High Dose Nitroglycerin for Cardiogenic Pulmonary Edema

Guest: Jill Logan, Pharm D

Key Articles:

- Cotter G, Metzkor E, Kaluski E, et al. Randomised trial of high-dose isosorbide dinitrate plus low-dose furosemide versus high-dose furosemide plus low-dose isosorbide dinitrate in severe pulmonary oedema. Lancet. 1998;351:389-93.
- Levy P, Compton S, Welch R, et al. Treatment of severe decompensated heart failure with high-dose intravenous nitroglycerin: A feasibility and outcome analysis. Ann Emerg Med. 2007;50:144-52.
- Wilson SS, Kwiatkowski GM, Millis SR, Purakal JD, Mahajan AP, Levy PD. Use of nitroglycerin by bolus prevents intensive care unit admission in patients with acute hypertensive heart failure. Am J Emerg Med. 2017;35:126-31.

Nitroglycerin in Heart Failure:

- Traditional teaching is that high doses of nitroglycerin are needed to reduce afterload, however, the majority of this data is from healthy volunteers.
- The severity of illness as well as the dose of nitroglycerin will likely impact the patient's response to high dose nitroglycerin.

Nitroglycerin bolus dosing:

- Nitroglycerin as a bolus has been studied in doses up to 2 mg (2000 mcg) both prospectively and retrospectively showing good safety outcomes with high dose intravenous push administration.
- The trial by Cotter, et al (Lancet 1998;351:389-93) showed decreased rates of mechanical ventilation, myocardial infarction, and adverse events in the high dose nitrite group when compared with the high dose furosemide group.

Practical considerations:

- If you plan to use high dose nitroglycerin via bolus administration, it is helpful to get your ED team on board ahead of time!
- Know your patient's baseline MAP and/or blood pressure and use caution if reducing MAP or DBP by more than 30%.
- There is no magic dose for IV push administration but Jill recommends 200 mcg in most patients. Higher or lower doses may be reasonable based on the patient specific characteristics.
- Nitroglycerin infusions may be started concomitantly with the bolus administration, however, once the patient's sympathetic drive has decreased the infusion will likely need to be titrated down.

- Avoid the use of high dose nitroglycerin in patients who are preload dependent or hypotensive.
- It is prudent to observe the effect of the high dose nitroglycerin administration prior to adding other pharmacologic interventions such as diuretics or ACE inhibitors.