

POSTER 427

Chemical Stability of Nitroglycerin (NTG) Tablets Carried in Ambulances of a Large Metropolitan System

Herman L, * ** Koenigsberg M, * ** Ward S, ** Sloan E, * Miller L⁺

* Program in Emergency Medicine

University of Illinois College of Medicine
Chicago, Illinois, USA

** Chicago North EMS System, Illinois Masonic Medical Center
Chicago, Illinois, USA

+ Loyola University Stritch School of Medicine
Chicago, Illinois, USA

Objective: To determine the amount of active nitroglycerin (NTG) tablets carried on advanced life support ambulances.

Design: Laboratory assay of the percentage of active NTG in the sublingual tablets (0.4 mg).

Setting: Urban, public, and private EMS System.

Intervention: All NTG tablets were removed from the ambulances and assayed for active NTG. Tablets (0.4 mg) were ground and dissolved in 24% methanol/24% acetonitrile/52% water, and filtered. The amount of nitroglycerin then was determined by liquid chromatography. Testing was performed by an independent laboratory. The peaks were measured in millimeters and the percentage of active NTG was calculated by using the area under the curve methodology. Nitroglycerin percent activity $\geq 80\%$ is considered within therapeutic range of bioavailability. The NTG tablets were exchanged every 120 days times two and the amount of active NTG was assayed and calculated by the above method.

Results: The mean percent activity was $96.0 \pm 6.7\%$ (95% CI = 87–105%). The mean percent activity of the NTG which had an undetermined storage time is $96.6 \pm 7.8\%$, while all NTG which had a storage time of 120 days had a mean activity of $95.3 \pm 5.2\%$. The difference of 1.3% is statistically significant ($p < .001$), albeit of doubtful clinical significance.

	NTG 1 (n = 62)		NTG 2 (n = 20)		NTG 3 (n = 34)	
Control	3	(4.8)	2	(10.0)	1	(2.9)
$n \geq 100\%$	20	(32.3)	4	(20.0)	4	(11.8)
$90\% \geq n < 100\%$	33	(53.2)	11	(55.0)	25	(73.5)
$80\% \geq n < 90\%$	5	(8.1)	2	(10.0)	4	(11.8)
$n < 80\%$	1	(1.6)	1	(5.0)	0	(0)

NTG 1—undetermined storage time prior to March, 1992

NTG 2—120 days, March-June, 1992

NTG 3—120 days, July-October, 1992

Conclusions: The NTG tablets used for sublingual administration in an urban EMS setting appear to remain stable (greater than 80% active NTG) up to 120 days of ambulance storage, although there is a significant variability in the amount of NTG. Further evaluation is needed to determine optimal exchange time beyond three months.

POSTER 503

Signal Processing of Ventricular Fibrillation Waveform Collected by Urban First-Responders Utilizing Semi-Automatic External Defibrillators

Braun O, Lober W, Meyer G, Valentine WL, Clark DM

Center for Prehospital Research and Training

University of California at San Francisco,
San Francisco, California, USA

Hypothesis: Digital signal processing of the ventricular fibrillation (VF) waveform can provide prognostic indicators of cardiac arrest outcomes.

Methods: All available digital electrocardiographic (ECG) data collected on solid state modules for 254 adult non-traumatic VF cardiac arrests from 20 August 1989 to 13 November 1992 were analyzed using signal processing software. Amplitude and frequency measurements of the presenting rhythm were made and compared to patient outcome. ECG measurements were: peak-to-trough, range, root mean square (RMS), and peak frequency (F-peak). Patient outcomes included: conversion (electrical conversion to a regular rhythm with a minimum of three complexes); stable conversion (electrical conversion not reverting to ventricular fibrillation); return of spontaneous circulation (ROSC); CCU/ICU admission; and discharge from hospital. Predictive value of signal characteristics was determined using logistic regression.

Results: There was a positive correlation between RMS amplitude and conversion, stable conversion, and ROSC. There was a positive correlation between F-peak (dominant frequency of the presenting rhythm), ROSC, admission, and discharge. The F-peak and RMS independently correlate with hospital discharge. The F-peak was greater in patients who received bystander CPR in both witnessed ($p = .01$) and unwitnessed ($p = .09$) arrests.

Outcome	RMS (p-value)	F-Peak (p-value)
Conversion	.0077	NS
Stable Conversion	.0156	NS
ROSC	.0019	.1002
Admit	NS	.1143
Discharge	.0060	.0517

Conclusion: Amplitude and frequency characteristics of the ventricular wave form correlate with outcomes from cardiac arrest. These measurements are objective and reproducible, and may reflect clinically useful physiologic characteristics of the fibrillating heart.