Pro/con debate:
Dexmedetomidine for poisoned patients

Dylan de Lange
National Poisons Information Center
The Netherlands

EAPCCT Madrid, 2016
Dexmedetomidine...

...works in critically ill patients to
  ✴ reduce sedation
  ✴ ventilation time
  ✴ prevent delirium

...works experimentally in cocaine users to
  ✴ decrease hypertension
  ✴ decrease heart rate
  ✴ yet remain quickly rousable
  ✴ no ventilatory depression

...works in intoxicated patients

...really works
Where would you like to work?
Where would you like to work?
Where would you like to work?

prison officer

police officer

ED nurse
Where would you like to work?

- prison officer
- police officer
- ED nurse

Nurses outrank prison officers and police in workspace related violence

Where would you like to work?

- prison officer
- police officer
- ED nurse

Nurses outrank prison officers and police in workspace related violence

**UK:** 50% of attacks happens at the ED  
**USA:** 87% physical assault last year  
**Australia:** 14% physical assault

Let’s be honest!
They don’t like our intoxicated patients

**Violent behavior:**

<table>
<thead>
<tr>
<th>Intoxication</th>
</tr>
</thead>
<tbody>
<tr>
<td>alcohol (or withdrawal)</td>
</tr>
<tr>
<td>stimulant</td>
</tr>
<tr>
<td>anabolic steroid</td>
</tr>
<tr>
<td>hypnotic/sedative</td>
</tr>
</tbody>
</table>

Hypoglycemia

Neurologic

Psychiatric

Antisocial behavior
Psychoactive Drug use in Europe

Cocaine intoxications at ED (Denmark)

Cocaine hospital admissions (Netherlands)

New Psychoactive substances (NPS)

(Meth)amphetamin (Europe)

Source: European Drug Report 2015 (emcdda.europe.org)
Psychoactive Drug use in Europe

Top 20 intoxications in 19 European sentinel emergency departments

New Psychoactive Substances (NPS)

Agitated patients

- Cocaine-induced vasospasm (~1%)
- DOA induced hypertension (~3.7%)
- DOA induced hyperthermia (~0.6%)

Hendricks et al. Reversible posterior encephalopathy ... Neurologist 2015;19(4):118-9
Agitated patients (~26%)

Presenting symptoms of N=5529 intoxications

<table>
<thead>
<tr>
<th>Clinical parameter</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>agitation/agression</td>
<td>26.5%</td>
</tr>
<tr>
<td>anxiety</td>
<td>18.8%</td>
</tr>
<tr>
<td>tachycardia &gt; 120 bpm</td>
<td>10.4%</td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>9.1%</td>
</tr>
<tr>
<td>Vomiting</td>
<td>8.5%</td>
</tr>
<tr>
<td>Hallucinations</td>
<td>6.9%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>3.7%</td>
</tr>
<tr>
<td>Seizures</td>
<td>2.5%</td>
</tr>
<tr>
<td>CPK &gt; 1000 IU/L</td>
<td>2.5%</td>
</tr>
<tr>
<td>Hyperthermia</td>
<td>1.3%</td>
</tr>
<tr>
<td>Arrhythmias</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

Sedation of poisoned patients

**Goal:** diminish sympathomimetic syndrome

- Mydriasis
- Agitation
- Tachycardia
- Hypertension
- Hyperthermia
- Seizures
- Sweating

**Problem:** over-sedation

**Cooling:**
- external cooling
- central sedation

**Oppose vasoconstriction:**
- phentolamine
- nitroglycerin
- nitroprusside

**Central sedation:**
- lorazepam
- diazepam
- midazolam
Adverse events associated with sedation at the ED

**Children:**
- 97%
- Adverse events:
  - Saturation <90%
  - Apnea
  - Paradoxical agitation
  - Laryngospasm
  - Emesis

n=1,180

**Adults:**
- 82%
- Adverse events:
  - Apnea (10%)
  - Ventilation (1%)
  - Desaturation (1%)
  - Bradycardia (2%)
  - No laryngospasm
  - No emesis

n=160

Sedation of poisoned patients

**The perfect sedative**

- short acting
- no hypoventilation
- no paradoxical agitation
- cooperative but awake
- does not induce delirium
Dexmedetomidine

Selective $\alpha_2$ agonist in CNS
- 8 times more selective than clonidine
- binds all 3 subunits of the $\alpha_2$ receptor

