PVCs that are new, frequent, multifocal, coming in couplets or runs. And watch for a PVC landing on the T wave. Remember R-on-T from Chapter 1? That one can kick off V-tach or V-fib.

Dr. R pearl. Before you call about PVCs, have the latest potassium and magnesium in your hand. Trust me, the provider's first question is going to be "what's the K and mag?" A lot of the time, fixing the electrolytes fixes the PVCs.

7.3 Idioventricular and accelerated idioventricular rhythm

Figure 7-3. Idioventricular rhythm.



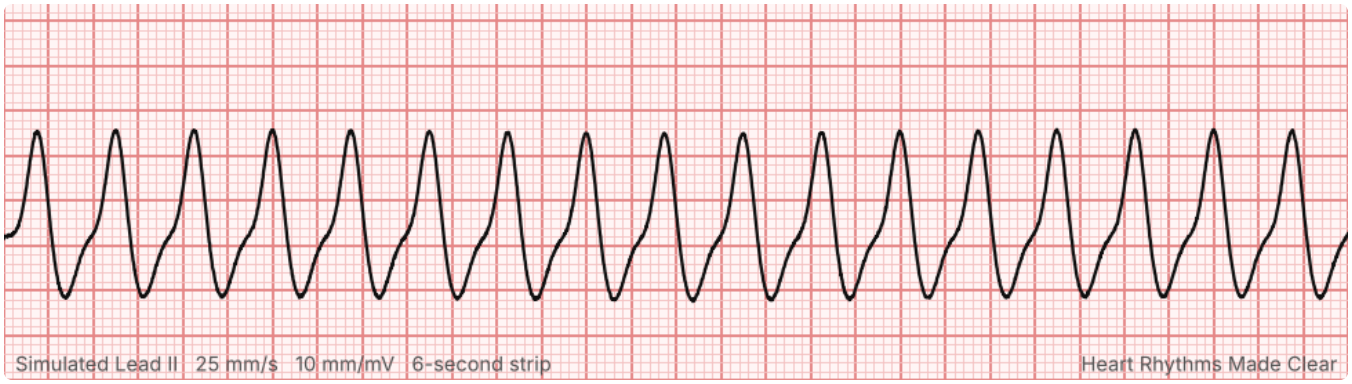
Look at this strip. Wide. Ugly. Slow. Count them: 1, 2, 3, 4 in 6 seconds. About 35. No P waves anywhere. Lower is slower, remember? This is the ventricles' own backup generator, the last one in the building. It shows up when everything above it has failed, and a lot of the time it means the heart is dying. Your patient's pressure is usually in the basement.

Do not try to get rid of this rhythm with an antiarrhythmic. It may be the only thing keeping your patient alive. Treat the cause and support the rate: atropine, pacing, epinephrine or dopamine, per the provider and ACLS bradycardia care.

Now, accelerated idioventricular rhythm (AIVR, 40 to 100) is a little different. You'll often see it right after a blocked artery gets opened up during an MI. We call it a reperfusion rhythm. It's usually short and the patient tolerates it. Watch it, but don't try to get rid of it.

7.4 Ventricular tachycardia (V-tach)

Figure 7-4. Monomorphic ventricular tachycardia.



Look at this. Wide, fast, and every complex looks the same. Boom, boom, boom, boom. Three or more PVCs in a row at over 100 is V-tach. Now, V-tach can have a pulse, or it can have no pulse. No pulse is a cardiac arrest (Chapter 8). So before anything else...

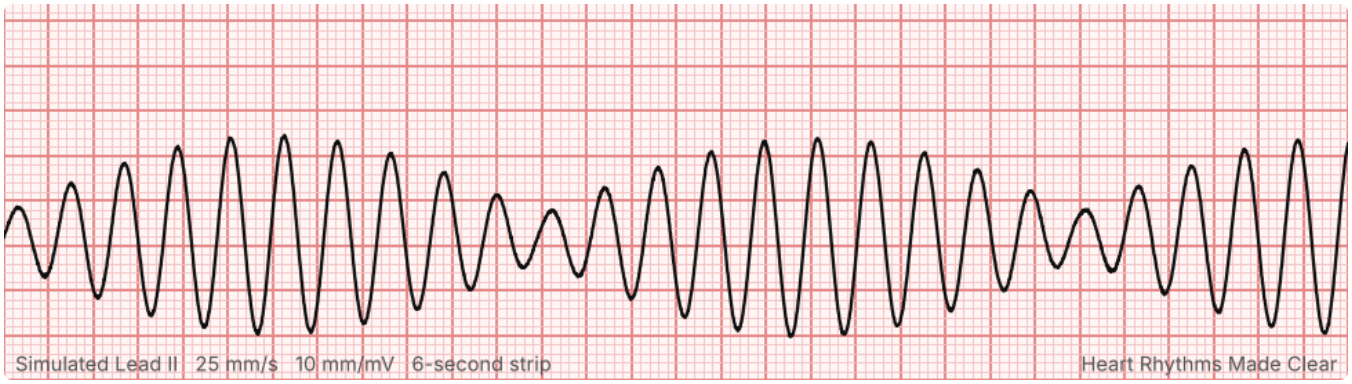
V-tach with a pulse: stable or unstable?

