

## Sodium Bicarbonate Shortage Recommendations

There is currently a critical national shortage of sodium bicarbonate (Na HCO<sub>3</sub>) 8.4%, 7.5% and 4.2% vials and syringes for injection.

These recommendations are intended to advise clinicians about the treatment of tricyclic antidepressant (TCA) and salicylate (ASA) toxicity during the shortage of sodium bicarbonate.

Sodium bicarbonate is used for the initial rapid treatment of QRS widening and cardiac dysrhythmias due to sodium channel blockade in TCA toxicity. The goal of therapy is to increase both sodium concentration and pH at the ion channel in order to reverse cardiac effects. Sodium bicarbonate is used in ASA toxicity to alkalinize urine and blood in order to promote ion trapping and prevent movement of ASA into the brain. The target pH for urine and blood is 7.5 – 7.55.

Sodium acetate can be used in place of sodium bicarbonate to treat TCA and ASA toxicity. Sodium acetate cannot be administered as a rapid bolus however, so careful attention must be paid to the dose and rate of infusion to avoid hypotension.

Hypertonic saline (3%) can be used to treat TCA toxicity and acts by raising the sodium concentration at the sodium channel. If the patient is mechanically ventilated, ventilator management can subsequently be employed to adjust serum pH to target.

Intervention	Typical Formulation	Concentration	Bolus	Infusion (note)
Na HCO <sub>3</sub>	8.4% 50 mL	1 mEq HCO <sub>3</sub> /mL	1 – 2 mEq/kg or 1 - 2 mL/kg <b>over 1–2 min</b>	150 mEq diluted to 1 L with dextrose 5% in water; infuse at twice the maintenance rate
Na Acetate	40 mEq in 20 mL	2 mEq acetate/mL	1 mEq/kg or 0.5 mL/kg <b>over 15 – 20 min</b>	150 mEq diluted to 1 L with dextrose 5% in water; infuse at twice the maintenance rate
3% Hypertonic Saline	3% NaCl in 500 mL	0.5 mEq sodium /mL	1-2 mEq/kg or 2-4 mL/kg IV bolus <b>over 1–2 min</b>	(If patient is on ventilator, adjust settings to achieve serum pH of 7.5 – 7.55)

For additional guidance on management of salicylate toxicity, refer to ACMT's 'Guidance Document: Management Priorities in Salicylate Toxicity'

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### References:

Neavyn MJ, Boyer EW, Bird SB, Babu KM. Sodium Acetate as a Replacement for Sodium Bicarbonate in Medical Toxicology: a Review. *J Med Toxicol*. 2013;9:250–254.

McCabe JL, Cobaugh DJ, Menegazzi JJ, Fata J. Experimental tricyclic antidepressant toxicity: a randomized, controlled comparison of hypertonic saline solution, sodium bicarbonate, and hyperventilation. *Annals of emergency medicine*. 1998;32:329-33.

McKinney PE, Rasmussen R. Reversal of severe tricyclic antidepressant-induced cardiotoxicity with intravenous hypertonic saline solution. *Annals of emergency medicine*. 2003;42:20-4.