



Pharmacy Friday



Rate Control for Atrial Fibrillation: Calcium Channel Blockers

1. Atrial fibrillation (AF) is a common cardiac dysrhythmia that requires many patients to seek emergency treatment each year
2. The American Heart Association estimates the prevalence of AF in the United States to be 3-6 million and is expected to double by 2050
3. Approximately 60%-70% of patients with AF present to the emergency department (ED) with rapid ventricular response (RVR)
4. (AHA/ACC/HRS) guideline for the acute management of patients with rapid AF suggest using an intravenous (IV) b-receptor antagonist (BB) or a non-dihydropyridine calcium channel antagonist (CCB) to slow RVR in the absence of hemodynamic instability or pre-excitation syndromes.

Properties	Diltiazem	Verapamil
Dose	IV 0.25 mg/kg up to 20 mg <ul style="list-style-type: none">• May repeat 0.35 mg/kg after 15 min	(IV) 5 to 10 mg (0.075 to 0.15 mg/kg) <ul style="list-style-type: none">• May repeat 10 mg after 30 min if needed
Administration	Slow IV push over ≥ 2 min and IV infusion	Slow IV push over ≥ 2 min
Formulation	IV push/IV infusion/PO	IV push/PO
PK/PD	Onset: 3 min Duration: 1-3 hr Excreted: 30% renal	Onset: 3-5 min Duration: 0.5-6 hr Excreted: 70% renal
Adverse Effect	Edema, hypotension, dizziness	Edema, hypotension, dizziness
Drug Interactions and warnings	Major CYP3A4 Inhibitor (\uparrow drug levels)	Major CYP3A4 Inhibitor (\uparrow drug levels)
Compatibility	n/a	\neq Furosemide, propofol, sodium bicarbonate

Author, Year	Design/ sample size	CCB regimen	Outcome
Means, 2017	Retrospective review/ n=111	IV bolus then: Diltiazem IR tablet 30-60mg vs Diltiazem infusion ~10mg/hr	PO diltiazem associated with Reduced treatment failure 6x more likely to dispo to floor Trend toward ↓ LOS
Ross, 2016	Retrospective review/n=456	Diltiazem 10 mg standard dose vs Diltiazem 0.2-0.3 mg/kg	No difference in: -Conversion to sinus rhythm - HR< 100 - Heart rate reduction ≥ 20% Weight based associated with greater: - SBP
Lee, 2011	Retrospective chart review/ n=180	Diltiazem low dose (≤0.2 mg/kg) vs Standard dose (>0.2 and ≤0.3 mg/kg) vs High dose (>0.3 mg/kg)	There were no significant differences in the rates of therapeutic response Higher rates of SBP <90 mmHg in standard and high dose compared to low dose
Schreck, 1997	RCT, open-label trial/n=30	Diltiazem 0.25 mg/kg, with a 2 nd dose 0.35 mg/kg at time 15 min + infusion vs Digoxin 0.25 mg x 2 at within min	Diltiazem associated with ↓ in heart rate at 5 min ↓ in SBP compared to digoxin ↓ heart rate achieved with digoxin did not reach statistical significance until time 3 hrs
Phillips, 1997	RCT, double blinded, crossover/ n=17	IV bolus diltiazem 20 mg x 2 vs IV bolus verapamil 5 mg x 2 followed by an 8-hour continuous infusion of each respective agent then washout period prior to crossover	Diltiazem > verapamil in ↓ HR at 2 min No difference in ↓ HR after 2 min, Mean ejection fractions Δ in blood pressures

References

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