What you find	Stable V-tach	Unstable V-tach
BP	OK	Low
Mental status	Alert	Confused, harder to wake up
Shock, chest pain, acute heart failure	No	Yes
What to expect	12-lead, expert consult, antiarrhythmic like amiodarone per the provider	**Synchronized cardioversion**
No pulse	—	Defibrillate and start CPR (Chapter 8)

What do you do? Check responsiveness and a pulse first. Then call for help, get the defibrillator on, oxygen if they're low, IV access, and get that crash cart in the room. Never treat the monitor. Treat the patient.

7.5 Torsades de pointes

Figure 7-5. Torsades de pointes.



Now look at this one. See how it twists? The complexes get taller, then shorter, then taller again, like a ribbon twisting around the baseline. That's torsades de pointes, a kind of V-tach where the shape keeps changing. It goes hand in hand with a **long QT**, which can come from a lot of drugs (some antiarrhythmics, some antibiotics, some antipsychotics, and nausea meds like ondansetron), plus low magnesium and low potassium.

Treatment: IV magnesium sulfate is the drug for torsades. No pulse? Treat it just like V-fib: defibrillate and CPR. Stop the drugs that stretch the QT, and fix the potassium.

Dr. R pearl. Keep an eye on the QT for any patient on a QT-stretching drug. A QTc that keeps climbing is your early warning. Catch it there, and you may never see torsades.

Chapter 7 NCLEX-style practice

Alright, let's see what you've got.

1. The monitor shows a wide-complex tachycardia at 180. What does the nurse do first?
    - A. Give amiodarone
    - B. Check the patient's responsiveness and pulse
    - C. Get a 12-lead ECG
    - D. Call the provider
2. A patient is having frequent PVCs. Which labs does the nurse check first?
    - A. Sodium and chloride
    - B. Potassium and magnesium
    - C. Hemoglobin and hematocrit
    - D. BUN and creatinine
3. The specific drug for torsades de pointes is:
    - A. Adenosine
    - B. Atropine

- C. Magnesium sulfate
- D. Digoxin

4. **NGN matrix.** For each finding, is it stable or unstable V-tach with a pulse? (1) BP 76/40; (2) alert, says "my heart is racing"; (3) new confusion; (4) chest pain and crackles; (5) BP 124/78.
5. A patient is in idioventricular rhythm at 32 with a BP of 70/40. Which order should the nurse question?
   - A. Get ready for transcutaneous pacing
   - B. Give lidocaine to get rid of the ventricular rhythm
   - C. Atropine 1 mg IV
   - D. Call the rapid response team

Answers and why

1. **B.** The exact same rhythm gets treated completely differently with and without a pulse. Check first.
2. **B.** Low potassium and magnesium are common, fixable reasons for a cranky heart.
3. **C.** Magnesium calms the heart muscle down in torsades.
4. **Unstable:** 1, 3, 4. **Stable:** 2, 5.
5. **B.** Knock out the escape rhythm, and your patient may have no rhythm at all.

Bridge to ACLS. V-tach with a pulse takes you to the wide-complex side of the ACLS Tachycardia Algorithm. Pulseless V-tach takes you to the Cardiac Arrest Algorithm (ACLS Prep Companion Chapters 5 and 7). Video: *Episode 7: Wide and Weird, Ventricular Rhythms*.

Chapter 8: Cardiac Arrest Rhythms

I've run a lot of codes. Here's what I can tell you: there are only four cardiac arrest rhythms, and they split into two groups. Shockable: pulseless V-tach and V-fib. Not shockable: asystole and PEA. Every single one of them gets high-quality CPR. The rhythm only decides one thing: do you shock or not?

What you'll be able to do after this chapter:

1. Name V-fib, pulseless V-tach, asystole and PEA.
2. Sort each one into shockable or not shockable.

3. Know your job as the nurse in the first few minutes of a code, including high-quality CPR and the H's and T's.

8.1 The four arrest rhythms

Rhythm	What you see	Shock it?	Key action
Ventricular fibrillation (V-fib)	A wavy, chaotic mess; no QRS, no P waves	**Yes**	Defibrillate, CPR
Pulseless V-tach	Wide, regular complexes, but no pulse	**Yes**	Defibrillate, CPR
Asystole	Flat line (confirm it in two leads, check the leads and the size)	No	CPR, epinephrine as soon as you can
PEA	Any organized rhythm on the monitor, but **no pulse**	No	CPR, epinephrine as soon as you can, find the cause

Dr. R Rule: "V-fib and pulseless V-tach, shock it. Flat line and PEA, push epi and find the cause. Everybody gets good CPR."

8.2 Ventricular fibrillation (V-fib)

Figure 8-1. Coarse ventricular fibrillation.

