

ISSUES IN THE TREATMENT OF HYPERKALAEMIA

Hyperkalaemia is a frequent medical emergency that can cause life-threatening cardiac arrhythmias and its management remains controversial

Insulin

Several clinical studies support that the administration of close to 20 units of regular insulin with glucose caused the plasma potassium (P_K) to fall rapidly; a drop of close to 1 mEq/dl at 60 min. Supraphysiological levels of insulin in plasma are required for maximal K^+ shift. Hypoglycaemia is a frequent complication. Supplementary parenteral glucose and blood glucose monitoring are essential.

Although *some advocate treating* non-diabetic hyperkalaemic patients with glucose without insulin, I feel that this is unwise because the high levels of insulin required **might not be achieved**. Also, hypertonic glucose may cause K^+ to shift out of cells in patients with inadequate insulin reserves, leading to a rise in P_K .

β_2 -adrenergic agonists

The ability of β_2 -adrenergic stimulation to lower P_K has been demonstrated with 10 or 20 mg of nebulized albuterol. The administration of albuterol caused a decrease in P_K within 30 min and the effect was sustained for at least 2 h. The mean maximum decrease in P_K was

0.6 mEq with the 10 mg dose

1 mEq with the 20 mg dose

20–40% of patients studied have a decline in P_K of <0.5 mM and it is not possible to predict who will fail to respond. Secondly, there are safety concerns because the doses used are 4–8 times those prescribed for the treatment of acute asthma. (in patients with significant coronary heart disease or unstable heart rhythms) .

NaHCO₃

50-100 mEq of intravenous hypertonic NaHCO₃ has a mild effect on hyperkalaemia.

After 4 hours of NaHCO₃ infusion the mean decrease in P_K is 0.5 mEq.

Lack of effect of NaHCO₃ in stable patients without significant acidosis has been reported

It is difficult to draw a definite conclusion from the available data in the literature.

Given this uncertainty, I still recommend NaHCO₃ to treat acute hyperkalaemia in patients with a significant degree of acidosis, but not as the only emergency therapy to shift K^+ into cells. Caution is warranted, as excessive administration of NaHCO₃ can induce hypernatraemia, ECF volume expansion, carbon dioxide retention and a fall in ionized serum calcium levels.

Cation-exchange resins

30 g of oral Kayexalate or 50 grams of rectal could possibly remove 0.8 to 1.2 mEq/dl of K^+

I do not recommend to use resins for treatment of acute hyperkalaemia. In the setting of chronic hyperkalaemia, it seems that the addition of resins to other measures may significantly enhance the excretion of K^+

Therapy	Dose	Onset of Effect	Duration of Effect
Calcium chloride	5-10 ml IV of 10% solution (500-1000mg) over 30 minutes	1-3 minutes	30-60 minutes
Sodium bicarbonate	1 mEq/kg IV bolus over 5 to 10 minutes	5-10 minutes	1-2 hours
Insulin plus glucose (use 1 unit of insulin/2.5 g glucose)	Regular insulin 10 U IV plus 50 ml D ₅₀ (25 g glucose) IV bolus	30 minutes	4-6 hours
Nebulized albuterol	10-20 mg nebulized over 15 minutes	15 minutes	15-90 minutes
Furosemide	40-80 mg IV bolus	With onset of diuresis	Until diuretic effect ends
Kayexalate	15-50 g PO or PR, plus sorbitol	1-2 hours	4-6 hours
Hemodialysis	Per institution	Immediate	Until dialysis completed

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Important Note: This document is a guideline, and not a policy statement. Always use clinical judgment when making decisions for an individual