

Assessment and Management

The history that matters, the examination that confirms it — and the four interventions that change outcomes

Airway, breathing, circulatory problems and shock are the most critical issues during the first minute of patient care.
Aligned to Region SOP

Gather fast, then act — and know what each action does

1 Assessment — 15 minutes 2 Management — 30 minutes 3 The through-line

Scene and primary assessment, a focused SAMPLE history built around medications, and a cardiac physical examination.

Basic life support, then electricity, then drugs, then handover. In that order, because that is the order of impact.

Every intervention in this deck moves rate, rhythm, preload, contractility or afterload — the variables from Part 1.

“Always determine the most important problems first”

Airway, breathing, circulatory problems and shock are always the most critical issues during the first minute of patient care. Cardiac patients invite the opposite behavior — a monitor, a 12-lead and a long medication list are all tempting, and none of them comes before finding out whether this patient is breathing and perfusing.

The four pillars of cardiovascular management

Basic life support

“The primary skill for managing serious cardiovascular problems” — basic airway maneuvers and CPR.

Electricity

Defibrillation, synchronized cardioversion, transcutaneous pacing.

Drugs

Antiarrhythmics, vasopressors, and the agents for myocardial ischemia.

Support and communication

Treated by the chapter as part of the treatment — including a formal verbal briefing at handover.

CASE STUDY

Read now. We solve it at the end.

Dispatch

Chest pain, 2210 hours.

On arrival

A 62-year-old man, 40 minutes of heavy substernal pressure that began while he was getting ready for bed. It radiates to his left arm. He is nauseated and sweating. His wife is with him.

HR 88, BP 138/84, RR 18, SpO₂ 97% on room air. Skin cool and damp. Lungs clear. GCS 15.

History of hypertension and high cholesterol. He takes lisinopril and atorvastatin. No known allergies. His 12-lead shows 2 mm of ST elevation in V2 through V4.

Your partner hands you the aspirin and reaches for the nitroglycerin.

Hold these questions:

- 1 Which wall is infarcting, and which artery is most likely involved?
- 2 Which single question must be asked before the nitroglycerin — and how do you ask it?
- 3 Is he stable or unstable by protocol definition? What does that change?
- 4 What is the most time-critical thing you can do for him?

SECTION 1

Assessment

Short, focused and largely medication-driven — the cardiac history is about efficiency.

Primary assessment · History · Medications · Physical examination

Scene size-up and primary assessment

1 Scene safe, then responsiveness

Level of responsiveness first, then move to the ABCs. Mental status in a cardiac patient is a perfusion finding.

2 Breathing — rate and depth

If the patient is not breathing, initiate manual ventilation and intubate as soon as possible.

3 Pulses — rate and quality

If no pulse is present, immediately begin CPR. Quality matters as much as rate: weak and thready is a stroke volume statement.

4 Then the skin

Color, temperature, moisture, turgor, mobility, edema. The first three are immediate perfusion data.

Cool, pale and damp with a normal blood pressure is the patient to worry about

Blood pressure is cardiac output times systemic vascular resistance. A compensating patient holds the pressure up by clamping down — and the clamping shows in the skin before it shows in the numbers. By the time the cuff is abnormal, the compensation has already failed.

Color

Pallor, mottling, cyanosis — peripheral vasoconstriction or desaturation.

Temperature and moisture

Cool and diaphoretic is sympathetic drive answering a falling output.

Turgor and mobility

Hydration status — relevant when hypovolemia is on the differential.

Edema

Peripheral or presacral — chronic right-sided failure or venous disease.

REGION SOP Every cardiac protocol opens with routine medical care, then “obtain ECG and 12 lead, transmit to receiving facility, and monitor capnography.” The 12-lead is part of the assessment, not an extra.

The focused cardiac history — what actually changes management

SAMPLE	In a cardiac patient, ask specifically
Signs and symptoms	Chest pain or discomfort · dyspnea · cough · syncope · palpitations — plus diaphoresis, nausea, fatigue, anxiety, and a feeling of IMPENDING DOOM, documented in the patient’s own words
Allergies	Including previous reactions to contrast or aspirin
Medications	The highest-yield part of the history — see the next slide
Past medical history	Targeted, not exhaustive: prior MI, angina, stents or bypass, heart failure, diabetes, hypertension. “Avoid spending excessive time”
Last oral intake	A meal high in saturated fats before onset raises gallbladder disease as an etiology. Ask about a recent INCREASE IN CAFFEINE and when they last drank one
Events preceding	What were they doing? Exertional onset relieved by rest suggests stable angina; onset at rest suggests unstable angina or infarction

Duration is a clock, not a detail

Angina usually lasts 3–5 minutes, sometimes up to 15, and is relieved by rest or nitroglycerin. Pain lasting 40 minutes and not relieved is a different problem — and reperfusion is time-dependent.

