ER BASICS · ONE-PAGER

After Cardiac Surgery

CSC focus: bleeding, tamponade, shock states, POAF, pacing and CSU-ALS

29 sources + more detail
erbasics.com/sheets/cardiac-surgery-postop.html
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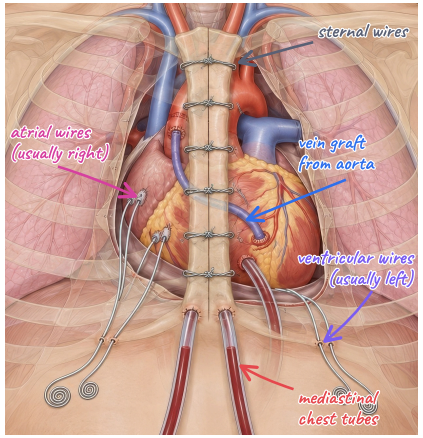
ARRIVAL What comes back from the OR, and the targets



1 First hours and bleeding

- BP: MAP about 60 to 90; avoid hypertension (worsens bleeding)
- Labs: ABG, Hgb, K, Mg, ionized Ca, coags; glucose 180 mg/dL or less (insulin drip)
- Rewarm to 36 °C or more; expect vasodilation; treat shivering (raises O2 demand)

Bleeding with instability also qualifies; follow your institution's protocols.

CHEST TUBE OUTPUT	CLASSIC RETURN-TO-OR TRIGGER
1st hour	Over 500 mL
Each of first 2 h	Over 400 mL/h
Each of first 3 h	Over 300 mL/h
First 4 h total	Over 1,000 mL

Best guided by TEG/ROTEM; also correct pH and ionized Ca.

PROBLEM	TYPICAL FIX
Residual heparin or rebound (ACT up)	Protamine
Fibrinogen under 150 mg/dL, oozing	Cryo or fibrinogen concentrate
Factor deficiency	PCC or plasma
Platelet deficit or dysfunction	Platelets (DDAVP if dysfunction)
Fibrinolysis	Tranexamic acid

Protamine: 1 mg reverses at least 100 units heparin; EACTS 2024 advises under 1:1 of the initial heparin dose. Very slow IV: 50 mg max over 10 min. Reactions: hypotension, anaphylaxis, pulmonary hypertensive crisis (NPH insulin, fish allergy, vasectomy, prior protamine). Heparin rebound: 30 min to 18 h post-op.

⚠ SAFETY Heavy bleeding with normal coags suggests a surgical source. Delayed re-exploration worsens outcomes; escalate early.

2 Tamponade, low output or vasoplegia?

PROBLEM	FILLING PRESSURES	CI	SVR
Bleeding	Low	Low	High
Tamponade	High, equalizing	Low	High
LV failure	PAOP high	Low	High
RV failure	CVP over PAOP	Low	High
Vasoplegia	Low to normal	Normal or high	Low

💡 EXAM TIP Exam favorite: drainage suddenly stops (clotted tubes) while CVP, PA diastolic and PAOP rise and equalize and pulse pressure narrows. Think tamponade; call the surgeon for re-exploration.

Often a localized clot: Beck's triad may be absent; TEE beats TTE.

Low output (LCOS): CI under about 2.0 to 2.2 with poor perfusion despite filling; stunning peaks about 4 to 8 h post-op. Optimize preload, rate, AV synchrony and electrolytes; add an inotrope. Escalate early to IABP, Impella or VA-ECMO, before lactate reaches 4.

Vasoplegia: MAP under 65, CI over 2.2, SVR under 800 (risks: long bypass, preop ACE inhibitors). Norepinephrine plus vasopressin; if refractory, methylene blue 1 to 2 mg/kg (serotonin syndrome with SSRIs, falsely low SpO2, G6PD hemolysis) or hydroxocobalamin 5 g (red urine, lab interference, CRRT blood-leak alarms). Follow your institution's protocols.

3 Post-op AF and epicardial pacing

POAF: 30 to 50%, more after valve surgery; peaks around day 2. STS 2026 prevention: oral amiodarone (Class I), beta-blockers or posterior pericardiotomy (IIa). Unstable: cardioversion. Stable: rate or rhythm control, replace K and Mg; anticoagulate by stroke risk once bleeding settles.

Atrial wires usually exit right, ventricular left; confirm labels.

MODE	TYPICAL USE
AAI	Sinus brady, AV conduction intact
DDD	AV block; keeps atrial kick
VVI	Backup, or slow AF



Failure to sense: spikes ignore intrinsic beats; one on a T wave can trigger VF.

⚠ SAFETY Wear gloves; insulate exposed wire ends (microshock). After wire removal, watch for tamponade.

4 CABG vs valve, and the sternum

SURGERY	WATCH FOR
CABG	Ischemia: ST changes, VT/VF; aspirin within 6 h
Radial graft	Spasm: CCB often for 1 year
AVR	Heart block; keep wires connected
Mechanical valve	Lifelong warfarin: INR 2.5 AVR (3.0 if risk factors), 3.0 MVR; no DOACs
Bioprosthetic	Aspirin; sometimes warfarin 3 to 6 months

Sternum: Keep Your Move in the Tube (upper arms close to the body) is replacing fixed 5 to 20 lb limits. Splint to cough. Risks: diabetes, obesity, smoking.

5 Arrest after cardiac surgery (CSU-ALS)

1. Call arrest: VF, asystole, or flat arterial and ETCO2 traces; resternotomy team gowns up
2. Airway: FiO2 100%, remove PEEP; bag, check tube, decompress suspected tension pneumothorax
3. VF/pVT: up to 3 shocks within 1 minute, before compressions; amiodarone 300 mg if they fail
4. Asystole or extreme brady: pace DDD 80 to 100/min, maximum output; no routine atropine. Paced PEA: pause pacer to unmask VF
5. Not fixed within 1 minute: compressions to arterial systolic over 60; stop infusions (sedation may continue)
6. No routine epinephrine or vasopressin; small doses only if an experienced clinician directs
7. Resternotomy within 5 minutes (first 10 days) or rapid ECMO in expert centers; IABP on pressure trigger

💡 EXAM TIP CSU-ALS vs ACLS: shock or pace before compressions; no AEDs or mechanical CPR devices. Systolic under 60 despite good compressions suggests tamponade or bleeding.

Follow your institution's protocols for all doses.

MORE What bypass does to the body

Bypass drains venous blood to a reservoir, oxygenates it and pumps it into the aorta, usually without pulsatility, while the heart is arrested with potassium cardioplegia behind an aortic cross-clamp. Blood contact with the circuit, surgical trauma and reperfusion of the heart and lungs set off a systemic inflammatory response (SIRS): complement and contact activation, activated neutrophils and endothelium, and a cytokine surge. At the bedside that means capillary leak, weight gain, vasodilation, fever in the first 24 to 48 hours that is usually inflammatory rather than infectious and, at the extreme, vasoplegia. The effects grow with bypass and cross-clamp times, so both belong in the handoff.

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