



Sodium Bicarbonate (NaHCO₃) Therapy for Sodium Channel Blocking Agent Toxicity with Wide QRS

- Acute poisoning with sodium-channel blocking agents can widen the QRS interval.
 - Sodium bicarbonate (NaHCO₃) may be used as a treatment for QRS widening and wide QRS complex dysrhythmias for the following reasons:
 - there is evidence that the width of the QRS following an overdose of a tricyclic antidepressant (a sodium channel blocking agent) is predictive of seizures (QRS > 100 msec) or predictive of cardiac dysrhythmias (QRS > 160 msec)¹
 - there is case report evidence that NaHCO₃ boluses will shorten the QRS and treat dysrhythmias and hypotension induced by a tricyclic antidepressant
 - this has been extrapolated to include other sodium channel blocking agent overdoses including: Type 1A, 1C antidysrhythmics, chloroquine & related agents, diphenhydramine, some typical & atypical antipsychotics, cocaine & other local anaesthetics, and propranolol
- *Note: Bupropion does prolong the QRS but NOT by sodium channel blockade and is therefore not addressed in this document.

Treatment Recommendation:

In the setting of suspected toxicity from a drug that is known to block the sodium channel where the QRS > 100 msec:

1. Administer NaHCO₃ 1-2 mEq/kg (1-2 mL/kg) as an **IV push BOLUS DOSE**.
2. Observe for narrowing of the QRS interval on the ECG after 5 minutes.
3. If no shortening of QRS, repeat Bolus Dose x 1.
4. After every 4 mEq/kg (or 4 mL/kg) of NaHCO₃ measure electrolytes and venous blood gas.

Do not administer additional NaHCO₃ therapy if:

Serum pH >7.55

Serum Sodium concentration >155 mmol/L

5. If the serum pH is > 7.55, but serum sodium is < 155 mmol/L AND the QRS is still > 100 msec may consider:
 - administration of hypertonic saline (3% NaCl) 1.5 mL/kg IV bolus. Measure electrolytes after giving 3% NaCl bolus.
6. IF still no response, abandon further NaHCO₃ or hypertonic saline therapy. Treat supportively. Call the Poison Centre.
7. If the patient's QRS widens out again after successful first-time treatment, may repeat as above.

NOTE: Excessive doses of NaHCO₃ and/or hypertonic saline have led to severe alkalosis and/or hyponatremia which has been directly responsible for patient deaths.

In the setting of SEIZURES secondary to tricyclic antidepressants, NaHCO₃ does NOT treat the seizure. It may be indicated if the seizure has precipitated a widening of the QRS or severe acidosis. Usual seizure management with benzodiazepines or propofol is indicated.

In the setting of severe CARDIAC VENTRICULAR DYSRHYTHMIAS not responsive to NaHCO₃ or hypertonic saline, lidocaine would be the anti-dysrhythmic of choice. 20% lipid emulsion may also be considered. Contact the Poison Centre.

¹Boehnert & Lovejoy, N Engl J Med. 1985. Aug 22;313(8):474-9