Hyperinsulinemia Euglycemia Therapy (HIET) [5383]

CONTACT TEXAS POISON CONTROL CENTER AT 1-800-222-1222

HIET IS RESTRICTED TO CRITICAL CARE MEDICINE

INDICATION: For confirmed/suspected calcium channel or beta-blocker overdose that does not respond to initial therapies (intravenous fluids, atropine, calcium or glucagon) or patients in cardiogenic shock

Discontinue all previous insulin orders and oral diabetes medications.

Hemodynamic goals of treatment with high dose insulin for calcium channel blocker/beta-blocker toxicity:
MAP > 60 mmHg
HR > 50 bpm
SVO2 > 70%
CI > 2.2
Urine output > 0.5 mL/kg/hr
Serum markers of perfusion (BMP, lactate, ABG or VBG)
Mental status, skin warmth/color, peripheral pulses

Nursing

Finger Stick Blood Glucose (FSBG) Monitoring (Single Response)

(X) Bedside glucose monitoring	Routine, Every 15 min DURING HIET INFUSION: -Every 15 minutes while titrating insulin and/or dextrose infusion -When blood glucose 150 - 250 mg/dL for 2 hours: Every 1 hour x 4 hours, then every 2 hours until infusion discontinued or blood glucose out of range AFTER HIET INFUSION: -Every hour x 4 hours -Then every 2 hours x 4 hours -Then every 4 hours up to 24 hours

Vitals

[X] Vital signs - T/P/R/BP (per unit protocol)	Routine, Every 15 min -Every 15 minutes x 2 hours -Then every 30 minutes x 3 hours -Then every 1 hour for the remainder of HIET infusion and 24 hours after

Notify

[X] Notify Provider	Routine, Until discontinued, Starting S, -If blood glucose is less than 100 mg/dL -If potassium is less than 3.3 mEq/L at baseline or after each potassium replacement -If magnesium is less than 1.5 mg/dL at baseline or after each magnesium replacement -If phosphate is less than 1 mEq/L at baseline or after each phosphorus replacement -If HR < 50 bpm -If SBP < 100 mmHg

HIET Electrolyte Replacement Protocol

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[X] HIET Electrolyte Replacement Protocol - RN to enter orders "Per Protocol - Cosign Required'	Routine, Until discontinued, Starting S

Electrolyte Replacement

Initial Electrolyte Replacement

[X] Potassium replacement (Single Response)	
( ) Potassium < 3.3 mEq/L (Single Response)	
( ) For peripheral line - potassium chloride 10 mEq in 100 mL IVPB	10 mEq, intravenous, Administer over: 60 Minutes, every 1 hour, For 6 Doses
( ) For central line - potassium chloride 20 mEq in 100 mL IVPB	20 mEq, intravenous, Administer over: 60 Minutes, every 1 hour, For 3 Doses
( ) Potassium 3.3 – 4 mEq/L (Single Response)	
( ) For peripheral line - potassium chloride 10 mEq in 100 mL IVPB	10 mEq, intravenous, Administer over: 60 Minutes, every 1 hour, For 4 Doses
( ) For central line - potassium chloride 20 mEq in 100 mL IVPB	20 mEq, intravenous, Administer over: 60 Minutes, every 1 hour, For 2 Doses
( ) Potassium 4.1 – 5.2 mEq/L (Single Response)	
( ) For peripheral line - potassium chloride 10 mEq in 100 mL IVPB	10 mEq, intravenous, Administer over: 60 Minutes, every 1 hour, For 2 Doses
( ) For central line - potassium chloride 20 mEq in 100 mL IVPB	20 mEq, intravenous, Administer over: 60 Minutes, every 1 hour, For 1 Doses
[ ] Phosphate replacement (central or peripheral IV line) (Single Response)	
( ) Phosphorus level 2 – 2.4 mg/dL	30 mmol, intravenous, once, For 1 Doses
( ) Phosphorus level 1.5 – 1.9 mg/dL	40 mmol, intravenous, once, For 1 Doses
( ) Phosphorus level < 1.5 mg/dL	60 mmol, intravenous, once, For 1 Doses