Two findings worth documenting verbatim

A feeling of impending doom is a real clinical finding. An anguished facial expression is the doorway observation experienced providers act on before the vital signs agree with them.

The medication list — the highest-yield question you will ask

Class	What its presence tells you
Antiarrhythmics • digitalis	A known rhythm problem — and digitalis toxicity is a live differential for bradycardia and junctional rhythms
Anticoagulants • platelet inhibitors	A prior clot, a stent, or atrial fibrillation — and a bleeding risk if trauma is also present
Beta-blockers • calcium channel blockers	They may not mount a tachycardia in shock, and overdose of either is a cardiac emergency
Diuretics • antihypertensives	Chronic heart failure or hypertension
Nitrates	They have angina — and may have taken doses before you arrived
Lipid-lowering agents	Known coronary artery disease
ERECTILE DYSFUNCTION or pulmonary hypertension drugs	The one that changes what you may GIVE — nitroglycerin is withheld within 48 hours

Ask the question you find awkward — directly, and in plain words

“Have you taken anything for erectile dysfunction in the last two days — Viagra, Cialis or similar?” Privately if you can, without embarrassment either way. Anyone who cannot ask it cannot safely give nitroglycerin. And ask what they have already taken tonight: patients frequently self-administer nitroglycerin or aspirin before calling.

The cardiac physical examination



Figure 33-76 Assessing jugular venous distention.
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Figure 33-78 Auscultating the chest.
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Technique	What you are looking for
INSPECTION	Tracheal position · thorax and scars or device bulges · epigastrium · peripheral AND presacral edema · skin · subtle signs of cardiac disease
AUSCULTATION	Breath sounds · heart tones — muffled tones are one leg of the tamponade triad · carotid bruit
PALPATION	Pulse rate, regularity and quality, central versus peripheral · thorax · epigastrium, including a pulsatile mass

Pattern	Points to
JVD with CLEAR lungs	Right-sided failure, tamponade or tension pneumothorax — a preload problem
Crackles WITH distended neck veins	Biventricular failure
Clear lungs, hypotension, FLAT veins	Hypovolemia
Pulsatile abdominal mass with hypotension	Aortic aneurysm until proven otherwise — and that patient does not get an aggressive fluid challenge

None of this takes long — and all of it happens while someone else is applying the monitor.

SECTION 2

Management

Basic life support first, then electricity, then drugs — in that order, because that is the order of impact.

BLS • Defibrillation • Cardioversion • Pacing • Drugs

Basic life support, vagal maneuvers and the precordial thump

1 Basic life support is the primary skill

Basic airway maneuvers and CPR. Everything else in this section adds to it — nothing replaces it, and the arrest protocols are built the same way.

2 Vagal maneuvers

Valsalva — bearing down as if having a bowel movement — or a deep cough. Your SOP adds blowing the plunger out of a 10 mL syringe, which is easier to coach.

3 Why they work

Vagal stimulation releases acetylcholine at the SA and AV nodes. In a reentrant SVT using the node as part of its circuit, briefly blocking the node breaks the circuit.

4 Precordial thump

A blow to the midsternum with the heel of the fist. “Little evidence regarding its effectiveness; however, there is also no evidence of harm.”

Carotid sinus massage — and the check that must come first

Have atropine readily available. IV, oxygen if hypoxic, ECG monitoring. Supine, head slightly hyperextended. Palpate each carotid SEPARATELY and AUSCULTATE FOR BRUITS — if bruits are present, do not perform it. Two fingers over ONE artery below the angle of the jaw, as high on the neck as possible, pressing against the vertebral body. Monitor continuously and terminate at the first sign of slowing or heart block. No longer than 15–20 seconds. If ineffective, repeat — preferably on the other side.

Never both sides at once. A bruit means plaque, and massaging plaque can send it to the brain.

REGION SOP SVT — STABLE: “Instruct patient to perform vagal maneuver” before adenosine. Vagal maneuvers include coughing, bearing down, and attempting to blow the plunger out of a 10 mL syringe.

Defibrillation — what it does and what makes it work

1

It is a reset, not an ignition

Current passes through a fibrillating heart to DEPOLARIZE the cells so they can REPOLARIZE uniformly — letting the pacemaker hierarchy resume in order.