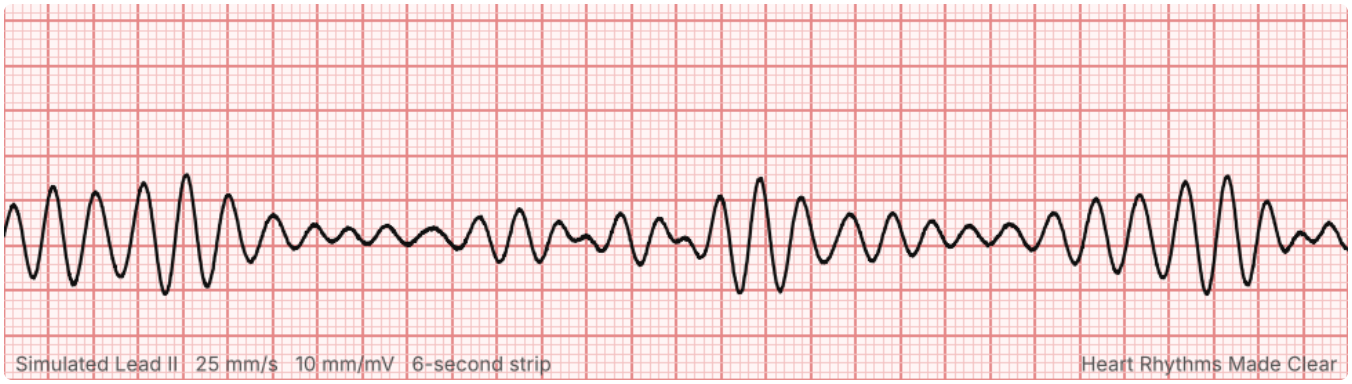
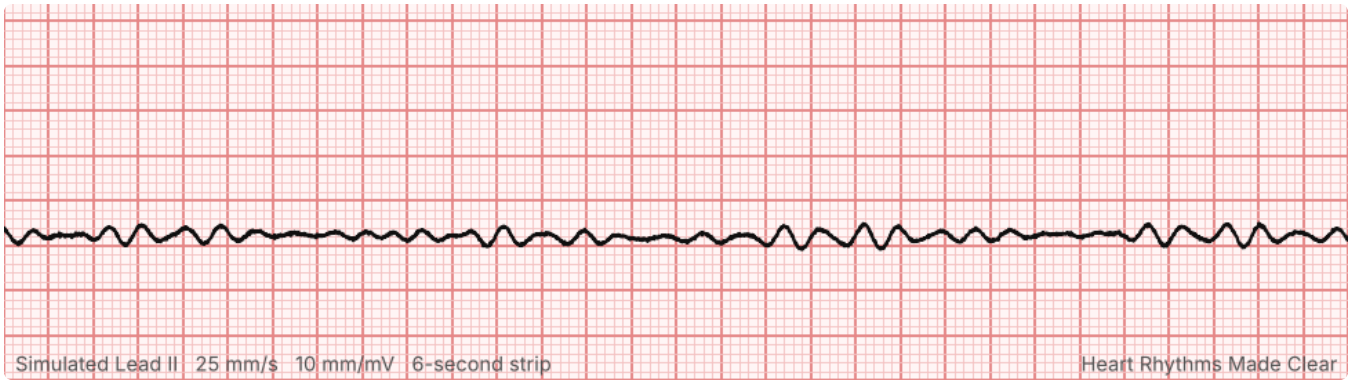


Figure 8-2. Fine ventricular fibrillation.



Look at these strips. Is there a P wave anywhere? Nope. A QRS? Nope. Just squiggles. Ugly, right? The ventricles are quivering instead of pumping. No blood is going anywhere. No pulse. Coarse V-fib has bigger waves. Fine V-fib has tiny waves and can fool you into thinking it's asystole, so turn up the size and check another lead.

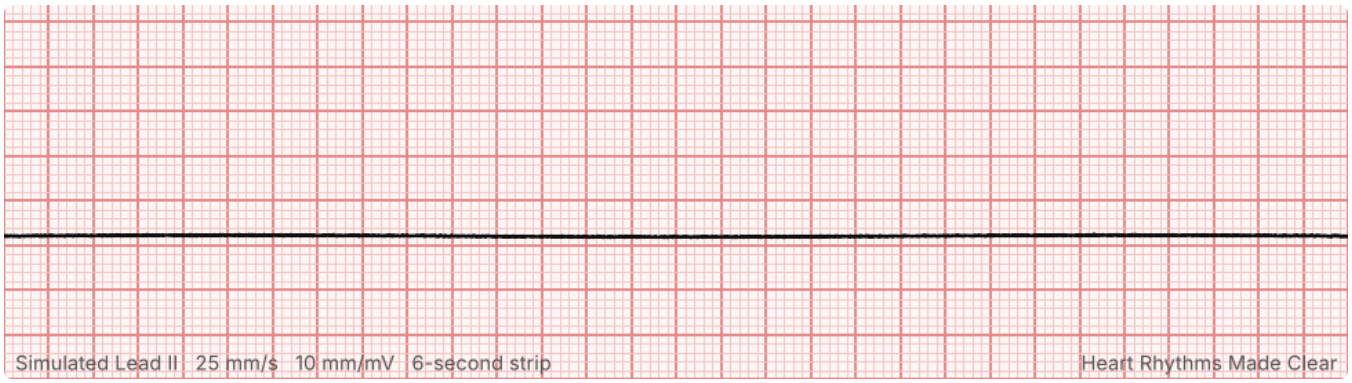
But first, look at your patient. A loose lead or somebody brushing their teeth can look just like V-fib. If they're unresponsive, not breathing and pulseless with this rhythm? Start CPR and get that defibrillator on them right now.

8.3 Pulseless V-tach

This is the same rhythm you saw in Figure 7-4, but now there's no pulse. Treat it exactly like V-fib: CPR and defibrillate.

