(Long-term) outcome of poisoned patients in the ICU

Dylan de Lange
Dutch National Poison Information Center & ICU
University Utrecht, the Netherlands
Malta, 28th May 2015, 11:00-11:20
... and they lived happily ever after

... do they?
Survival assumptions

Survival of intoxicated patients:

(%)

100
90
80
70
60
50

hospital/ICU
Intoxication and ICU mortality in the Netherlands:

- Seeking professional advice (GP, pharmacy, doctor, etc)
- Calling Dutch PIC (~50,000/year)
- ED (~15,000/year)
- ICU (~2,300/year)
- Hospital mortality (~2%)

Hoevermans et al. RIVM rapport 2010 & Wetenschappelijk Platform 2007;1(6):142-144
Intoxication associated mortality

Acute intoxications at the ED in the Western World

Admitted to the ICU (4-40%)

Hospital mortality (<4%)

A low ICU associated mortality raises questions:

1. If patients have such a low mortality. Should they be admitted to an ICU?

2. Do intoxicated patients really have a low mortality?

3. What’s their health-related quality of life (HRQoL)?
Predicting ICU requirement at the ICU in the Netherlands (2010-2015):

85 ICU’s (90% of the ICU’s)
N=406,123 admissions

N=16,391 admissions with “intoxication” diagnosis (4%)

N=12,365 admitted from ED

N=9,677 admitted from ED

Exclusion:
mechanical ventilation on ED (N=1956)
GCS= 3 (N=704)
CPR (N=19)

ICU requirement:
1. mechanical ventilation
2. vasopressors
3. GCS = 3
4. died
Predicting ICU requirement

at the ICU in the Netherlands (2010-2015):

N=9,677 admitted from ED

N=9,611 survived hospital

N=60 (0.6%) died on the ICU

variables that are available within 1 hour of ICU admission

univariate analyses
- age (p < 0.001)
- other admission reason (p < 0.001)
- etc.

multivariate analyses
- bootstrap (500 samples)
- backward selection (Akaike)
- variables > 60% in all bootstraps were used

model predicting ICU need
- if, in the first 24h:
  1. mech. ventilated
  2. GCS 3
  3. vasopressors
  4. died
Predicting ICU requirement at the ICU in the Netherlands (2010-2015):

<table>
<thead>
<tr>
<th>covariate</th>
<th>odds ratio need for ICU requirement</th>
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<tbody>
<tr>
<td>age ≥ 41 and ≤ 51 years</td>
<td>2.66 (1.91 - 3.69) reference: &lt;28 years</td>
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<tr>
<td>street drugs</td>
<td>2.53 (1.44 - 4.45) reference: alcohol</td>
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<tr>
<td>systolic BP &gt; 135 mmHg</td>
<td>0.32 (0.25 - 0.40) reference: sBP &lt; 105</td>
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<tr>
<td>Glasgow Coma Scale &lt; 9</td>
<td>4.47 (3.57 - 5.99) reference: GCS ≥ 14</td>
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<tr>
<td>Presence of other non-intoxication diagnosis</td>
<td>3.33 (2.67 - 4.15)</td>
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<tr>
<td>...etc</td>
<td></td>
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</table>

If this model predicts a “ICU requirement” > 2.5%, then the PPV 10.4 (9.0 - 11.8) and **NPV 98.7 (98.2 - 98.9)**. Yet, only 55% of the patients (N =5322) would remain admitted.
Intoxication associated mortality

after admission to the ICU in the Netherlands (2008-2011)

N = 246,053

N = 9,129 intoxications (3.7%)

hospital mortality (2.1%)

Brandenburg et al. Crit Care Med 2014;42(6):1471-9
Intoxication associated survival after ICU/hospital discharge (2008-2011)

Mortality is higher in the first months after discharge than in-hospital mortality!

Brandenburg et al. Crit Care Med 2014;42(6):1471-9
Intoxication associated survival

Overall Mortality Rate Following a Self-poisoning Episode Relative to Matched Controls

Time From Index Admission, y

Probability of Survival

No. at Risk
Case 65784 64633 57213 49952 42406 35289 28020 20918 13638 5974 21
Control 65784 65662 58693 51668 44159 36993 29511 22132 14528 6370 23

Finkelstein et al. JAMA Psychiatry 2015; April 1
Intoxication and repeated suicide

Suicide Among Patients Following a Self-poisoning Episode Relative to Matched Controls

Hazard ratio 41.96 (95%-CI 27.75 - 63.44)

Time From Index Admission, y

Probability of Survival

No. at Risk
Case | 65784 | 64586 | 57132 | 49885 | 42351 | 35235 | 27973 | 20871 | 13608 | 5955 | 21
Control | 65784 | 65647 | 58678 | 51657 | 44149 | 36985 | 29506 | 22124 | 14523 | 6366 | 23

Finkelstein et al. JAMA Psychiatry 2015; April 1
Health Related Quality of Life

12 months after ICU discharge

EQ-5D-3L

Dutch population: 0.86
ICU patients: 0.83
Dialysis: 0.65
Intoxication patients: 0.71

P = 0.02

Health related Quality of Life

Extreme poor HRQoL (EQ-5D-3L < 0.4)

EQ-5D < 0.4:
- metastasized lung cancer
- dementia with depression
- stage IV ALS
- severe depression score in Bipolar disease

Raya Brandenburg et al. Clin Tox 2015; epub
Grutters et al. Thorax 2010;65:903-
Conclusions

... and more questions

1. It appears that patients can be admitted safely to other wards. But... validation is necessary.

2. Mortality of intoxicated patients is substantial after ICU discharge. Why?

3. The HRQoL after intoxication is low. We need ways to improve this.
The future

TOXIC study
follow up after intoxication

1. Predicting admission “yes/no”
2. Toxicological analyses
3. Costs and cost effectiveness
4. Outcome (HRQoL)

Prof. Jan Meulenbelt
Dylan de Lange
Laura Hondebrink
Douwe Dekker
Erik van Maarseveen
Prof. Karin Kaasjager
Questions?

d.w.delange@umcutrecht.nl