URINE ALKALINISATION FOR ENHANCED ELIMINATION OF SALICYLATES

- Urine alkalinisation enhances renal elimination of a select number of toxins by the administration of intravenous sodium bicarbonate ($NaHCO_3$) to produce urine with a pH ≥ 7.5
- For certain toxins that are weak acids, urine alkalinisation increases the ionization of the toxin in the renal tubular lumen to decrease diffusion back into blood, thereby increasing renal clearance

Indications:

Acute ASA overdose:

- If ASA level not available & patient has signs more than tinnitus
- [ASA] ≥ 3.5 mmol/L (48 mg/dL)
- Metabolic acidosis

Chronic ASA toxicity:

- Consider alkalinisation for [ASA] ≥ 2.9 mmol/L (40 mg/dL) since symptoms/signs do not correlate with levels in chronic toxicity

End Point:

- [ASA] ≤ 2.2 mmol/L (30 mg/dL) AND
- 2 consecutive [ASA] levels coming down AND
- Patient is clinically well

Contraindications:

- ARDS/pulmonary edema, cerebral edema, or renal failure

Urine alkalinisation preparation and dosing:

1. Use 8.4% (1 mmol NaHCO3/mL) 50 mL ampules when available. Remove 150 mL from 1 Litre of D5W. Add 150 mL of NaHCO3 (8.4%)(ie. 3 X 50 mL ampules) to that litre bag. The total volume will again be 1 Litre. If serum K+ needs correction, may add 20-40 mEq of KCl to this same bag. Run this solution at 1 ½ to 2 times maintenance (2-3 mL/kg/h to a maximum of 200 mL/hr) to ensure a urine output of 2-3 mL/kg/hr.
   - If only 7.5% (0.89 mmol NaHCO3/mL) 50 mL ampules are available, may use as a substitute for the 8.4% NaHCO3 ampules. Note that the final solution will be slightly hyponatremic.
2. A foley catheter must be inserted. The original bladder contents must be emptied. Every 1-2 hours the contents of the catheter bag must be emptied and the pH tested. Aim for urine pH ≥ 7.5.

Monitoring:

Urine pH every 1-2 hours
- Target urine pH >7.5

Serum blood gases every 2 hours
- Keep serum pH < 7.56

Serum potassium (K^+) every 2 hours
- K^+ may require IV or oral liquid supplementation to ensure effective urine alkalinisation (extended-release oral K^+ supplements are not appropriate for this indication)
- Target normal range 3.5-5 mmol/L

Serum salicylate levels every 2 hours
- Continue to monitor levels until at least 2 decreasing levels **AND** final level < 2.2 mmol/L (30 mg/dL)

Contact Poison Centre:

- Any deterioration in patient condition
- Evidence of decreased O_2 saturations, pulmonary edema, altered mental status, renal failure, oliguria, serum pH >7.55, non-resolving metabolic acidosis, rising serum ASA levels or serum ASA levels not declining despite urine alkalinisation
- Any questions or concerns

1 800 268 9017®
416 813 5900
Ontario Poison Centre / Centre antipoison de l'Ontario

1 855 7POISON®
1 855 776 4766
Manitoba Poison Centre / Centre antipoison du Manitoba

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