8.4 Asystole

Figure 8-3. Asystole.



Flat. Nothing. No electricity at all. But before you call it asystole, **confirm it**: make sure the leads are on, turn up the size, and look in a second lead. Asystole is **not shockable.** You can't shock a flat line. Give high-quality CPR, epinephrine as soon as you can, and hunt for a cause you can fix. Honestly, outcomes are poor, which is why catching your patient going downhill early matters so much.

8.5 Pulseless electrical activity (PEA)

Here's the tricky one. The monitor shows an organized rhythm. It might even look like normal sinus. But there's no pulse. The electricity is working; the pump isn't. **You don't find PEA by looking at the monitor. You find it with your fingers on the pulse.**

8.6 The H's and T's: causes you can fix

H's	T's
Hypovolemia (not enough volume)	Tension pneumothorax
Hypoxia (not enough oxygen)	Tamponade (cardiac)
Hydrogen ion (acidosis)	Toxins
Hypo-/hyperkalemia	Thrombosis, pulmonary (PE)
Hypothermia	Thrombosis, coronary (MI)

You're the nurse. A lot of the time, you're the one who knows the story that points to the cause. The dialysis patient who missed sessions with a sky-high potassium. The post-op patient who might have a PE. The patient who's been bleeding. Speak up during the code. The team needs to hear it.

8.7 Your first few minutes

1. Check if they respond and if they're breathing, and check a pulse (10 seconds, no more).
2. Call for help and the crash cart. Call the code.
3. Start high-quality CPR: 100 to 120 a minute, at least 2 inches (5 cm) deep in adults, let the chest come all the way back up, keep pauses short, and don't over-breathe them.
4. Get the defibrillator pads on as soon as it gets there. Shock if it's shockable.
5. Switch compressors about every 2 minutes, at the rhythm checks. You will get tired. Everybody does.
6. Get IV or IO access. Get epinephrine ready (and amiodarone or lidocaine for V-fib or V-tach that won't quit), per the team leader.
7. Write down the times, rhythms, shocks and drugs.

Dr. R pearl. The most common mistake I see in a code? Stopping compressions too long. Every second off the chest, the blood flow to the brain drops. Keep your pauses for rhythm checks and shocks under 10 seconds.

Chapter 8 NCLEX-style practice

Alright, let's see what you've got.

1. Which rhythms are shockable? (Select all that apply.) A. V-fib. B. Asystole. C. Pulseless V-tach. D. PEA. E. Sinus bradycardia.
2. The monitor shows a flat line. The patient is talking to the nurse. What does the nurse do first?
    - A. Start CPR
    - B. Check the leads and the patient connection
    - C. Give epinephrine
    - D. Defibrillate
3. The monitor shows sinus rhythm at 90, but the nurse can't feel a carotid pulse. This is:
    - A. Sinus rhythm
    - B. Asystole
    - C. Pulseless electrical activity
    - D. V-fib
4. **NGN bowtie.** A dialysis patient who missed two sessions is found unresponsive with no pulse. The monitor shows PEA. Pick the most likely condition (high potassium, hypothermia, tension pneumothorax), two actions (keep up high-quality CPR; give epinephrine and expect calcium and treatment for the high potassium; defibrillate; give adenosine), and two things to monitor (pulse at rhythm checks, end-tidal CO2, urine color, pupil size).
5. Which CPR finding needs fixing?
    - A. Compressions at 110 a minute
    - B. Switching compressors every 2 minutes
    - C. Leaning on the chest between compressions
    - D. Compressions 2 inches deep

Answers and why

1. **A, C.** Only V-fib and pulseless V-tach get shocked.
2. **B.** Treat the patient, not the monitor. A patient who's talking to you is not in asystole.

3. **C.** A rhythm on the monitor with no pulse is PEA.
4. **Condition:** high potassium. **Actions:** keep up high-quality CPR; give epinephrine and expect calcium and treatment for the high potassium. **Monitor:** pulse at rhythm checks; end-tidal CO2. Shocking doesn't fix PEA.
5. **C.** Leaning keeps the chest from coming all the way back up, so less blood gets back to the heart.

Bridge to ACLS. These four rhythms are the ACLS Adult Cardiac Arrest Algorithm (ACLS Prep Companion Chapters 4 and 5). Video: *Episode 8: Shock or No Shock, the Four Arrest Rhythms*.

Chapter 9: Treatments and Devices

Every rhythm problem gets fixed one of three ways: a drug, electricity, or fixing the cause. In this chapter I want you to get comfortable with all three, so when the provider calls it, you already know what to grab, what to set up, and what to watch afterward.

What you'll be able to do after this chapter:

1. Tell defibrillation, synchronized cardioversion and pacing apart, and match each one to the right rhythms.
2. Spot a paced rhythm, failure to capture and failure to sense.
3. Know the nursing checks for the common rhythm drugs.
4. Teach a patient who's going home with a pacemaker or an ICD.

