CHAPTER 194

Beta-Blockers

Matthew K. Riddle
Christian Tomaszewski

REFERENCES

1. Gummin DD, Mowry JB, Spyker DA, et al: 2016 annual report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 34th annual report. *Clin Toxicol* 55: 1072, 2017. [PMID: 29185815]
2. Kerns W: Management of beta-adrenergic blocker and calcium channel antagonist toxicity. *Emerg Med Clin North Am* 25: 309, 2007. [PMID: 17482022]
3. DeWitt CR, Waksman JC: Pharmacology, pathophysiology, and management of calcium channel blocker and beta-blocker toxicity. *Toxicol Rev* 23: 223, 2004. [PMID: 15898828]
4. Poirier L, Tobe SW: Contemporary use of β-blockers: clinical relevance of subclassification. *Can J Cardiol* 30 (5 Suppl): S9, 2014. [PMID: 24684855]
5. Ripley TL, Saseen JJ: β-blockers: a review of their pharmacological and physiological diversity in hypertension. *Ann Pharmacother* 48: 723, 2014. [PMID: 24687542]
6. Love JN, Elshami J: Cardiovascular depression resulting from atenolol intoxication. *Eur J Emerg Med* 9: 111, 2002. [PMID: 12131631]
7. Palatnick W, Jelic T: Emergency department management of calcium channel blocker, beta-blocker, and digoxin toxicity. *Emerg Med Pract* 16: 1, 2014. [PMID: 24883458]
8. Love JN, Howell JM, Litovitz TL, Klein-Schwartz W: Acute beta-blocker overdose: factors associated with the development of cardiovascular morbidity. *J Toxicol Clin Toxicol* 38: 275, 2000. [PMID: 10866327]
9. Reith D, Dawson A, Epid D, et al: Relative toxicity of beta-blockers in overdose. *J Toxicol Clin Toxicol* 34: 273, 1996. [PMID: 8667464]
10. Yee LM, Wu D: False-positive amphetamine toxicology screen results in three pregnant women using labetalol. *Obstet Gynecol* 117: 503, 2011. [PMID: 21252805]
11. Young AT, Merkel MJ, Heitner SB, Schulman PM: Focused echocardiography during glucagon administration to diagnose beta-blocker-induced cardiomyopathy. *J Cardiothorac Vasc Anesth* 29: 1301, 2015. [PMID: 25575407]
12. Rennyson SL, Littmann L: Brugada-pattern electrocardiogram in propranolol intoxication. *Am J Emerg Med* 28: 256.e7, 2010. [PMID: 20159410]
13. Heard K: Gastrointestinal decontamination. *Med Clin North Am* 89: 1067, 2005. [PMID: 16227054]
14. Wax PM, Erdman AR, Chyka PA, et al: Beta-blocker ingestion: an evidence-based consensus guideline for out-of-hospital management. *Clin Toxicol (Phila)* 43: 131, 2005. [PMID: 15906457]
15. Isbister GK, Kumar VV: Indications for single-dose activated charcoal administration in acute overdose. *Curr Opin Crit Care* 17: 351, 2011. [PMID: 21716104]
16. Höjer J, Troutman WG, Hoppu K, et al: Position paper update: ipecac syrup for gastrointestinal decontamination. *Clin Toxicol (Phila)* 51: 134, 2013. [PMID: 23406298]
17. Thanacoody R, Caravati EM, Troutman B, et al: Position paper update: whole bowel irrigation for gastrointestinal decontamination of overdose patients. *Clin Toxicol (Phila)* 53: 5, 2015. [PMID: 25511637]
18. Jang DH, Spyres MB, Fox L, Manini AF: Toxin-induced cardiovascular failure. *Emerg Med Clin North Am* 32: 79, 2014. [PMID: 24275170]
19. Shepherd G: Treatment of poisoning caused by beta-adrenergic and calcium channel blockers. *Am J Health Syst Pharm* 63: 1828, 2006 (review). Erratum in: *Am J Health Syst Pharm* 65: 1592, 2008. [PMID: 16990629]
20. Petersen KM, Bøgevig S, Holst JJ, et al: Hemodynamic effects of glucagon: a literature review. *J Clin Endocrinol Metab* 103: 1804, 2018. [PMID: 29546411]
21. Megarbane B, Karyo S, Baud F: The role of insulin and glucose (hyperinsulinaemia/euglycaemia) therapy in acute calcium channel antagonist and beta-blocker poisoning. *Toxicol Rev* 23: 215, 2004. [PMID: 15898827]
22. Engebretsen KM, Kaczmarek KM, Morgan J, Holger JS: High-dose insulin therapy in beta-blocker and calcium channel blocker poisoning. *Clin Toxicol (Phila)* 49: 277, 2011. PMID: 21563902]