Medications

Medications

[X] Prior to insulin infusion initiation (Single Response) (Selection Required)	
( ) Blood glucose < 300 mg/dL	**"Followed by" Linked Panel**
[ ] dextrose 50% solution	25 g, intravenous, once, For 1 Doses
[ ] insulin regular (HumuLIN-R) injection	1 Units/kg, intravenous, once, For 1 Doses
( ) Blood glucose > 300 mg/dL	1 Units/kg, intravenous, once, For 1 Doses
[X] insulin regular 500 units/50 mL (10 unit/mL) continuous infusion (High Concentration)	1-10 Units/kg/hr, intravenous, continuous -Initiate at 1 unit/kg/hr. -Titration by MD ONLY. MD to titrate by 1 - 2 units/kg/hr every 10 min PRN to achieve the hemodynamic goals. -Hold insulin if potassium LESS than or equal to 3.3 mEq/L
[X] Dextrose infusions (Central Line Only) (Single Response) Administer via Central Line Only.	
(X) dextrose 20% (20 g/100 mL) continuous infusion (CENTRAL Line Only)	0.5 g/kg/hr, intravenous, continuous Administer via Central Line Only. -Blood glucose < 100 mg/dL, increase rate by 50% -Blood glucose 100 - 149 mg/dL, increase rate by 25% -Blood glucose 150 - 250 mg/dL, continue the same rate -Blood glucose > 250 mg/dL, decrease rate by 25% -Notify MD if dextrose infusion rate is GREATER than or equal to 250 mL/hr. [MD can consider changing dextrose infusion from D20% to D50%] -Do not discontinue dextrose once insulin infusion stops. Dextrose may still be required after cessation of insulin, continue blood glucose checks per protocol

( ) dextrose 50% (50 g/100 mL) continuous infusion (CENTRAL Line Only)	0.5 g/kg/hr, intravenous, continuous Administer via Central Line Only. Pharmacy to dispense bag. -Blood glucose < 100 mg/dL, increase rate by 50% -Blood glucose 100 - 149 mg/dL, increase rate by 25% -Blood glucose 150 - 250 mg/dL, continue the same rate -Blood glucose > 250 mg/dL, decrease rate by 25% -Notify MD if dextrose infusion rate is GREATER than or equal to 250 mL/hr -Do not discontinue dextrose once insulin infusion stops. Dextrose may still be required after cessation of insulin, continue blood glucose checks per protocol

Labs

Labs

[X] Basic metabolic panel	STAT For 1 Occurrences
[X] Magnesium Level	
[X] Magnesium level	Now then every 2 hours For 3 Occurrences Every 2 hours x 3 occurrences
[X] Magnesium level	Every 4 hours, Starting H+8 Hours For 3 Occurrences Every 4 hours once insulin and dextrose infusion rates are stable (to start after the 'Every 2 hours x 3 occurrences' Magnesium Level is completed).
[X] Phosphorous Level	
[X] Phosphorus level	Now then every 2 hours For 3 Occurrences
[X] Phosphorus level	Every 4 hours, Starting H+8 Hours For 3 Occurrences Every 4 hours once insulin and dextrose infusion rates are stable (to start after the 'Every 2 hours x 3 occurrences' Phosphorus Level is completed).
[X] Potassium Level	
[X] Potassium level	Every hour For 7 Occurrences Obtain Potassium Level every 1 hour while titrating insulin and dextrose infusions. Check every 4 hours when insulin and dextrose infusions have remained at the same rate of GREATER THAN OR EQUAL to 1 hour and blood glucose is stable at 150-250 mg/dL. After HIET therapy is discontinued, obtain every 4 hours for 6 occurrences.
[X] Schedule potassium level for HIET	Routine, As needed Obtain Potassium Level every 1 hour while titrating insulin and dextrose infusions. Check every 4 hours when insulin and dextrose infusions have remained at the same rate of GREATER THAN OR EQUAL to 1 hour and blood glucose is stable at 150-250 mg/dL. After HIET therapy is discontinued, obtain every 4 hours for 6 occurrences.

Consults

Pharmacy Consults

[X] Consult to Pharmacy - Notification of HIET Patient	Routine, Until discontinued, Starting S Specify reason: Notification of hyperinsulinemia euglycemia therapy (HIET) patient