9.1 Electricity: three tools

Tool	Used for	Synchronized?	What the nurse needs to know
Defibrillation	V-fib, pulseless V-tach	No	Stop compressions only for the shock; "Clear!"; get right back on the chest

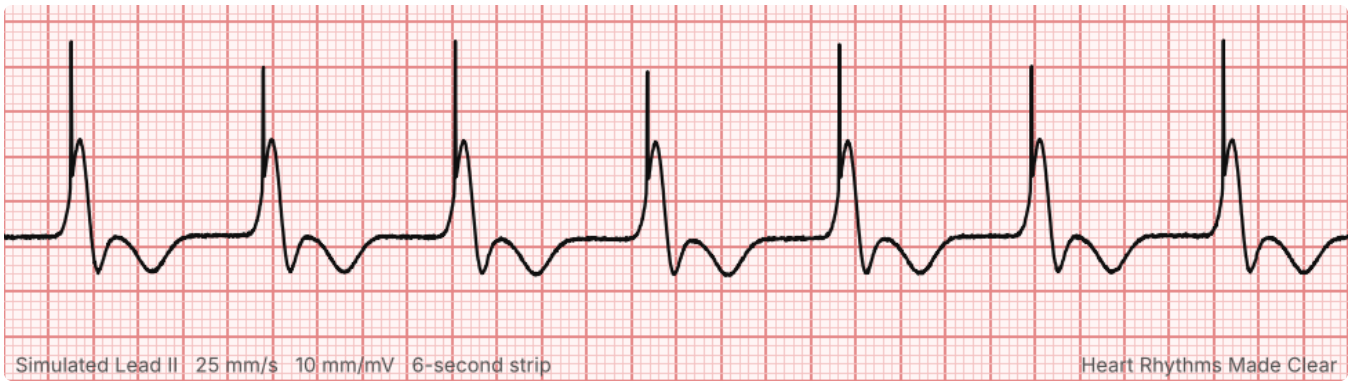
Tool	Used for	Synchronized?	What the nurse needs to know
Synchronized cardioversion	Unstable fast rhythms with a pulse (SVT, A-fib, flutter, V-tach with a pulse)	**Yes.** Hit SYNC and look for the markers on every R wave	Sedate if you can; on a lot of machines you have to hit SYNC again before every shock; A-fib over 48 hours means a clot question first
Transcutaneous pacing	Slow rhythms with symptoms, Mobitz II, third-degree block	—	Pads front and back (or per the device); set the rate (often 60 to 80) and turn up the mA until you get capture; give pain meds or sedation

Dr. R Rule: "No pulse, no sync. Pulse and unstable, sync it. Too slow and sick, pace it."

Dr. R pearl. Check pacing capture two ways. On the monitor: a wide QRS after every spike. **And** with your hands: a pulse that matches the paced rate. Use the femoral pulse. The pacer makes the chest muscles jump, and that can trick you into feeling a carotid pulse that isn't really there.

9.2 Paced rhythms

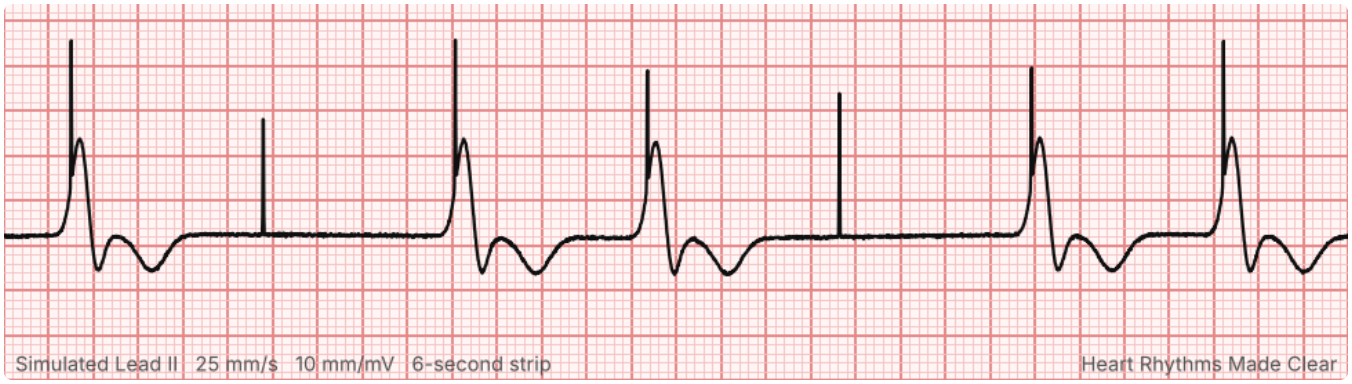
Figure 9-1. Ventricular paced rhythm (100 percent capture).



See that tall, skinny line shooting straight up? That's the pacemaker spike. Now look right after it: a wide QRS. Spike, QRS. Spike, QRS. Spike, QRS. Every spike gets a beat. That's capture. That's what you want to see.

Problem	What you see	What it means	What you do
Failure to capture	Spikes with no QRS after them	The pacer fires, the heart doesn't answer	Check your patient; turn up the mA (temporary pacer) per the provider; call; check the lead
Failure to sense (undersensing)	Spikes landing in random places, even on T waves	The pacer doesn't "see" the patient's own beats	Call; risk of R-on-T and V-tach
Failure to pace (oversensing)	No spikes when the rate drops below the set rate	The pacer is being fooled into staying quiet	Check your patient; call; get transcutaneous pacing ready

Figure 9-2. Pacemaker failure to capture.



