Prehospital use of thrombolytics for STEMI

Report by Mitch Kreutzer

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Clinical Scenario: Picture yourself working in rural Saskatchewan on a cold snowy day, roads are terrible you get toned out for a 60 y/o male complaining of chest pain. Upon arrival you find a dusky looking man clutching his chest, you determine he is having a STEMI when the ecg shows elevation in v2,v3. Considering your rural location and road condition you realize that you are over an hour away from your local hospital and the thrombolytics they have, little own the cath lab at the tertiary hosp 3-4 hrs away. And you ask yourself is there something more I could do to benefit my patient in these situations?

PICO: prehospital STEMI pts., prehospital thrombolytics, compared to in hospital thrombolytics, outcomes

Search Strategy: "emergency medical services"[mh] or emergency medical services or ambulance or paramedic or prehospital)) AND (stemi or steacs or acute coronary syndrome or acute myocardial infarction)) AND (fibrinolytics or thrombolytics or tenecteplase or lysis)) AND not pci

Search outcome: 201 hits

Relevant Paper:

Prehospital-Initiated vs Hospital-Initiated Thrombolytic Therapy The Myocardial Infarction Triage and Intervention Trial, W. Douglas Weaver, MD 1993

Population sample: 360 adult STEMI pts. Under 75 with symptoms 6 hours or less

Design: Randomized controlled clinical trial which is a level 1 study

Outcomes: The primary endpoint was a ranked composite score (combining death, stroke, serious bleeding, and infarct size). The relation between time to treatment and outcome (composite score, infarct size, ejection fraction, and mortality) was also assessed.

Results: Initiating treatment prehospital decreased time of onset to treatment from 110 to 77 minutes (P<.001). more pts. with prehospital administration had resolved pain (23% vs 7%; P<.001), there were no significant differences in the composite score (P=.64), mortality (5.7% vs 8.1%), ejection fraction (53% vs 54%), or infarct size (6.1% vs 6.5%). Report did show improved outcomes in pts. receiving treatment prior to 70 mins onset of symptoms (composite score, P=.009; mortality, 1.2% vs 8.7%, P=.04; infarct size, 4.9% vs 11.2%, P<.001 ; and ejection

fraction, 53% vs 49%, P=.03) than those receiving treatment over 70 mins after onset of symptoms.

Strengths/weaknesses: The study did seem well done it was a randomized study with a large specific group of patients, one down fall to the study was the urban ems setting with short transport times though it showed some promising results of early thrombolytic use, I feel the results in a rural setting would have been more profound. There was also a large age gap between prehospital and in hospital pts though I don't feel this swayed the study one way or the other.

Mortality and prehospital thrombolysis for acute myocardial infarction

A meta-analysis, Laurie J Morrison, MD, FRCPC, 2000

Population sample: 6434 Adult STEMI patients. From 6 randomized trials

Design: Meta-analysis, which is a level 1 study

Outcomes: time to thrombolytic treatment and all cause hospital mortality, secondary outcomes: ejection fraction, infarct size, scene time, and Q wave infarct frequency and complications were inconsistent between trials.

Results: time to thrombolysis favored prehospital group with a decrease of time to treatment of 60 mins (P=.007)

Results were pooled from all 6 studies which measured short term mortality favoring prehospital thrombolytics, (95% ci 0.70-0.98, P=.03) reducing risk of all cause mortality by 17%, absolute risk by 2% translating to 1 life saved for every 62 pts. with overt AMI

Test of Homogeneity yield a P value =.90

Strengths/weaknesses: this study being a meta-analysis reviewed 6 randomized trials which included 6434 patients that fit its criteria making a strong argument for its findings, it used data from various prehospital settings and providers, which I considered as a possible weakness having various levels of training for providers delivering the thrombolytics prehospital, the review did show that even with various providers delivering thrombolysis there was no significant difference in results due to that factor.

Considerations: Although I do feel strongly that prehospital thrombolytics would be beneficial prehospitally, I believe a reason I would not change my current practice would be that from the 2 studies I read it appeared that the prehospital thrombolytics were only beneficial to a very small group of patients that being patients with STEMI onset of less then 70 mins prior to needle. One study went on to say that majority of pts waited approx. 30 mins following onset of

symptoms to call 911 making that window of time to needle even smaller to see beneficial results, that being considered the results for patients in that time frame showed substantially better outcomes in mortality, infarct size, and ejection fraction.

Clinical Bottom Line: I found that early intervention specifically in the time frame of <70/min of onset of symptoms to needle (thrombolytics) was beneficial to patient outcome reducing short term as well as 1yr,5yr mortality, infarct size, and ejection fraction.

Resources:

Mortality and prehospital thrombolysis for acute myocardial infarctionA meta-analysis Laurie J. Morrison, MD, FRCPC, P. Richard Verbeek, MD, FRCPC, Andrew C. McDonald, MD, FRCPC, Bruce V. Sawdsky, MD, CCFP-EM, Deborah J. Cook, MD, FRCPC

Prehospital-Initiated vs Hospital-Initiated Thrombolytic Therapy The Myocardial Infarction Triage and Intervention Trial W. Douglas Weaver, MD; Manuel Cerqueira, MD; Alfred P. Hallstrom, PhD; Paul E. Litwin, MS; Jenny S. Martin, RN; Peter J. Kudenchuk, MD; Mickey Eisenberg, MD; for the Myocardial Infarction Triage and Intervention Project Group