Sedation
- reduces sympathetic activity
- sedation by inhibition of noradrenergic activity at locus coeruleus
- sedated but quickly aroused
- no respiratory depression

Neuroprotective
- decreases cerebral catecholamines and CNS glutamate

Other effects
- suppression of stress response to noxious stimuli
- decreases CBF, ICP
- decreases shivering
- analgesia
Dexmedetomidine vs Midazolam for Sedation of Critically Ill Patients
A Randomized Trial

RCT with n= 244 dexmedetomidine and N= 122 midazolam

Riker er al. Dexmedetomidine for critically ill patients. JAMA 2009;301(5):489-499
Experimental study in N= 22 healthy volunteers:

- Sympathetic neural activity
- Skin vascular resistance

Central Sympatholysis as a Novel Countermeasure for Cocaine-Induced Sympathetic Activation and Vasoconstriction in Humans

Experimental study in N= 22 healthy volunteers:

**MAP (mmHG):**

- Baseline: 80
- Cocaine: 85
- DEX 0.1: 90
- DEX 0.3: 95

*p < 0.001*

---

**Heart rate (bpm):**

- Baseline: 60
- Cocaine: 70
- DEX 0.1: 80
- DEX 0.3: 70

*NS*

---

**Skin vasc. resistance:**

- Baseline: 20
- Cocaine: 15
- DEX 0.1: 10
- DEX 0.3: 15

*p = 0.001*
Dexmedetomidine as a Novel Countermeasure for Cocaine-Induced Central Sympathoexcitation in Cocaine-Addicted Humans

RCT in cocaine addicted and healthy volunteers:

A

![Graph showing Mean Arterial Pressure and Skin Vascular Resistance vs. dexmedetomidine dose]

Kontak et al. Hypertension 2013;61:388-394
Evaluation of dexmedetomidine therapy for sedation in patients with toxicological events at an academic medical center

<table>
<thead>
<tr>
<th>Patient</th>
<th>Toxicological event</th>
<th>Median heart rate (beats/min)</th>
<th>Median systolic blood pressure (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before DEX*</td>
<td>During DEX</td>
<td>Before DEX*</td>
</tr>
<tr>
<td>1</td>
<td>TCA, CCB, Anticholinergic OD</td>
<td>78</td>
<td>74</td>
</tr>
<tr>
<td>2</td>
<td>SSRI, TCA OD</td>
<td>82</td>
<td>103</td>
</tr>
<tr>
<td>3</td>
<td>Unknown</td>
<td>93</td>
<td>69</td>
</tr>
<tr>
<td>4</td>
<td>CO inhalation</td>
<td>95</td>
<td>69</td>
</tr>
<tr>
<td>5</td>
<td>SSRI, TCA OD</td>
<td>94</td>
<td>68</td>
</tr>
<tr>
<td>6</td>
<td>Herbal OD#</td>
<td>108</td>
<td>101</td>
</tr>
<tr>
<td>7</td>
<td>Benzo OD</td>
<td>111</td>
<td>97</td>
</tr>
<tr>
<td>8</td>
<td>Inhalation injury(^1)</td>
<td>126</td>
<td>134</td>
</tr>
<tr>
<td>9</td>
<td>Unknown</td>
<td>70</td>
<td>68</td>
</tr>
<tr>
<td>10</td>
<td>Opioid, Sympath OD</td>
<td>86</td>
<td>72</td>
</tr>
<tr>
<td>11</td>
<td>Toxic alcohol(^#)</td>
<td>91</td>
<td>85</td>
</tr>
<tr>
<td>12</td>
<td>Benzo OD(^\d)</td>
<td>71</td>
<td>68</td>
</tr>
<tr>
<td>13</td>
<td>Unknown</td>
<td>102</td>
<td>118</td>
</tr>
<tr>
<td>14</td>
<td>Sympath OD(^\d)</td>
<td>117</td>
<td>82</td>
</tr>
<tr>
<td>15</td>
<td>Unknown</td>
<td>97</td>
<td>89</td>
</tr>
<tr>
<td>16</td>
<td>Unknown</td>
<td>105</td>
<td>85</td>
</tr>
<tr>
<td>17</td>
<td>Unknown(^\d)</td>
<td>93</td>
<td>58</td>
</tr>
<tr>
<td>18</td>
<td>Benzo, Hypnotic OD(^\d)</td>
<td>113</td>
<td>79</td>
</tr>
<tr>
<td>19</td>
<td>Opioid, Benzo, Muscle relaxer OD</td>
<td>92</td>
<td>88</td>
</tr>
<tr>
<td>20</td>
<td>Unknown</td>
<td>119</td>
<td>86</td>
</tr>
<tr>
<td>21</td>
<td>APAP, Diphen OD</td>
<td>89</td>
<td>82</td>
</tr>
<tr>
<td>22</td>
<td>APAP, Ethanol OD</td>
<td>93</td>
<td>88</td>
</tr>
</tbody>
</table>
Take home message(s)