23. Woodward C, Pourmand A, Mazer-Amirshahi M: High dose insulin therapy, an evidence based approach to beta-blocker/calcium channel blocker toxicity. *Daru* 22: 36, 2014. [PMID: 24713415]
24. Holger JS, Stellpflug SJ, Cole JB, et al: High-dose insulin: a consecutive case series in toxin-induced cardiogenic shock. *Clin Tox* 49: 653, 2011. [PMID: 21819291]
25. Kerns W II, Schroeder D, Williams C, et al: Insulin improves survival in a canine model of acute beta-blocker toxicity. *Ann Emerg Med* 29: 748, 1997. [PMID: 9174520]
26. Holger JS, Engebretsen KM, Fritzlar SJ, et al: Insulin versus vasopressin and epinephrine to treat beta-blocker toxicity. *Clin Toxicol (Phila)* 45: 396, 2007. [PMID: 17486481]
27. Cole JB, Stellpflug SJ, Ellsworth H, et al: A blinded, randomized, controlled trial of three doses of high-dose insulin in poison-induced cardiogenic shock. *Clin Toxicol (Phila)* 51: 201, 2013. Erratum in: *Clin Toxicol (Phila)* 51: 1246, 2013. [PMID: 23530460]
28. Cole JB, Arens AM, Laes JR, Klein LR, Bangh SA, Olives TD: High dose insulin for beta-blocker and calcium channel-blocker poisoning. *Am J Emerg Med* 36: 1817, 2018. [PMID: 29452919]
29. Weinberg GL: Lipid emulsion infusion. Resuscitation for local anesthetic and other drug overdose. *Anesthesiology* 117: 180, 2012. [PMID: 22627464]
30. Ozcan MS, Weinberg G: Intravenous lipid emulsion for the treatment of drug toxicity. *J Intensive Care Med* 29: 59, 2014. [PMID: 22733724]
31. Cao D, Heard K, Foran M, Koyfman A: Intravenous lipid emulsion in the emergency department: a systematic review of recent literature. *J Emerg Med* 48: 387, 2015. [PMID: 25534900]
32. Levine M, Hoffman RS, Lavergne V, et al: Systematic review of the effect of intravenous lipid emulsion therapy for non-local anesthetics toxicity. *Clin Toxicol* 54: 194, 2016. [PMID: 26852931]
33. American College of Medical Toxicology: ACMT Position Statement: interim guidance for the use of lipid resuscitation therapy. *J Med Toxicol* 7: 81, 2011. [PMID: 21327839]
34. Browne A, Harvey M, Cave G: Intravenous emulsion does not augment blood pressure recovery in a rabbit model of metoprolol toxicity. *J Med Toxicol* 6: 373, 2010. [PMID: 20354918]
35. Geib AJ, Liebelt E, Manini AF: Clinical experience with intravenous lipid emulsion for drug-induced cardiovascular collapse. *J Med Toxicol* 8: 10, 2012. [PMID: 21989640]
36. Levine M, Skolnik AB, Ruha AM, et al: Complications following antidotal use of intravenous lipid emulsion therapy. *J Med Toxicol* 10: 10, 2014. [PMID: 24338451]
37. Cole JB, Stellpflug SJ, Engebretsen KM: Asystole immediately following intravenous fat emulsion for overdose. *J Med Toxicol* 10: 307, 2014. [PMID: 24519703]
38. Hayes BD, Gosselin S, Calello DP, et al: Systematic review of clinical adverse events reported after acute intravenous lipid emulsion administration. *Clin Toxicol* 54: 365, 2016. [PMID: 27035513]
39. Rodríguez B, Wilhelm A, Kokko KE: Lipid emulsion use precluding renal replacement therapy. *J Emerg Med* 47: 635, 2014. [PMID: 25271183]
40. Sandroni C, Cavallaro F, Caricato A, et al: Enoximone in cardiac arrest caused by propranolol: two case reports. *Acta Anaesthesiol Scand* 50: 759, 2006. [PMID: 16987374]
41. Pfaender M, Casetti PG, Azzolini M, et al: Successful treatment of a massive atenolol and nifedipine overdose with CVVHDF. *Minerva Anestesiol* 74: 97, 2008. [PMID: 18288073]
42. Masson R, Colas V, Parienti JJ, et al: A comparison of survival with and without extracorporeal life support treatment for severe poisoning due to drug intoxication. *Resuscitation* 83: 1413, 2012. [PMID: 22469751]
43. Johnson NJ, Gaieski DF, Allen SR, Perrone J, DeRoos F: A review of emergency cardiopulmonary bypass for severe poisoning by cardiotoxic drugs. *J Med Toxicol* 9: 54, 2013. [PMID: 23238774]