

# Paramedic - Evidence Based Medicine (P-EBP) Program

## Paramedic CAT (Critically Appraised Topic) Worksheet

**Title:** Prehospital use of IV vs SL nitrates for treatment of pain in patients presenting with ACS

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**Clinical Scenario:** Paramedics are treating a 68-year-old male presenting with acute coronary syndrome whose pain is not being successfully managed by repeat doses of sublingual nitrates. Rather than proceeding to an opioid analgesic, paramedics decide to administer intravenous nitrates.

### **PICO (Population – Intervention – Comparison – Outcome) Question:**

In patients with acute coronary syndrome in the prehospital setting, is the administration of intravenous nitrates more effective than sublingual nitrate administration in management of ischemic chest pain?

**Search Strategy:** (((prehospital OR "out of hospital" OR EMS OR paramedic OR EMT OR "emergency medicine" OR ambulance OR "emergency medical services")) AND (ACS OR "acute coronary syndrome" OR "chest pain" OR infarction OR ischemia OR angina OR "heart attack" OR "chest discomfort" OR MI)) AND (nitroglycerin OR nitro OR nitrate OR vasodilator)

**Search Outcome:** 429

### **Relevant Papers:**

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
Cotter, G. et al. (1998)	72 patients with unstable angina lasting longer than 10 minutes	Prospective study Intravenous nitrates	Optimal blood pressure	Optimal blood pressure achieved in 68% of patients who received	Similar baseline characteristics between both

	accompanied by ST-segment depression of 1mm or more (in two contiguous leads) on ECG	vs sublingual nitrates (LOE1)	Pain relief	intravenous nitroglycerin vs. 41% in sublingual group (p=0.0004).  More pronounced pain relief in 67% of patients who received intravenous nitrates vs. 39% of patients in sublingual nitrates group (p=0.004).	groups.  Patients were alternately assigned to a group.  Initial treatment continued until symptoms resolved and decreased of blood pressure, but no time frame until symptom relief provided.  Small sample size.  Pain scale not very elaborate; only from 0 to 3 and not very specific. More detailed pain scale may be beneficial.
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**Comments:** Search results were very limited. In the prehospital setting, both primary and advanced care paramedics administer nitrates by sublingual route for chest pain of ischemic origin. It is within the scope of practice of advanced care paramedics in Nova Scotia to transport patients with nitroglycerin infusions.

Nitrates mediate vasodilation, therefore reduce ventricular preload, wall tension and oxygen demand. Their effects on arterial and venous vessels is dose dependent. High dose nitrates may cause systemic hypotension. This may lead to decreased coronary blood flow distal to occlusion and worsen myocardial ischemia.



**Consider:** The cost and how the medications are supplied should be considered to implement in prehospital setting.

**Clinical Bottom Line:** This study demonstrates that intravenous nitrates are more effective at pain relief and achieving optimal blood pressure. However, there is limited research to support the prehospital administration of intravenous nitrates.

**References:**

Cotter, G., Faibel, H., Barash, P., Shemesh, E., Moshkovitz, Y., Metzkor, E., Simovitz, A., Miller, R., Schlezinger, Z., Golik A., "High-dose nitrates in the immediate management of unstable angina: optimal dosage, route of administration, and therapeutic goals." The American Journal of Emergency Medicine, Volume 16, Issue 3, 1998