Let's walk it. Spike, QRS. Spike... uh-oh. No QRS. The pacer fired, and the heart didn't answer. Spike, QRS. Spike, QRS. Spike... nothing again. That's failure to capture.

9.3 Implanted devices

A **permanent pacemaker** treats slow rhythms. An **ICD (implantable cardioverter-defibrillator)** watches for V-tach and V-fib and shocks the patient. A lot of devices do both.

What to teach before they go home:

1. Keep the arm on the device side below shoulder level, and no heavy lifting for as long as they tell you (often several weeks), so the wires stay put.
2. Watch the incision for redness, swelling, drainage or fever.
3. Carry the device ID card. Tell every provider and airport security.

4. Keep cell phones and magnets at least 6 inches from the device. Don't lean over a running car engine. Follow the MRI rules for your specific device.
5. Keep your remote monitoring and device check appointments.
6. ICD: one shock and you feel fine? Call your provider. More than one shock, or you feel sick? Call 911.

9.4 Rhythm drugs: what the nurse checks

Drug	Used for	What you check
Adenosine	Stable SVT	6 mg rapid IV push, then a 20 mL flush; second dose 12 mg; warn the patient about the scary feeling and a possible pause; run a strip
Atropine	Slow rhythms with symptoms	1 mg IV every 3 to 5 minutes, max 3 mg (current ACLS); may not work for Mobitz II or third-degree
Epinephrine	Cardiac arrest; drip for slow rhythms	Arrest: 1 mg IV/IO every 3 to 5 minutes
Amiodarone	V-fib/pulseless V-tach (arrest), V-tach with a pulse, A-fib	Arrest: 300 mg, then 150 mg; watch for low BP, slow HR and a long QT
Lidocaine	Backup for V-fib/pulseless V-tach	Watch for confusion and seizures (toxicity)
Magnesium sulfate	Torsades, low magnesium	Watch BP, reflexes, breathing
Beta blockers (metoprolol)	Rate control, A-fib	Hold for low HR or BP per the order; watch for heart block
Calcium channel blockers (diltiazem)	Rate control, A-fib, flutter	Hold for low BP; avoid in heart failure with a weak pump, per the provider

Drug	Used for	What you check
Digoxin	Rate control, heart failure	Apical pulse for a full minute; hold for HR under 60 or per order; watch the potassium (low K makes toxicity more likely); toxicity: nausea, vision changes, new rhythms
Blood thinners (warfarin, DOACs, heparin)	Stroke prevention in A-fib	Bleeding precautions; INR for warfarin; aPTT or anti-Xa for heparin

Always check doses against the current ACLS guidelines, your hospital's protocols and the provider's order.

Chapter 9 NCLEX-style practice

Alright, let's see what you've got.

1. A patient in SVT at 190 has a low blood pressure and is confused. The nurse gets ready for:
    - A. Defibrillation
    - B. Synchronized cardioversion
    - C. Transcutaneous pacing
    - D. Carotid massage only
2. On a paced patient's strip, the nurse sees spikes with no QRS after them. This is:
    - A. Failure to sense
    - B. Failure to capture
    - C. Normal pacing
    - D. Oversensing
3. Before giving digoxin, the nurse checks the:
    - A. Radial pulse for 15 seconds
    - B. Apical pulse for a full minute
    - C. Blood pressure only
    - D. Breathing rate

4. **NGN highlight.** Highlight the statements that show the patient gets the ICD teaching: "I'll raise my arm over my head to stretch every hour." "I'll keep my phone in the pocket on the other side." "If I get shocked several times, I'll call 911." "I don't need to tell the airport about my device." "I'll keep my device check appointments."
5. The nurse is pacing a patient through the skin. Which finding proves the heart is actually pumping with each paced beat?
    - A. Pacer spikes on the monitor
    - B. The chest muscles twitching
    - C. A femoral pulse that matches the paced rate
    - D. A carotid pulse felt during pacing

Answers and why

1. **B.** Fast, unstable and has a pulse? Sync it.
2. **B.** The pacer fires, but the heart doesn't answer.
3. **B.** A full minute of apical pulse before digoxin. Every time.
4. **The right ones:** the phone on the other side; calling 911 for several shocks; keeping appointments.
5. **C.** Twitching muscles can fake a carotid pulse. The femoral pulse is the one you trust.

Bridge to ACLS. Electricity, pacing and the arrest drugs are covered step by step in ACLS Prep Companion Chapters 5 through 7. Video: *Episode 9: Shock, Sync or Pace?*

Chapter 10: Clinical Judgment Cases

Alright, this is where it all comes together. Naming the rhythm is only half the job. The NCLEX Next Generation wants to know what you DO with that strip: notice the cues, figure out what they mean, decide what matters most, act, and then check if it worked. So let's practice it, six patients, the way you'll see them at the bedside.

What you'll be able to do after this chapter:

1. Use the NCSBN Clinical Judgment Model on a rhythm problem.
2. Prioritize like a nurse: patient first, strip second.
3. Handle the NGN question types (matrix, bowtie, highlight, cloze, select all) on rhythm questions.