2

Direct current, measured in joules

Alternating current models should not be used. Typically 360 J monophasic, or 120–200 J biphasic.

3

Charge DURING compressions

Continue CPR while the defibrillator charges. The hands-off interval is the largest controllable determinant of coronary perfusion pressure.

4

Resume CPR immediately after the shock

Without a pulse check. Two minutes of compressions, then reanalyze — a perfusing rhythm needs time to generate a pulse anyway.

The eight factors	Can you change it?
Time from onset of ventricular fibrillation	YES — by getting there and shocking early. The single biggest factor
Condition of the myocardium • heart size and body weight	No — patient factors
Pad size • pad placement • pad–skin interface • pad contact	YES — all four, and all four are routinely done badly
A properly functioning defibrillator	YES — at the start of every shift, not at the patient’s side

REGION SOP Arrest sequence: assess ≤ 10 sec • CPR 30:2 for a 2-min cycle • monitor on immediately • defibrillate incrementally per chart, CPR 2 min • EPINEPHRINE 1 mg q3–5 min, no max • AMIODARONE 300 mg then 150 mg • if still shockable, VECTOR CHANGE — a second set of pads anterior-posterior at maximum joules.

Synchronized cardioversion and transcutaneous pacing



Figure 33-82 Engaging the synchronizer.

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Figure 33-84 Adjusting pacer output.

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	DEFIBRILLATION	SYNCHRONIZED CARDIOVERSION
Patient	Pulseless — VF or pulseless VT	Organized activity WITH A PULSE
Timing	Immediate, unsynchronized	Delivered on the R WAVE by the synchronizing circuit
Energy	Maximum	Lower levels — which synchronizing permits
Why	Depolarize everything and let the hierarchy restart	Convert the rhythm while AVOIDING the vulnerable window on the T wave

Not synchronizing can turn a perfusing tachycardia into ventricular fibrillation

A shock landing on the upslope of the T wave — the relative refractory period from Part 1 — is R-on-T. Hold the button until the machine discharges, because it waits for an R wave. Re-arm the synchronizer after every shock. And torsades cannot be synchronized: defibrillate at maximum joules instead.

1 Set the rate, usually 60–80

Output to zero, pacer on, then SLOWLY increase output until you note ventricular capture.

2 Electrical capture

A wide QRS following each pacer spike. Necessary, but not sufficient.

3 MECHANICAL capture is the treatment

A pulse matching the set rate — palpate FEMORAL, because pacer twitching is easily mistaken for a carotid pulse.

4 It hurts

A conscious patient needs sedation: MIDAZOLAM 2 mg, repeat 2 min, max 10 mg, with fentanyl available.

REGION SOP Bradycardia: ATROPINE 1 mg while preparing to pace — do not delay pacing for the drug · repeat q3 min, max 3 mg · and NO atropine for Type II or third-degree block: pace.

The drug categories — and what each one is for

Category	What it does	In your system
Antiarrhythmics	Control or suppress arrhythmias — by changing conduction or automaticity	AMIODARONE (wide complex, refractory VF) · VERAPAMIL (rate control) · ADENOSINE (SVT) · ATROPINE (bradycardia)
Vasopressors / sympathomimetics	Constrict blood vessels, raising arterial pressure — and raise rate and contractility	EPINEPHRINE 1 mg in arrest · PUSH-DOSE EPINEPHRINE 50 mcg under OLMC for peri- and post-arrest hypotension
For myocardial ischemia	Improve supply or reduce demand — the balance from Part 1	OXYGEN titrated to target · ASPIRIN · NITROGLYCERIN · FENTANYL. The chapter also lists nitrous oxide and morphine
Fibrinolytics	Destroy the clot and stop further injury	A hospital therapy in most systems — your contribution is early recognition, early alert, correct destination
Other, used infrequently	Diuresis, sedation, antiemesis	The chapter names furosemide, diazepam, lorazepam and ondansetron

Sort the drug box by which variable it moves, and it stops being a list

Amiodarone and adenosine change CONDUCTION. Atropine changes RATE. Epinephrine changes CONTRACTILITY, rate and afterload. Nitroglycerin changes PRELOAD, and at higher doses afterload. Fentanyl cuts the catecholamine drive raising rate and contractility. Four columns, not twenty flash cards — and the categories are national while the numbers are local.

Support, communication and handover

1 Calm is a physiologic intervention

Fear raises catecholamines, which raise rate and contractility, which raise myocardial oxygen demand. Explaining what you are doing has a measurable effect on the balance from Part 1.