...works in critically ill patients to
- reduce sedation
- ventilation time
- prevent delirium

...works experimentally in cocaine users to
- decrease hypertension
- decrease heart rate
- yet remain quickly rousable
- no ventilatory depression

...works in intoxicated patients

Class IIa evidence. Benefit > risk “It’s reasonable”
“Additional studies with focussed objectives needed”
What’s next?
Pro/con debate:
Dexmedetomidine for poisoned patients

Part II
The fight continues...
Professor Geoff Isbister

Professor
School of Medicine and Public Health
Dr Geoff Isbister doesn’t take himself too seriously.

Professor Geoff Isbister
Professor
School of Medicine and Public Health
Dr Geoff Isbister doesn’t take himself too seriously.

... researcher admits he originally chose medicine because he thought it could fund his musical interests.
Dr Geoff Isbister doesn’t take himself too seriously.

... researcher admits he originally could fund his musical interests with medicine because he thought it

“Even when there are no trials or evidence to support it, they believe it works.”

Professor Geoff Isbister
School of Medicine and Public Health
Dr Geoff Isbister doesn’t take himself too seriously.

... researcher admits he originally could fund his musical interests or evidence to support it, they believe it works."

“The moment I am not able to accept that I’m wrong is the moment I will pack up and stop doing research”, he promises
Dr Geoff Isbister doesn’t take himself too seriously.

“The only cure for tarantism is violent and energetic dancing for 3-4 days.”

Lancet 2004;364:549-53

... researcher admits he originally could fund his musical initiatives or evidence.

“The moment I am not able to accept that I’m wrong is the moment I will pack up and stop doing research”, he promises.

Even when...
Dr Geoff Isbister doesn’t take himself too seriously.

“Apulians used [spider bites] as an opportunity to resurrect orgies and attribute their unseeingly behavior to spider bites”

*Lancet 2004;364:549-53*

“Energetic dancing for 3-4 days”

*Lancet 2004;364:549-53*

... researcher admits he originally could fund his musical inspirations or evidence...
Dexmedetomidine Use in the Setting of Cocaine-Induced Hypertensive Emergency and Aortic Dissection: A Novel Indication

Table 1

<table>
<thead>
<tr>
<th>Time</th>
<th>BP mm Hg</th>
<th>Nitroglycerine mcg/kg/hr</th>
<th>Esmolol mcg/kg/hr</th>
<th>Lorazepam mg/hr</th>
<th>Labetalol mcg/kg/hr</th>
<th>Dexmedetomidine mcg/kg/hr</th>
<th>Sedation level</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:15</td>
<td>214/129</td>
<td>100</td>
<td>230</td>
<td>2 mg IVP</td>
<td>—</td>
<td>—</td>
<td>0</td>
</tr>
<tr>
<td>3:25</td>
<td>100</td>
<td>230</td>
<td>2 mg IVP</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3:30</td>
<td>215/120</td>
<td>100</td>
<td>230</td>
<td>2 mg IVP</td>
<td>—</td>
<td>—</td>
<td>0</td>
</tr>
<tr>
<td>3:35</td>
<td>100</td>
<td>230</td>
<td>2 mg/hr</td>
<td>30</td>
<td>—</td>
<td>—</td>
<td>0</td>
</tr>
<tr>
<td>3:45</td>
<td>194/120</td>
<td>230</td>
<td>2 mg/hr</td>
<td>60</td>
<td>50 mcg bolus</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>4:00</td>
<td>184/109</td>
<td>Off</td>
<td>4 mg/hr</td>
<td>60</td>
<td>0.1</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>4:15</td>
<td>164/94</td>
<td>Off</td>
<td>4 mg/hr</td>
<td>60</td>
<td>0.1</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>4:30</td>
<td>109/52</td>
<td>Off</td>
<td>4 mg/hr</td>
<td>60</td>
<td>0.1</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>4:45</td>
<td>118/70</td>
<td>Off</td>
<td>Off</td>
<td>0.1</td>
<td>1-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5:00</td>
<td>121/70</td>
<td>Off</td>
<td>Off</td>
<td>0.1</td>
<td>1-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5:15</td>
<td>123/71</td>
<td>Off</td>
<td>Off</td>
<td>0.1</td>
<td>1-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5:30</td>
<td>132/78</td>
<td>Off</td>
<td>Off</td>
<td>0.1</td>
<td>1-2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A cannabinoid-intoxicated child treated with dexmedetomidine: a case report

