

BETA BLOCKER OVERDOSE

(Last updated October 2020; Reviewer: Tabinda Jawaid, MBBS Aysun Tekin, MD; Ognjen Gajic, MD)

PRESENTING COMPLAINT: Shortness of breath, irregular heartbeat, lightheadedness.

FINDINGS

- **A** Check airway, wheezing might be present
- **B** ↑ RR
- **C** ↓ BP, ↓ HR
- **D** Altered variable (V,P,U,D)* Presyncope/syncope, acute delirium, depressed level of consciousness or seizures might occur.
- **E** Pallor, diaphoresis
- **U_{PC}** Myocardial depression/ventricular dysfunction/arrhythmia
- **L_{PC}** ↓↑ glucose, ABG: ↓ pH, ↓ HCO₃, ↓ CO₂, electrolytes

*V (verbal), P (Pain), U (unconsciousness), D (delirious)

L_{PC} (point-of-care labs), U_{PC} (point-of-care ultrasound)

OTHER HISTORY

- Time of ingestion and amount.
- Etiology of drug overdose:
 - Intentional vs. unintentional
 - Suicidal ideation

- Confusion (dementia, polypharmacy, etc.)
- Type of beta blocker:
 - Beta-1 selective or non-selective
 - Membrane stabilizing activity – propranolol, acebutolol
 - Lipid soluble – propranolol, more likely to cause CNS effects
 - Sotalol: has class III anti-arrhythmic effects
- Co-ingestion of other medications – calcium channel blockers, tricyclic antidepressants

DIFFERENTIAL DIAGNOSIS

- Drug toxicities
 - calcium channel blockers
 - clonidine
 - tricyclic antidepressants
 - digoxin
 - cholinergic toxicity
- Other causes of shock
 - Cardiogenic
 - Distributive
 - Hypovolemic

OTHER INVESTIGATIONS

EKG:

- Sinus bradycardia is the most common finding
- 1st degree AV block
- Junctional rhythm
- QT prolongation / Torsades de Pointes can occur with sotalol
- Asystole (severe cases)

Monitoring:

- Continuous cardiac, saturation, and arterial blood pressure monitoring

Additional tests: screen for other drugs or toxins, CG, glucose, electrolytes, cardiac enzymes, metabolic panel, acetaminophen and salicylate levels (if suspected).

Imaging:

- Chest X-ray (pulmonary edema)
- Echocardiography: myocardial depression, ventricular dysfunction, arrhythmia

THERAPEUTIC INTERVENTIONS

Initial interventions:

- Advanced cardiac life support, intubation with mechanical ventilation, fluid bolus (If necessary, in severe cases)

Medications:

- GI decontamination: Activated charcoal 1mg/kg
 - Hemodynamically stable patient, with ingestion within last 2 hours.
 - Consider extended time frame with ingestion of extended release forms.
- Atropine 0.5 mg – 1 mg IV every 3-5 minutes (not to exceed a total of 3mg or 0.04 mg/kg)
 - Usually effective only in mild toxicity cases
- Glucagon 50 – 150 mcg/kg IV bolus
 - Can be repeated in 3-5 minutes
 - If repeated glucagon boluses fail glucagon infusion: starting dose based on initial response from boluses (i.e.: 10 mg/hour, if improvement seen with two successive 5mg doses).
- Euglycemic insulin therapy
 - Initial Bolus 1 IU/kg
 - Drip - 0.5 IU/kg/hour can titrate up to 1 IU/kg/hr
 - Concomitant glucose administration to maintain euglycemia
 - Eu/hypoglycemia - d50 bolus, followed by continuous dextrose infusion
 - Hyperglycemia – can hold d50 bolus
 - Potassium replacement as needed
- Calcium (improves negative inotropy, but not bradycardia)
 - Calcium gluconate 10% - 30 ml bolus over 5-10 minutes

- Calcium Chloride 10% - 10 ml (1gram) IV bolus over 5 minutes
 - Monitor for rare but serious cardiac side effects.
- Sodium bicarbonate 150 mEq bolus.
 - Indicated for QRS duration longer than 120 ms or severe acidosis.
- Vasopressors (if necessary to maintain MAP > 60 mmHg)

Procedures:

- Cardiac pacing
- Hemodialysis
- Extraordinary measures
 - Aortic balloon pump
 - Extracorporeal circulatory support (bypass)

Contact/Consult: Poison Control and Cardiology/Intensive Care Team if necessary and available.

ONGOING MANAGEMENT

● **Therapeutic goals:**

- HR > 60 mmHg, MAP >60 mmHg, EF >50% (or at previously baseline),

improved mental condition, resolution of acidosis.

● **Further monitoring vs. disposition:**

- Any patients with signs of hemodynamic instability should be monitored in ICU,

and further therapy as indicated.

- Asymptomatic patients whom have ingested beta blocking agents with MSA, extended release forms, or sotalol should be monitored for at least 6 hours.

CAUTION

- **Complications:**

- Shock, ventricular arrhythmias, asystole, respiratory failure, seizures.

REFERENCES & ACKNOWLEDGMENTS

-This card was reviewed by Reviewers: Prashant Jagtap, MD; Courtney Bennett, DO in 2016.

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-Ref2 Greene, Shepherd Pharm D. Treatment of poisoning caused by β -adrenergic and calcium-channel blockers. American Journal of Health Systems Pharmacy (2006). 63: 19 1828-1835.

-Ref3 Lemkin, Ellen and Barrueto, Fermin. Beta Blocker Poisoning. In :UpToDate, Post TW (Ed) UpToDate, Waltham, Ma. (Accessed on February 9, 2015)