The Use of Norepinephrine vs Epinephrine in Post Cardiac Arrest Shock

Introduction

1. The effects of epinephrine on animal hemodynamics have been studied since the late 1800s with recent concern with deleterious complications with cerebral and myocardial oxygen supply.
2. Recently, there has been consideration for norepinephrine post cardiac arrest to minimize the complications associated with epinephrine

	Epinephrine	Norepinephrine
Dose	**Weight-based dosing:** • Usual dosage range: 0.01 to 1 mcg/kg/minute; titrate based on clinical end points (eg, MAP, end-organ perfusion) **Non-weight-based dosing:** • Usual dosage range: 1 to 80 mcg/minute; titrate based on clinical end points (eg, MAP, end-organ perfusion Institutional infusion rates may vary	**Weight-based dosing:** • Initial: 0.05 to 0.15 mcg/kg/minute; titrate based on clinical end points (eg, MAP, end-organ perfusion); usual dosing range: 0.05 to 1 mcg/kg/minute **Non-weight-based dosing** (based on ~80 kg patient): • Initial: 5 to 15 mcg/minute; titrate based on clinical end points (eg, MAP, end-organ perfusion); usual dosing range: 5 to 80 mcg/minute Institutional infusion rates may vary
Pharmacokinetics	**Onset**: Immediate **Distribution:** 1-2 minutes to reach peak **Metabolism:** rapid hepatic degradation **Elimination**: urine (inactive metabolites) **Half-life:** <5 minutes	**Onset**: Immediate **Distribution:** 1-2 minutes to reach peak **Metabolism:** rapid hepatic degradation **Elimination**: urine (inactive metabolites) **Half-life:** <5 minutes
Adverse Effects	Tachyarrhythmias, myocardial ischemia, extravasation leading to necrosis,	

Mechanism of Action	Receptor Activity	Pharmacological Action	Effect
	α agonist	Peripheral vasoconstriction	↑ myocardial and cerebral blood flow
	β agonist	↑ heart rate and contractility	↑ myocardial oxygen demand

Overview of Evidence

Author (Year)	Study Design/Patient Population	Intervention	Results
Bougouin, 2022	Retrospective N=766	● Norepinephrine infusion ● Epinephrine infusion	● **All-cause hospital mortality was significantly higher in the epinephrine group (OR 2.6; 95%CI 1.4-4.7; P = 0.002).** ● Proportion of patients with CPC of 3-5 at hospital discharge was also higher with epinephrine
Weiss, 2021	Retrospective N=93	● Norepinephrine infusion ● Epinephrine infusion	● **Significantly more EPI patients had refractory hypotension, rearrest, or death** in the emergency department (EPI 21/42, 50% vs. NE 10/45, 22.2%; P = 0.008) ● In an adjusted regression model, the odds of reaching the primary outcome in the **ED were 3.94 [95%CI 1.38-12.2] (P = 0.013) times higher in the EPI** group compared to NE treated patients.
Mion, 2014	Case report N=1	● Epinephrine then transition to norepinephrine	● 58 year male, The cardiac rhythm turned into a ventricular fibrillation (VF). That had reccurent v fib with epinephrine ● Return of spontaneous circulation was observed, with the recovering of sinusal activity. After staying for several weeks in intensive care unit because of multiorgan failure, the patient recovered without sequelae.
Kim, 2012	Retrospective N=90	● Norepinephrine infusion ● Epinephrine infusion	● The survivors (N=46) were more likely to have received norepinephrine infusion than the non-survivors (34.8% vs 22.6%). ● Of those who had a prolonged arrest (more than ten minute down time, N=28) the survivors were also more likely to have received norepinephrine infusion (42.85% vs 25%).

Conclusions

- It's controversial as to whether epinephrine is preferred vasopressor post cardiac arrest.
- Norepinephrine is a reasonable agent to use post arrest if it is clinically warranted.

References

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