- 19 months old
- Δ9-tetrahydrocannabinol
- lethargic
- paroxysms of agitation
- pain score
Novel Use of Dexmedetomidine for the Treatment of Anticholinergic Toxidrome

- Trying to get high
- 24 pills diphenhydramine (~ 600 mg)
- RASS +4
- lorazepam 15 mg iv didn’t work
- dexmedetomidine 1.0 ug/kg LD followed by 0.5 ug/kg/h relieved psychotic symptoms
Dexmedetomidine to Control Agitation and Delirium from Toxic Ingestions in Adolescents

J Pediatr Pharmacol Ther 2010

- 4 cases ecstasy (MDMA) intoxication
- tachycardia, hypertension, agitation
- lorazepam failed
- dexmedetomidine 1.0 ug/kg LD followed by 0.5-1.0 ug/kg/h relieved psychotic symptoms
- dexmedetomidine is safe and effective treatment for sympathicomimetic syndrome

Evidence for benzodiazepines

Randomized, Double-blind, Placebo-controlled Trial of Diazepam, Nitroglycerin, or Both for Treatment of Patients with Potential Cocaine-associated Acute Coronary Syndromes

- benzodiazepines for sympathicomimetic syndromes
- few randomized trials
- evidence from animal studies and case reports (level II c)

RCT benzodiazepines (n=12), NTG (n=15) or both (n=13) for cocaine poisoning

Hollander et al. NEJM 1995;333:1267-1272
The problem with benzodiazepines

Paradoxical Reactions to Benzodiazepines: Literature Review and Treatment Options

Paradoxical agitation:

- 1% adults
- 1.4% in children
- More (?) in alcoholics?

Severe adverse reactions:

- 3.5% apnea, coma

Mancuso et al. Pharmacotherapy 2004;24(9):1177-1185
The problem with ketamine

**KETAMINE INFUSIONS: PHARMACOKINETICS AND CLINICAL EFFECTS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>% Change over Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td>19%</td>
</tr>
<tr>
<td>sBP</td>
<td>31%</td>
</tr>
<tr>
<td>dBP</td>
<td>27%</td>
</tr>
<tr>
<td>CI</td>
<td>12%</td>
</tr>
</tbody>
</table>

Idvall et al. Anesth Anal 1979;51:1167-1173
Conclusions

1. Dexmedetomidine works in critically ill patients
   - good availability
   - knowledge how to use it is available

2. has a good pharmacodynamic profile

3. has been shown to work in case-series and case-reports

4. Evidence for benzodiazepines and ketamine is limited to case-reports and animal studies
Dexmedetomidine for emesis in cats

Thanks for the attention

WHAT DO YOU MEAN

I WON'T GROW UP TO BE A TIGER?
Cocaine gives me a headache
**Evidence for benzodiazepines**

**Diazepam in the Prevention of Seizures and Death in Cocaine-Intoxicated Rats**

- Benzodiazepines prevent cocaine induced seizures if given **prior** to intoxication.
- Benzodiazepines can be used as **rescue** treatment.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% Seizure</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMSO 3 minutes after cocaine (n = 20)</td>
<td>85</td>
</tr>
<tr>
<td>Diazepam 0.5 mg/kg 3 minutes after cocaine (n = 10)</td>
<td>100</td>
</tr>
<tr>
<td>Diazepam 1 mg/kg 3 minutes after cocaine (n = 10)</td>
<td>0$^*$</td>
</tr>
<tr>
<td>Diazepam 1 mg/kg rescue* (n = 14)</td>
<td>100</td>
</tr>
</tbody>
</table>

* Diazepam given at time of first seizure. Values are in minutes ± SEM.
† Time (in min) after cocaine injection.
$P ≤ .05$ compared with DMSO by $x^2$ or Student’s $t$ test.
$^5P ≤ .01$ compared with DMSO by $x^2$ or Student’s $t$ test.

