

Symptomatic Calcium Channel or Beta-Blocker Overdose

(cardiac or hemodynamic instability; also includes GI complications or muscle cramps)

Advanced hemodynamic monitoring Early Assessment of Cardiac Function

- Arterial line to monitor BP
- Foley catheter to monitor urine output
- Central Venous Catheter to monitor central venous pressure
- Cardiac Monitor to monitor heart rate and rhythm
- Consider placing NG tube and early intubation for airway protection

If within 2 hours

Give Activated Charcoal (AC)
0.5 g/kg in 300 mL of water
orally or via nasogastric tube*

If greater than 2 hours since ingestion* or
unknown time since ingestion

1. Obtain ionized Calcium and give Calcium Chloride 10% 2 g IV push, then start IV infusion of Calcium Chloride 10% at rate of 2 g/hour (8 grams calcium chloride per 250 mL bag) **OR** 6 g/hour of 10% Calcium Gluconate (24 grams calcium gluconate per 1000 mL bag)
 - Monitor free calcium every 2 hours after start of infusion
 - Titrate calcium infusion to maintain ionized calcium 5-7 mg/dL
2. Start IV Normosol-R or Lactated Ringers for fluid resuscitation
3. Initiate hyperinsulinemia euglycemia therapy (see treatment table Page 2)
4. Give Norepinephrine (NE) for hypotension
5. Give Epinephrine (Epi) for low cardiac output or low heart rate
6. If bradycardic, give atropine 0.5-1 mg IV push every 2-3 minutes for maximum of 3 mg

If refractory to first line therapy

Lipid Emulsion Therapy (20%)

- Infuse 500 mL over 30 minutes to create a lipid sink

Methylene Blue 1-2 mg/kg IV single bolus

Consider advanced cardiac therapy (ECMO, intra-aortic balloon pump, etc.) or consulting nephrology about plasmapheresis after administration of lipids and methylene blue

*If longer than two hours, may still consider AC or whole bowel irrigation if patient took high quantities of extended release products. If patient's aspirates discontinue immediately.

Hyperinsulinemia Euglycemia Therapy

- Check STAT blood glucose prior to High-Dose Insulin (HDI) initiation
- Check STAT potassium prior to HDI initiation (do not initiate until potassium >3.5 mmol/L) with VBG + or ABG +. See replacement table Page 3.
- Goal blood glucose between 150 – 250 mg/dL

↓
Follow treatment based on initial blood glucose level
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Blood Glucose	Treatment (Dextrose and Insulin) **Dose based on actual body weight unless BMI > 30 kg/m² then use adjusted**
< 100 mg/dL	Give 2 amps of dextrose 50% IVP and start dextrose at 25 g/hour (Dextrose 10% @ 250 mL/hour; Dextrose 20% @ 125 mL/hour; Dextrose 70% @ 36mL/hour) Start regular insulin infusion at 1 unit/kg/hour
100-200 mg/dL	Give 2 amps of dextrose 50% IVP and start dextrose at 25 g/hour (Dextrose 10% @ 250 mL/hour; Dextrose 20% @ 125 mL/hour; Dextrose 70% @ 36 mL/hour) Give regular insulin bolus of 1 unit/kg IVP followed by an insulin infusion at 1 unit/kg/hour
> 200 mg/dL	Give 1 amp of dextrose 50% IVP and start dextrose at 25 g/hour (Dextrose 10% @ 250 mL/hour; Dextrose 20% @ 125 mL/hour; Dextrose 70% @ 36 mL/hour) Give regular insulin bolus of 1 unit/kg IVP followed by an insulin infusion at 1 unit/kg/hour



Titrate insulin and dextrose

- Insulin is titrated based on desired HR and SBP (**DO NOT** titrate based on blood glucose)
- Dextrose infusion is titrated based on blood glucose
- Monitor blood glucose every 15 minutes until between 150-250 mg/dL for one hour, then monitor glucose every hour
- Recheck potassium every 4 hours for 24 hours, then every 8 hours while on HDI (goal potassium >3.0 mmol/L). See replacement table Page 3. Additionally monitor Mg and Phos levels with insulin therapy.

Insulin Titration ↓

Titrate by 1 unit/kg/h every 30 minutes to desired HR and SBP up to a maximum 10 units/kg/h

do not titrate based on blood glucose

Dextrose Titration ↓

Blood Glucose	Dextrose Titration (based on blood glucose – check every 15 minutes until between 150-250 mg/dL for one hour, then monitor glucose every hour)
< 100 mg/dL	Give 1 amp of dextrose 50% IVP and increase dextrose by 100%
100-149 mg/dL	Increase dextrose infusion rate by 50%
150-250 mg/dL	Continue current dextrose infusion rate
250-300 mg/dL	Decrease dextrose infusion rate by 50%
> 300 mg/dL	Decrease dextrose infusion rate by 75%

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Transition off Insulin and Dextrose

- Once hemodynamic stability is maintained begin slowly titrating insulin infusion down by 0.1-1 unit/kg/h every 30-60 minutes
- If patient becomes hemodynamically unstable during titration (bradycardic, hypotensive), increase insulin infusion to previous dose where hemodynamic stability was maintained and reattempt titration in 1-2 hours
- Dextrose infusion should continue ~24 hours after conclusion of HDI therapy with blood glucose checks every 1 hour x6 hours, then every 2 hours x6 hours, then every 4 hours. May decrease dextrose infusion by 50% every 6 hours if blood glucose remains in 150-250 mg/dL

Potassium	Reference Range (3.5 – 5.3 mg/dL)	
Level	PO diet or tube feeds ≥ 20 mL/h	NPO or tube feeds < 20 mL/h
4 – 4.3	20 mEq Potassium Chloride PO/NG/FT once	20 mEq IVPB over 1 hour (central line) or 2 hours (peripheral line)
3.7 – 3.9	40 mEq Potassium Chloride PO/NG/FT once	40 mEq IVPB over 2 hour (central line) or 4 hours (peripheral line)
3.4 – 3.6	60 mEq Potassium Chloride IVPB over 3 hours (central line) or over 6 hours (peripheral line) once	
3 – 3.3	80 mEq Potassium Chloride IVPB over 4 hours (central line) or over 8 hours (peripheral line) once	
Less than 3	80 mEq Potassium Chloride IVPB over 4 hours (central line) or over 8 hours (peripheral line) once **Notify physician and recheck potassium 2 hours after infusion**	

+++Only for use in patients with normal renal function+++

References

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