10.1 The Dr. R 5-step strip-to-action method

1. **Look at the patient.** Pulse? Responding? Breathing? BP?
2. **Read the strip.** Rate, rhythm, P waves, PR, QRS (Chapter 2).
3. **Name the rhythm and the danger.** Stable, unstable, or arrest?
4. **Act.** Call for help, oxygen, IV, pads, drugs or electricity, fix the cause.
5. **Check again.** New strip, new vitals, new assessment. Did it work?

Case 1: The post-op patient with a racing heart

A 62-year-old, two days after hip surgery, tells you she feels "fluttery." HR 148 and irregularly irregular, BP 118/72, sat 95 percent, no P waves on the monitor. She's alert and oriented.

So what are we looking at? Irregularly irregular, no P waves. You already know this one.

NGN cloze: The nurse recognizes the rhythm as **[atrial fibrillation with rapid ventricular response]**. Because the patient is **[stable]**, the nurse expects **[rate control medication such as diltiazem or a beta blocker per order]** and reports the new onset because of the risk of **[stroke from clots in the atria]**.

Case 2: The dizzy patient on metoprolol

A 70-year-old says he almost passed out in the bathroom. HR 44, BP 82/50, cool and clammy. On the strip, the P waves are marching along at 80, the QRS complexes are at 44, and they have nothing to do with each other.

P's and Q's don't agree? You guessed it.

Bowtie. Condition: **third-degree AV block**. Actions: **put the pacing pads on and get ready to pace; call the provider or rapid response**. Monitor: **BP and mental status; capture with a femoral pulse that matches the paced rate**.

Why? Atropine may get tried, but it often doesn't work at this level of block. Pacing is the fix you can count on. And hold that metoprolol and clarify.

Case 3: The palpitations that won't stop

A 28-year-old suddenly has a heart rate of 210, regular and skinny. BP 122/76. Alert, but scared.

NGN select all. Which actions are right? A. Have the patient bear down (vagal maneuver). B. Get adenosine 6 mg ready as a rapid IV push followed by a 20 mL flush. C. Defibrillate. D. Run a strip while giving the adenosine. E. Warn the patient they may feel a short pause or chest pressure. **Answer: A, B, D, E.** Defibrillation is for patients with no pulse. She's talking to you.

Case 4: The heart failure patient with new PVCs

A 74-year-old on furosemide is throwing 12 PVCs a minute, and now couplets. Labs: K 3.0, Mg 1.4. BP 128/70.

What's the first thing I told you to have in your hand before you call about PVCs? The potassium and the magnesium. And look at them. Both low. That water pill is pulling them out.

NGN matrix (expected or not expected): Replace potassium as ordered (expected). Replace magnesium as ordered (expected). Give another dose of furosemide (not expected). Watch for runs of V-tach (expected). Ignore it because the BP is normal (not expected).

Case 5: Found unresponsive

You walk into the room and find a 58-year-old unresponsive, not breathing, no pulse. The monitor shows coarse V-fib.

This is the one you train for. Here's your order: call for help and the defibrillator, start high-quality CPR, shock as soon as the defibrillator is on, get right back on the chest for 2 minutes, then check the rhythm. Epinephrine after the second shock; amiodarone for V-fib that won't quit.

Case 6: The QT nobody was watching

After starting a new antibiotic and IV ondansetron, a 66-year-old's QTc climbs from 450 to 540 milliseconds. A few minutes later, the monitor shows a wide rhythm that twists around the baseline, and the patient stops responding.

Remember that twisting ribbon from Chapter 7?

NGN highlight: The cues that point to torsades are: **the new QT-stretching drugs**, **QTc 540**, **the twisting wide-complex rhythm**. **What you expect:** treat it as pulseless V-tach if there's no pulse (CPR, defibrillation), IV magnesium sulfate, stop the QT-stretching drugs, check the potassium and magnesium.

Chapter 10 review: patient first, strip second

If your patient is...	Think	Do
Stable, but the rhythm is off	Find the cause	Assess, report, check labs and meds, keep watching
Unstable and too fast	Synchronized cardioversion	Pads, sedation, sync
Unstable and too slow	Pacing	Atropine (if it fits), pads, pace
No pulse, V-fib or V-tach	Shock	CPR, defibrillate
No pulse, asystole or PEA	No shock	CPR, epinephrine, H′s and T′s

Bridge to ACLS. These cases are the bedside version of the ACLS megacode. Talk them through out loud before you walk into ACLS class (ACLS Prep Companion Chapter 8, Megacode Practice). Video: *Episode 10: Strip to Action, Clinical Judgment Cases*. And if you′re serious about passing your NCLEX, book a one-on-one with me. Let′s knock it out together.

Appendices

Here′s your toolbox. Tear these pages out (well, print them), stick them in your clinical bag, and use them every time you see a strip.