2 The six facts the receiving team needs

Age and complaint · time of ONSET · the 12-lead finding and when it was taken · what you gave and when · the response · current vitals and rhythm. Everything else can wait.

3 The STEMI handover is a different animal

A time-critical briefing to a team already assembled. An accurate onset time and a transmitted 12-lead are the two things that matter most.

4 The timeline IS the clinical record

Record 12-lead acquisition and transmission times, the alert, every drug with time, dose and response, and rhythm changes with times.

“Clearly explain the findings to the nurse or physician in a formal verbal briefing”

It takes about thirty seconds and it shapes the next thirty minutes. Practice it aloud until it is boring.

REGION SOP ACS: “If positive ST elevation then contact STEMI receiving center and call Alert at earliest possible time. Computer assisted ECG interpretation may be used along with provider interpretation.”

What Part 3 gives you for the rest of the chapter

1 The first minute belongs to ABC

Airway, breathing, circulation and shock come before the monitor, the 12-lead and the medication list — however tempting those are in a cardiac patient.

2 The skin reports perfusion before the cuff does

Cool, pale and damp with a normal pressure is a compensating patient. By the time the blood pressure is abnormal, the compensation has failed.

3 The medication list is the diagnosis

Eleven classes, each answering a question — and one of them, the ED and pulmonary hypertension drugs, decides whether you may give nitroglycerin at all.

4 Defibrillation is a reset, not an ignition

It depolarizes everything so the pacemaker hierarchy can resume in order. Charge during compressions; resume compressions immediately after, without a pulse check.

5 Synchronizing avoids the T wave

The shock lands on the R wave because the upslope of the T is the vulnerable window. Fail to synchronize and you can convert a perfusing rhythm into VF.

6 Only MECHANICAL capture is treatment

A wide QRS after each pacer spike is electrical capture. A pulse matching the set rate is the goal — palpate femoral, and sedate the conscious patient.

Next: Part 4 — specific cardiovascular emergencies

Ninety minutes: acute coronary syndrome, heart failure, tamponade, hypertensive emergencies, cardiogenic shock, cardiac arrest and the vascular emergencies — all of them using the assessment and the interventions from this deck.

The 62-year-old — the question before the drug

Which wall, which artery

ST elevation in V2–V4 is the ANTERIOR wall — the left anterior descending. The largest territory and most of the septum, which is why anterior infarcts become pump failure. He can deteriorate fast while looking well.

The question before the drug

“Have you taken anything for erectile dysfunction in the last two days?” Nitroglycerin is withheld within 48 hours of Viagra, Levitra or Cialis — the combination causes profound hypotension that fluid may not fix.

Stable — and what that changes

GCS 15, MAP about 102, perfusing. The stable pathway is aspirin, ECG and 12-lead, nitroglycerin, fentanyl. If nitroglycerin is out, analgesia moves from optional to important — pain is driving oxygen demand.

The most time-critical action

The STEMI ALERT. Aspirin and analgesia matter; reperfusion changes the outcome. Transmit the 12-lead and call from the scene, at the earliest possible time.

The most important thing done for this patient in the first five minutes was a question, not a drug.

Check your understanding

- 1 Which four problems are the most critical in the first minute of cardiac care?
- 2 Give the sequence of the cardiovascular primary assessment.
- 3 Name the six skin findings the chapter asks you to assess.
- 4 Why does the skin report falling perfusion before the blood pressure does?
- 5 List the five common chief complaints in a cardiac patient.
- 6 Name six of the eleven medication classes flagged as especially significant.
- 7 Which medication history absolutely changes what you may give, and over what window?
- 8 What two things does “last oral intake” specifically screen for in a cardiac patient?
- 9 How long does angina usually last, and what relieves it?
- 10 Name the four techniques of the cardiac physical examination.
- 11 JVD with clear lungs points to which three problems?
- 12 What must you check before carotid sinus massage, and what are the limits on the technique?
- 13 Define defibrillation in terms of what it does to the cells.
- 14 Name four of the eight factors influencing defibrillation success.
- 15 Which two habits minimize the hands-off interval during defibrillation?
- 16 How does synchronized cardioversion differ from defibrillation?
- 17 Why must you synchronize — and what can happen if you do not?
- 18 Distinguish electrical from mechanical capture. Which one is the treatment?
- 19 Name the chapter’s four categories of cardiovascular drugs.
- 20 List the six facts a receiving team needs in a cardiac handover.

Answer these before the session and again after — that gap is the measure of what you learned.