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Prehospital adverse events associated with nitroglycerin use in STEMI patients with right ventricle infarction

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Introduction: Paramedics in our region do not perform 15-lead ECGs. As a result, patients experiencing a Right Ventricular Infarct (RVI) may receive nitroglycerin (NTG). In many cases, paramedics do not administer NTG to those with inferior STEMI out of concern that there may be an associated RVI. The purpose of this study is to determine if there is a difference in prehospital adverse events (AEs) associated with NTG administration in patients with unrecognized RVIs compared to those with an inferior STEMI and no RVI. **Methods:** Ambulance Call Records (ACR) of patients with prehospital STEMI between Jan 1, 2012 and Dec 31, 2015 were analyzed for the incidence of NTG administration. AEs were defined as HR < 60 bpm, systolic BP <100 mmHg or drop of 1/3, GCS decrease of >2, syncope, arrest or death. Hospital records were reviewed to determine patients diagnosed with an inferior STEMI without RVI and those with a concurrent or primary RVI as diagnosed on angiography, ECG or discharge diagnosis. **Results:** Of the 334 ACRs that were filtered and manually reviewed, 144 were excluded (not STEMI, inter-facility transports, duplicate ACR) resulting in 189 patients that had a prehospital STEMI. The mean (SD) age was 66.9 (13.5) years and 70.6% were male. Of 189 STEMI patients, 82 (42.9%) received NTG. Nineteen (41.3%) of these patients were subsequently diagnosed with RVI and 27 (58.7%) had inferior STEMI without RVI. For patients receiving NTG, AEs occurred in 11 (57.9%) within the RVI group, and 10 (37.0%) within the inferior STEMI group (**Δ** 20.9%, 95% CI -7.8% to 45.4%, p = 0.2). Cardiac arrest or death did not occur in either group. A total of 107 did not receive NTG and of these, 93 (86.9%) did not meet conditions or had contraindications for NTG use (22 RVI, 42 inferior STEMI). Three patients had a cardiac arrest and one died while in EMS care, none of which received NTG or had RVIs. **Conclusion:** Results of this study suggest no difference in the rate of AEs between patients with inferior STEMI and STEMI with RVI when NTG is administered in the prehospital setting. In our EMS system, the conditions and contraindications of NTG administration may be protective against AEs in RVIs, so the potential benefit of a prehospital 15-lead ECG may be limited.

Keywords: nitroglycerin, ST elevation myocardial infarction, prehospital

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System and patient level determinants of EMS offload delay

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Introduction: Arriving EMS patients often experience offload delay due to a lack of available care spaces. Arrival in an overcrowded ED is the primary cause of offload delay, but patient characteristics may also play a role. Our objective was to describe system and patient level determinants of offload delay. **Methods:** From July 2013 to June 2016, administrative data was collated from the four Calgary Zone adult EDs. All CTAS level 2 and 3 patients arriving by ambulance were eligible for study. To define patient complexity and illness severity, we captured patient demographic data, living situation (homecare/facility vs. independent), vital signs, complaint category (medical, cardiovascular, mental health/neuro, GI, trauma/MS, other), biochemical parameters (serum Na, K, creatinine, hemoglobin, WBC), patient care needs (IV fluid bolus, IV antibiotics, CT scan, admission) and mortality at 7 and 30 days. **Results:** 162,002 EMS patients were studied. Of these, 67,785 went to a care space within 15 minutes (minimal offload delay), 53,185 between 15 and 59 minutes (moderate offload delay), and 41,032 at ≥60 minutes (severe offload delay). Vital signs, biochemical and hematologic parameters did not differ between groups. ED site was a strong predictor of offload delay (odds ratio {OR} = 1.0, 2.03, 2.14, 3.5 for the 4 EDs), as was arrival on weekday (OR = 1.38) or night shift (OR = 0.71). After adjusting for site, day and time of arrival, multivariate logistic regression models showed the following associations with offload delays of more than 15 minutes: male sex (OR = 0.94), age (OR = 1.01 per year of age), dependent living situation (OR = 1.15), CTAS 3 acuity (OR = 1.27), number of prior ED visits within a year (OR = 1.06 per visit), and complaint category: general medical (1.0), cardiovascular (0.90), mental health/neuro (0.90), GI (0.85), trauma/MS (0.61). Odds ratio estimates were precise—all with p < 0.001. Offload delay was associated with prolonged time to MD, increased EDLOS and higher LWBS/AMA rates. Delayed patients had similar rates of IV antibiotic use, but lower rates of IV fluid bolus, CT use, admission, and 7-day mortality. **Conclusion:** The strongest predictor of offload delay is arrival to a crowded ED, but patient factors including female sex, older age, dependent living status and repeat hospital use increase risk. Patients subjected to offload delay also appear to have lesser immediate care needs and lower short-term mortality.

Keywords: offload delay, determinants, overcrowding

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Impact of EMS direct referral to community care on services received

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Introduction: The Community Referral by Emergency Medical Services (CREMS) program was implemented in January 2015 in Southwestern Ontario. The program allows Paramedics, who are interacting with a patient as a direct result of a call to 9-1-1, to directly refer patients in need of home care support to their local Community Care Access Centre (CCAC) for needs assessment. If indicated, subsequent referrals are made to specific services (e.g. nursing, physiotherapy and geriatrics) by the CCAC. Ideally, CREMS connects each patient with appropriate, timely care, supporting individual needs. Similar referral programs have been implemented in communities with preliminary data showing positive results. The primary objective of this project was to evaluate the success of the CREMS program by determining the number of referrals made by EMS in London-Middlesex to CCAC since implementation as well as the proportion of referred patients receiving a new or increase in service due to EMS referral. **Methods:** Data for all CCAC referrals from London-Middlesex EMS was collected for a thirteen month period (February 2015-February 2016). Data was evaluated for quantity of referrals and proportion that led to a patient receiving new or increased home care service. **Results:** There were 436 referrals made in the study period which represented 391 individuals. 54% of patients were between 65-84 years of age. Of the 391 patients, 162 (41%) were not known to CCAC and of those 119 (73%) received a new service due to EMS referral. The most common new services were occupational therapy (61%) and nursing (47%). Of the 229 (59%) of patients that were already known to CCAC, 101 (44%) received an increase in service due to EMS referral. No patients refused a new or increase in service. **Conclusion:** Of all patients referred to CCAC, 56% received a new service or had a change in existing services which suggests that a large number of patients benefited from early EMS referral to community services. The results of this project provide

https://doi.org/10.1017/cem.2017.96 Published online by Cambridge University Press