Appendix A: Rhythm Atlas (one-page review)

Rhythm	Rate	Regular?	P waves	PR	QRS	First nursing thought
Normal sinus rhythm	60-100	Yes	Upright, one per QRS	0.12-0.20	Under 0.12	Baseline
Sinus bradycardia	Under 60	Yes	Normal	Normal	Narrow	Symptoms?
Sinus tachycardia	100-150ish	Yes	Normal	Normal	Narrow	Find the cause

Rhythm	Rate	Regular?	P waves	PR	QRS	First nursing thought
Sinus arrhythmia	60-100	Varies with breathing	Normal	Normal	Narrow	Usually normal
Sinus arrest/pause	Varies	No (pause)	Missing during pause	Normal	Narrow	Length of pause, symptoms
PACs	Underlying	Early beats	Early, different shape	May differ	Narrow	Caffeine, stress, electrolytes
SVT	150-250	Yes	Hidden	Not measurable	Narrow	Vagal, adenosine
Atrial flutter	Atrial 250-350	Usually	Sawtooth	None	Narrow	Rate control, clot risk
Atrial fibrillation	Varies	Irregularly irregular	None (wavy)	None	Narrow	Rate control, clot risk
Junctional escape	40-60	Yes	Inverted, absent or after QRS	Under 0.12 if seen	Narrow	Symptoms, digoxin?
Accelerated junctional	60-100	Yes	Same	Same	Narrow	Digoxin, MI
Junctional tachycardia	Over 100	Yes	Same	Same	Narrow	Cause, rate
First-degree AV block	Underlying	Yes	Normal	Over 0.20, constant	Narrow	Monitor
Second-degree type I	Underlying	Grouped	Normal	Longer, longer, drop	Narrow	Usually stable
Second-degree type II	Usually slow	May be irregular	Normal, some not conducted	Constant	Often wide	Pads on
Third-degree AV block	20-60	Yes (both, separately)	March through	Varies	Narrow or wide	Pace
PVCs	Underlying	Early beats	None for PVC	None	Wide, bizarre	K+, Mg2+, O2
Idioventricular	20-40	Yes	None	None	Wide	Don't suppress
Ventricular tachycardia	100-250	Yes	None	None	Wide	Pulse check
Torsades de pointes	150-300	No	None	None	Twisting	Magnesium

Rhythm	Rate	Regular?	P waves	PR	QRS	First nursing thought
Ventricular fibrillation	None	Chaotic	None	None	None	CPR, shock
Asystole	None	—	None	None	None	CPR, epi
PEA	Any	Any	Any	Any	Any	No pulse: CPR, epi, H′s and T′s
Paced rhythm	Set rate	Yes	Varies	—	Spike then wide QRS	Capture?

Appendix B: Drug Quick Reference

Drug	Main use in this book	Remember
Adenosine	Stable SVT	6 mg rapid push + 20 mL flush; then 12 mg
Atropine	Symptomatic bradycardia	1 mg every 3-5 min, max 3 mg
Epinephrine	Arrest; bradycardia infusion	1 mg every 3-5 min in arrest
Amiodarone	VF/pVT; VT with pulse; A-fib	Arrest: 300 mg, then 150 mg
Lidocaine	VF/pVT alternative	Watch for toxicity
Magnesium sulfate	Torsades	Watch BP, reflexes
Diltiazem	A-fib/flutter rate control	Watch BP
Metoprolol	Rate control	Hold for low HR/BP per order
Digoxin	Rate control, heart failure	Apical pulse 1 minute; K+
Anticoagulants	A-fib stroke prevention	Bleeding precautions, labs

Always check doses against the current AHA guidelines, your hospital′s protocol and the provider's order. Every time.

Appendix C: Strip Practice Worksheet

Use this on every strip, including real strips from the monitor at clinical. Fill it in out loud. Do it enough times, and you won't need the sheet anymore.

Step	Your answer
1. Patient: pulse, BP, LOC, symptoms	
2. Rate (6-second strip x 10, or 300 / large boxes)	
3. Rhythm: regular or irregular	
4. P waves: present? one per QRS? same shape?	
5. PR interval (seconds)	
6. QRS width (seconds)	
7. Rhythm name	
8. Stable, unstable or arrest?	
9. Nursing action	

Appendix D: Glossary

- **AV dissociation:** atria and ventricles beating independently (third-degree block).
- **Bigeminy:** every other beat is an early beat (often a PVC).
- **Capture:** the heart responds to a pacemaker spike with a beat.
- **Compensatory pause:** the pause after a PVC before the next normal beat.
- **Defibrillation:** an unsynchronized shock for VF or pulseless VT.
- **Escape rhythm:** a backup pacemaker taking over when a higher one fails.
- **Ectopic beat:** a beat that starts outside the SA node.
- **J point:** where the QRS ends and the ST segment begins.
- **PR interval:** time from the start of the P wave to the start of the QRS.
- **QRS complex:** ventricular depolarization.
- **QT interval:** start of the QRS to the end of the T wave; QTc is corrected for heart rate.
- **Refractory period:** time when heart cells can't fire again.
- **Synchronized cardioversion:** a shock timed to the R wave for unstable tachycardia with a pulse.

- **Vagal maneuver:** bearing down or similar actions that slow AV-node conduction.

Appendix E: References and Resources

- American Heart Association. *Advanced Cardiovascular Life Support Provider Manual* and current AHA Guidelines for CPR and Emergency Cardiovascular Care.
- OpenStax. *Medical-Surgical Nursing* and *Anatomy and Physiology 2e* (Rice University), used as a content checklist; available free at openstax.org.
- NCSBN. *NCSBN Clinical Judgment Measurement Model* and NCLEX test plans, ncsbn.org.

This book is a study aid, not an official AHA publication, and it does not replace your course materials, your hospital's protocols or your provider's orders. Now go knock out that NCLEX. — Dr. R