Paediatric Nephrology and Urology Unit
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Sodium Bicarbonate

Presentation:	• Injection 4.2% (0.5 mmol/mL); 10mL vial and 500mL Polyfusor. • Injection 8.4% (1 mmol/mL); 10mL vial and 500mL Polyfusor. (1mmol of sodium bicarbonate is equivalent to 1mmol sodium and 1mmol bicarbonate).
Indications:	1: Severe metabolic acidosis, where perfusion has been optimised. 2: Severe renal hyperkalaemia 3: Cardiac Arrest- *see PICU Emergency Drugs Calculator* 4: As part of maintenance or replacement fluid regimen in bicarbonate losing states e.g. renal tubulopathy.
Dose:	**1: Severe metabolic acidosis**: 1 mmol/kg as a single dose. **2: Severe renal hyperkalaemia** (all ages): 1 mmol/kg as a single dose. **3: Cardiac Arrest:** see Emergency Drugs Calculator. **4: Maintenance or Replacement Fluids:** sodium bicarbonate can be added to clear fluids as an alternative sodium source to in order to reduce chloride intake. Total daily bicarbonate intake should usually be between 1-3 mmol/kg/day, but higher doses can be given if blood gases remain acceptable. If sodium-containing solutions used ensure that the addition of sodium bicarbonate is taken into account when calculating sodium intake.
Route of administration:	Intravenous: either as a bolus or an infusion according to indication. Central route preferred as high risk of tissue damage on extravasation: see directions for administration below.
Directions for Administration:	The 8.4% solution should ideally be diluted 1 in 5 for central administration and 1 in 10 for peripheral administration. Suitable diluents include 0.9% sodium chloride, 5% glucose and 10% glucose. Avoid using 0.9% sodium chloride in renal impairment (risk of hypernatraemia). In arrest or other emergency situations, or in fluid restricted patients where central access is not available, the 4.2% solution can be given NEAT peripherally to patients under 2 years, and the 8.4% solution can be given NEAT peripherally to those over 2 years. However, exercise **extreme caution** and monitor infusion site closely. In fluid restricted patients the 8.4% solution can be given neat centrally. **1: Severe metabolic acidosis:** prepare required dose (using dilution information above) and infuse over 20 – 30 minutes. **2: Hyperkalaemia:** prepare dose (using information above) and infuse over 30 minutes. **3: Cardiac Arrest:** see Emergency Drugs Calculator. **4. Maintenance or Replacement Fluids:** the 8.4% solution can be added to fluids containing glucose, sodium chloride or glucose/sodium chloride mixtures, with or without potassium (see under compatibility below).
Cautions and Contraindications:	Caution in metabolic or respiratory alkalosis, hypokalaemia, hypocalcaemia (give calcium supplementation first), hypernatraemia or hyperosmolar states. Use with caution in patients with ongoing chloride losses such as in vomiting or gastrointestinal suction. Exercise caution in those receiving diuretics known to cause a hypochloremic alkalosis e.g. furosemide and thiazides.
Common Side Effects:	Hypochloraemic alkalosis (especially with loop or thiazide diuretics). Hypernatraemia, hypokalaemia, hypocalcaemia and increased osmolality. Sodium load may cause fluid retention and pulmonary oedema. Extravasation can cause severe chemical cellulitis and necrosis. Tetany has been reported.
Compatibility	Stability data supports the addition of sodium bicarbonate to fluids containing up to 40mmol/L of potassium. Anecdotally, higher concentrations of potassium have been used but there is limited data to support this practice: extreme vigilance is required. Note that fluids containing >40mmol/L potassium should usually be administered centrally.
Additional Comments:	Potassium concentration and pH are inversely related; therefore, increases in pH result in a decrease in potassium concentration. Rapid changes in serum sodium concentration should be avoided.

References

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