

**2009 LLSA ACMT/AACT Medical Toxicology Review
Puerto Rico, March 28, 2009**

Henry CR, Satran D, et al. Myocardial injury and long-term mortality following moderate to severe carbon monoxide poisoning. *JAMA*. Jan 2006;295(4):398-402.

Michael G. Holland, MD, FAACT, FACMT, FACOEM, FACEP

Clinical Assistant Professor, Department of Emergency Medicine

SUNY Upstate Medical University

Consulting Medical Toxicologist

Upstate New York Poison Center, Syracuse, NY

Attending Physician in Occupational Medicine

Center for Occupational Health of Glens Falls Hospital

Glens Falls, NY



Content Area 2.2

Industrial, Household, and Environmental Toxicants

Henry CR, Satran D, et al. Myocardial injury and long-term mortality following moderate to severe carbon monoxide poisoning. *JAMA*. Jan 2006;295(4): 398-402.

- 8 year prospective study: '94 - '02
- All adults with mod.- severe CO poisoning who were:
 - Transferred to regional center for HBO Rx
 - Included if they were admitted after HBO
- Followed through 2005 for mortality
- Assessed predictors for mortality



Results

- 230 patients enrolled
 - Average age 47.2 years
 - 72% were male
- Initial CO poisoning:
 - Accidental in 135 (59%)
 - Intentional 91 (40%)
 - Unclear in 4 (1%)



Results

- High illness severity
 - 117 (51%) intubated due to CO poisoning
 - 187 (81%) had persistent or transient LOC
 - 182 (79%) had GCS <15 on arrival to HBO
 - 14 (6%) required pressors
 - 27 (12%) required NTG and/or lidocaine
- Low in-hospital mortality- 5% (12 pts)
 - Usually due to burns or CNS anoxia



Cardiac risk factors assessed:

- 129 (56%) were smokers
- 52 (22.6%) had HTN
- 16 (7%) had DM
- Prior CV disease was uncommon:
 - 15 (6.5%) prior MI
 - 7 (3%) prior CHF
 - 6 (2.6%) prior PTCA/CABG



Myocardial Injury in 85 patients (37%)

- Elevated Biomarkers- 81 patients (35.2%)
 - 52 (22,6%) had Troponin I \geq 0.7 ng/mL
 - 29 (12.6%) had CK-MB \geq 5.0 ng/mL
- Diagnostic ECG changes (biomarkers not available)
 - 4 patients (1.7%)

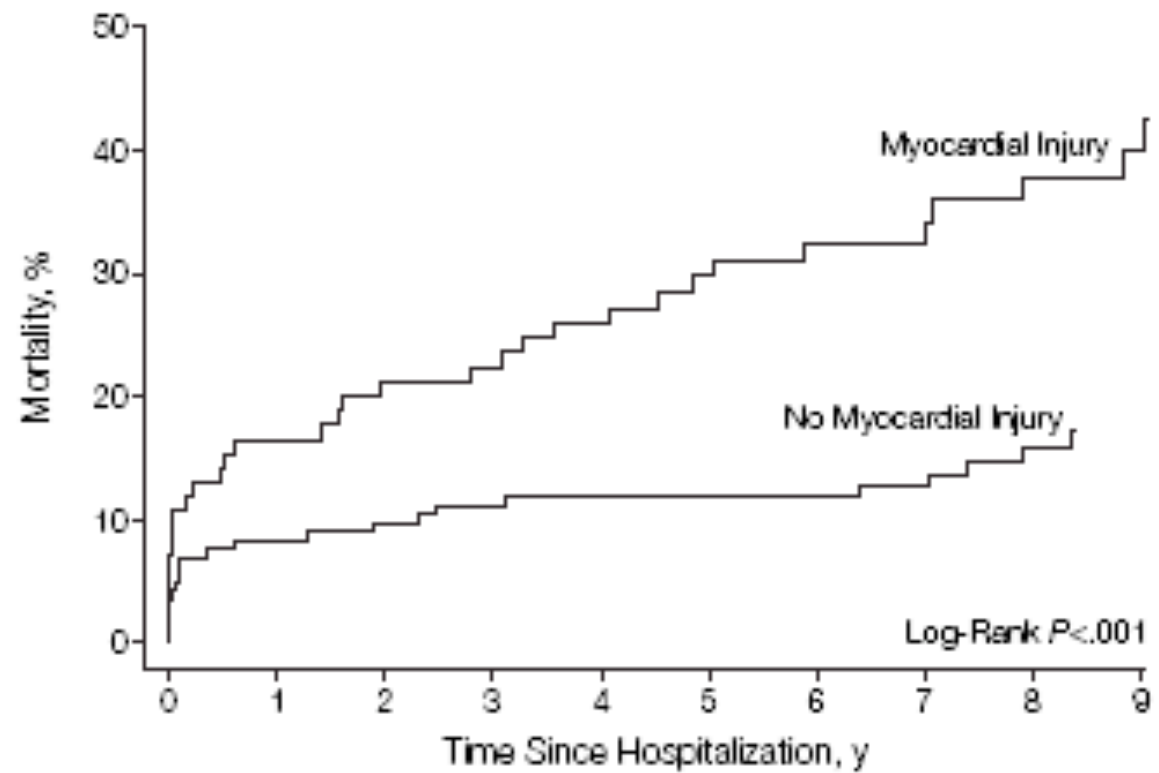


Comparison of Patients with & without Myocardial Injury (MInj)

- In-hospital mortality: 12 of 230 (5%)
 - With MInj- 6 of 85 (7.1%)
 - Without MInj- 6 of 145 (4.1%)
- Mortality post-discharge (f/u 7.6 yr):
 - 42 additional deaths (54 total)= 24%
 - SMR 3.0 compared to US statistics for age
 - With MInj- 32 of 85 (38%)
 - Without MInj- 22 of 145 (15%)



Figure. Mortality of Patients With and Without Myocardial Injury



No. at Risk					
Myocardial Injury	85	67	61	45	31
No Myocardial Injury	145	131	126	102	71



Conclusions

- Neurologic Injury most studied outcome
- MInj common in mod-sev CO poisoning
- This study shows MInj rates are significant in mod-sev CO poisoning
- +MInj- had $> 2X$ mortality of – MInj
- Patients with CO poisoning should be aggressively screened for MInj
- Those with + MInj should have further CV work-up and Rx to reduce post-discharge mortality

