

# OUTCOMES FOLLOWING MECHANICAL VENTILATION OF SALICYLATE-POISONED PATIENTS

Adam Bosak MD, An Tran MD, Anne-Michelle Ruha MD, Steven Curry MD, Angela Padilla-Jones RN  
Department of Medical Toxicology, Banner Good Samaritan Medical Center; Phoenix, AZ.

## Background

- Salicylate (SAL) poisoning may produce coma and respiratory failure necessitating mechanical ventilation (MV). Co-ingestants may also contribute to the need for MV in this patient population.
- Some published literature suggests that MV be avoided in SAL poisoning since intubation and MV may culminate in acute deterioration and death from rise in PCO<sub>2</sub> and fall in arterial pH, allowing movement of SAL from the blood into the brain and other organs.

## Research Question

- What clinical outcomes are associated with MV in the setting of SAL poisoning?

## Methods

- A retrospective chart review was performed from January 1, 2004 – December 31, 2013.
- Patients with SAL poisoning were identified via ICD-9 codes and toxicology patient registries.
- SAL poisoning was defined as a peak serum SAL level >20 mg/dL.
- Mild-Moderate (M-M) poisoning was 20-50 mg/dL, and moderate to severe (M-S) poisoning was > 50 mg/dL.
- Hypotension was defined as a systolic blood pressure < 100 mm Hg.
- An arterial pH < 7.35 was considered to be acidemic.

## Results

|   | Mild – Moderate<br>(20-50 mg/dL) | Moderate – Severe<br>( > 50 mg/dL) |
|---|----------------------------------|------------------------------------|
| [SAL] Ranges  | 20.5 – 48.3 mg/dL                | 50.5 – 101.7 mg/dL                 |
| Patients  | 16                               | 23                                 |
| Isolated SAL Poisoning                                | 0/16                             | 5/23                               |
| Co-ingested psychoactives/<br>Respiratory Depressants | 15/16                            | 16/23                              |
| Intubated for Agitation                               | 4/16                             | 6/23                               |
| Intubated for Coma/Respiratory Failure                | 12/16                            | 17/23                              |
| Acidemia Prior to MV (pH < 7.35)                      | 2/16 (10 unknown)                | 3/23 (14 unknown)                  |
| Acidemia Post MV                                      | 6/16 (1 unknown)                 | 8/23 (2 unknown)                   |
| Sodium Bicarbonate Infusion Prior to MV               | 10/16                            | 10/23 (2 unknown)                  |
| Hypotension (< 100 mm Hg)                             | 6/16                             | 12/23                              |
| Need for Vasopressors                                 | 3/6                              | 9/12                               |
| Hypotension following MV                              | 3/6                              | 9/12                               |
| Need for Hemodialysis                                 | 2/16                             | 11/23                              |

**39 Patients Who Underwent Mechanical Ventilation**

## Results Cont.

- 263 patients were identified with SAL poisoning, of which 39 were placed on MV.
- Ages ranged from 15-82 years.
- No deaths, cardiac arrests, or seizures occurred, and all patients made a complete recovery.

## Discussion

- Literature is scant on MV in SAL-poisoned patients with a few case reports of poor outcomes following MV. These reports should not be used as justification to avoid MV, since avoidance of MV can itself result in death.
- At our center, we closely monitor and adjust arterial pH to correct acidemia and maintain alkalemia during and after intubation. This is done with sodium bicarbonate and/or hyperventilation. Although 14/39 were acidemic following MV we cannot determine if MV was associated with immediate pH drop as the majority did not have a blood gas performed prior to intubation.

## Conclusion

- Hypotension was the most serious event associated with MV.
- Our data suggest that SAL-poisoned patients can be mechanically ventilated with good outcomes when care is taken to prevent falls in arterial pH.