Dexmedetomidine vs Midazolam or Propofol for Sedation During Prolonged Mechanical Ventilation
Two Randomized Controlled Trials

PRODEX RCT with n= 251 *dexmedetomidine* and N= 249 *propofol*

Table 3. Patients’ Arousalability, Ability to Communicate Pain, and Ability to Cooperate With Nursing Care

<table>
<thead>
<tr>
<th></th>
<th>Adjusted Mean Estimate (95% CI)</th>
<th>Preferred Usual Care</th>
<th>P Value&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Estimate of Difference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dexmedetomidine vs midazolam (MIDEX)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 249)</td>
<td>(n = 251)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total VAS score&lt;sup&gt;b&lt;/sup&gt;</td>
<td>49.7 (45.5 to 53.8)</td>
<td>30.0 (25.9 to 34.1)</td>
<td>&lt;.001</td>
<td>19.7 (15.2 to 24.2)</td>
</tr>
<tr>
<td>Can the patient communicate pain?</td>
<td>46.3 (41.7 to 50.9)</td>
<td>24.2 (19.7 to 28.8)</td>
<td>&lt;.001</td>
<td>22.1 (17.1 to 27.1)</td>
</tr>
<tr>
<td>How arousable is the patient?</td>
<td>58.2 (53.7 to 62.6)</td>
<td>40.7 (36.3 to 45.1)</td>
<td>&lt;.001</td>
<td>17.5 (12.7 to 22.3)</td>
</tr>
<tr>
<td>How cooperative is the patient?</td>
<td>44.8 (40.3 to 49.2)</td>
<td>25.1 (20.8 to 29.5)</td>
<td>&lt;.001</td>
<td>19.7 (14.8 to 24.5)</td>
</tr>
<tr>
<td><strong>Dexmedetomidine vs propofol (PRODEX)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 251)</td>
<td>(n = 247)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total VAS score&lt;sup&gt;b&lt;/sup&gt;</td>
<td>51.3 (46.9 to 55.7)</td>
<td>40.1 (35.7 to 44.6)</td>
<td>&lt;.001</td>
<td>11.2 (6.4 to 15.9)</td>
</tr>
<tr>
<td>Can the patient communicate pain?</td>
<td>49.3 (44.5 to 54.2)</td>
<td>35.4 (30.5 to 40.4)</td>
<td>&lt;.001</td>
<td>13.9 (8.7 to 19.1)</td>
</tr>
<tr>
<td>How arousable is the patient?</td>
<td>59.1 (54.7 to 63.4)</td>
<td>47.8 (43.4 to 52.3)</td>
<td>&lt;.001</td>
<td>11.2 (6.5 to 16.0)</td>
</tr>
<tr>
<td>How cooperative is the patient?</td>
<td>47.2 (42.3 to 52.2)</td>
<td>38.0 (33.0 to 43.0)</td>
<td>&lt;.001</td>
<td>9.2 (3.9 to 14.5)</td>
</tr>
</tbody>
</table>

Abbreviation: VAS, visual analogue scale.
<sup>a</sup> Analysis of covariance with effects for treatment, country, and baseline values.
<sup>b</sup> A higher score represents a better outcome.
Dexmedetomidine as a Novel Countermeasure for Cocaine-Induced Central Sympathoexcitation in Cocaine-Addicted Humans

A

△ Mean Arterial Pressure

NS

p<0.01

mm Hg

Cocaine + Placebo
Cocaine + Dexmedetomidine 0.4 μg/kg
Cocaine + Dexmedetomidine 1.0 μg/kg

△ Heart Rate

p<0.01

beats/min

Kontak et al. Hypertension 2013;61:388-394
Central Sympatholysis as a Novel Countermeasure for Cocaine-Induced Sympathetic Activation and Vasoconstriction in Humans

Experimental study in N= 22 healthy volunteers:

