TOXICOLOGY

CALCIUM CHANNEL BLOCKER OVERDOSE

Mechanism of action

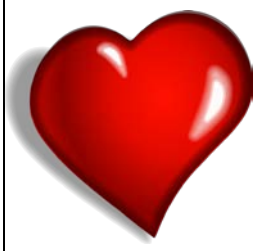
Block L type voltage sensitive calcium channels preventing intracellular influx into cells. These channels are functionally important in vascular smooth muscle cells, cardiac muscle cells and islet beta cells.
Preparations - Immediate and modified release available.

Note
Peak plasma concentration: 6-12 hrs post ingestion
Elimination half-life: 35-50 hrs

Overdose effects

- Arteries – smooth muscle relaxation causes vasodilatation, therefore causes:
    - reduced afterload
    - systemic hypotension
    - coronary vasodilatation
- Heart – reduces myocardial contractility (myocardial depression) and heart rate (bradycardia)
- Metabolic – hypoinsulinaemia, insulin resistance.

S&S

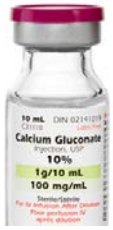


Bradycardia
First degree heart block
Hypotension
Refractory shock
Myocardial ischaemia
Mesenteric ischaemia
Metabolic – Hyperglycaemia, Hyperkalaemia, Acidosis, Vomiting
Neuro - Seizures
Pulmonary oedema
Renal failure

Overdose management

1. Supportive care
2. IV fluid resuscitation – 20ml/kg 0.9% saline
3. Gastric decontamination – activated charcoal if present within 1 hr
4. Atropine
    - Management of bradycardia
    - Dose = 0.6mg every 2 min (max. 1.8 mg)

5. 10% Calcium gluconate
    - Temporising measure to increase HR & BP
    - Caution = Monitor calcium levels if repeat dosing
    - Dose = 0.6ml/kg (up to 30ml) over 5 minutes with repeat dosing every 10-20 mins (max. 4 doses)



6. Actrapid bolus & infusion (High dose insulin – euglycaemic therapy (HIET))
    - Improves myocardial contractility and systemic perfusion
    - Caution = Check plasma glucose & potassium prior to commencing
        - If glucose <10mmol/l → 50ml 50% dextrose
        - If potassium <2.5 mmol/l → 20mmol potassium over 30 minutes with cardiac monitoring
        - Run 100ml/hr 10% dextrose concurrently
    - Doses
        - Bolus : Actrapid 1 unit/kg
        - Infusion: Commence at 0.5-2 units/kg/hr titrated to clinical response
        - Increase by 2 units/kg/hr every 10 minutes
        - Max dose 10 units/kg/hr
    - Monitoring
        - BM – every 20 mins during dose change then 1 hrly
        - Potassium hrly

7. 20 % Intralipid
    - Reduces free concentrations of active drug and therefore improves myocardial function
    - Doses
        - Bolus: 1.5ml/kg (may be repeated 1-2 times for cardiovascular collapse or asystole)
        - Infusion: 0.25-0.5ml/kg/min for 30-60 mins (max. dose 500ml)

If hypotension unresponsive to above measures then consider inotrope infusions including adrenaline and noradrenaline. Consider ECMO or intra-aortic balloon pump if refractory.