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**Citation:** S.S. Wilson et al., (2017) Use of nitroglycerin by bolus prevents intensive care unit admission in patients with acute hypertensive heart failure, *American Journal of Emergency Medicine*, 35, 126–131.

**Clinical Question:** To compare health resource utilization and length of stay (LOS) among patients who presented in acute heart failure (AHF) and received nitroglycerine via intermittent bolus dosing, continuous drip or a combination of both.

**Introduction:** Vasodilators such as nitroglycerine have become a mainstay in the management of AHF. When nitro is administered IV, it is typically done so as a continuous drip. However, continuous IV nitro has been associated with increased healthcare costs and increased length of stay. Comparatively, when given in higher bolus doses, nitro has greater effect on arterial vasodilation thereby further decreasing afterload leading to favorable changes in hemodynamics. It has been shown that the use of bolus dosing has decreased ICU admission and LOS. The aim of this study was to examine the impact this approach has on resource utilization.

**Methods:** This was a retrospective observational cohort study. All patients in the study were seen in the ED at the Detroit Receiving Hospital between Jan 1, 2007 and Jul 31, 2011. All patients over 18 who were treated for AHF and received IV nitro (only if started in the ED and including those that were stopped in the ED prior to admission) were included. Patients were excluded if pregnant or if nitro was given for an indication other than AHF. Of note, this hospital required all patients on titratable vasoactive drips to be admitted to the ICU. Data on disposition (ICU vs non-ICU), LOS and need for airway management (intubation or BiPAP) were recorded. Readmission rates within 30 days were also examined. Patients were categorized into 3 groups: 1.bolus dosing, 2.continuous infusion and 3.combination.

**Results:** A total of 1,227 patients were identified. Of these, 395 met eligibility (124 bolus, 182 infusion, 89 combo). The most common reason for exclusion was a non-AHF indication for nitro. There were no significant differences regarding age, sex or race among the 3 groups. In the bolus group, the median total dose was 2 mg (79% of people received 1 dose, 14.6 received 2 doses and 6.4% received 3 or more doses). In the infusion group, the median rate of infusion was 20 mcg/min for minimum rate and 35 mcg/min for max rate. In the combo group, the median dose of the boluses was 2 mg, with 40.5% received 1 dose, 28.1% received 2 doses, 9% received 3 doses, and 12.4% received 4 or more nitroglycerin boluses. The median starting rate of nitro infusion was 20 mcg/min and the max rate was 60 mcg/min in these patients. Patients who received nitro bolus therapy alone were significantly less likely to require ICU admission (48.4% bolus vs 68.7% infusion vs 83% combination;  $P < .0001$ ) and median total hospital LOS was significantly shorter: bolus = 3.7 days; infusion = 4.7 days; and combination = 5.0 days;  $P = .02$ . The rates of mechanical ventilation and BiPAP were statistically similar. Hospital readmission within 30 days was significantly higher among the infusion group (65% infusion vs 33% bolus vs 28.5% combination group;  $P = .001$ ).

**Discussion:** Based on the findings of this study, the null hypothesis was rejected. Bolus dosing of nitro led to a significant decrease in ICU admissions (20-30%) as well as a significant decrease in LOS of 2-3 days for patients with AHF as compared to patients that received some form of continuous nitro. Limitations include the fact that nitro drips required ICU stays at this hospital, which is why LOS was also analyzed. This was also a single center study. Another variable that wasn't analyzed was severity of AHF. The findings and strength of this study could be improved in a future prospective, randomized, multicenter trial.

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