Table 3

<table>
<thead>
<tr>
<th>Dexmedetomidine Group (n = 11)</th>
<th>Baseline</th>
<th>Cocaine</th>
<th>Plus Dexmedetomidine 0.1 μ/kg</th>
<th>Plus Dexmedetomidine 0.3 μ/kg</th>
<th>p Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial pressure (mm Hg)</td>
<td>91 ± 2</td>
<td>100 ± 2†</td>
<td>93 ± 3‡§</td>
<td>89 ± 2‡§</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Heart rate (beats/min)</td>
<td>65 ± 2</td>
<td>77 ± 2†</td>
<td>76 ± 2†</td>
<td>68 ± 2‡§</td>
<td>NS</td>
</tr>
<tr>
<td>Skin SNA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated activity, %</td>
<td>100</td>
<td>174 ± 10</td>
<td>103 ± 11</td>
<td>35 ± 8</td>
<td></td>
</tr>
<tr>
<td>Ln % integrate activity</td>
<td>4.61 ± 0</td>
<td>5.15 ± 0.06</td>
<td></td>
<td>4.0 ± 0.11§¶</td>
<td>3.37 ± 0.28†‡§</td>
</tr>
<tr>
<td>Skin blood flow (perfusion units)</td>
<td>6.03 ± 0.56</td>
<td>4.83 ± 0.50</td>
<td>6.87 ± 2.34</td>
<td>8.50 ± 2.22‡§</td>
<td>NS</td>
</tr>
<tr>
<td>Skin vascular resistance</td>
<td>16.20 ± 1.38</td>
<td>22.26 ± 1.78†</td>
<td>19.58 ± 2.2</td>
<td></td>
<td>15.10 ± 2.24‡§</td>
</tr>
<tr>
<td>(resistance units)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OAAS scale</td>
<td>5 ± 0</td>
<td>5 ± 0</td>
<td>5 ± 0</td>
<td>5 ± 0</td>
<td>NS</td>
</tr>
</tbody>
</table>

Data expressed as mean ± SE. *Interaction between treatment group and time effect and represents difference in response between dexmedetomidine and saline; †p < 0.01 vs. baseline; ‡p < 0.01 vs. cocaine; §p < 0.01 versus saline; ¶p < 0.05 versus baseline; †p < 0.05 versus cocaine; #p < 0.05 versus saline.

NS = non-significance at the level of p > 0.05; OAAS = observer's assessment of alertness and sedation; SNA = sympathetic nerve activity.
Dexmedetomidine...

- works in critically ill patients to
  - reduce sedation
  - ventilation time
  - prevent delirium

- works experimentally in cocaine users to
  - decrease hypertension
  - decrease heart rate
  - yet remain quickly rousable
  - no ventilatory depression

- works in intoxicated patients

...really works
Evaluation of dexmedetomidine therapy for sedation in patients with toxicological events at an academic medical center

Table 1. Baseline characteristics and DEX usage (N = 22).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Median (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>39 (23)</td>
</tr>
<tr>
<td>Male*</td>
<td>13 (59)</td>
</tr>
<tr>
<td>Race*</td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>18 (82)</td>
</tr>
<tr>
<td>African-American</td>
<td>1 (4.5)</td>
</tr>
<tr>
<td>Asian</td>
<td>1 (4.5)</td>
</tr>
<tr>
<td>Other*</td>
<td>2 (9)</td>
</tr>
<tr>
<td>Toxicological event*</td>
<td></td>
</tr>
<tr>
<td>Known agent/ingestant</td>
<td>15 (68)</td>
</tr>
<tr>
<td>SOFA Score</td>
<td>7 (5)</td>
</tr>
<tr>
<td>Initial heart rate (beats per min)</td>
<td>106 (28)</td>
</tr>
<tr>
<td>Initial systolic blood pressure (mmHg)</td>
<td>118 (138)</td>
</tr>
<tr>
<td>Infusion rates (mcg/kg/h)</td>
<td></td>
</tr>
<tr>
<td>Initial infusion rate</td>
<td>0.2 (0.1)</td>
</tr>
<tr>
<td>Median infusion rate</td>
<td>0.6 (0.66)</td>
</tr>
<tr>
<td>Duration of DEX therapy (hours)</td>
<td>44.5 (77)</td>
</tr>
<tr>
<td>Time within target RASS (hours)</td>
<td>6.5 (45)</td>
</tr>
</tbody>
</table>

IQR, interquartile range; SOFA, Sequential Organ Failure Assessment
*Data presented as n (%).
\*Patient identified as ‘other’ in electronic medical chart.