

Management of Cardiotoxic Poisoning

C. McDermott, M. Sweeney, Emergency Department, Sligo General Hospital, Ireland

INTRODUCTION

Calcium channel blockers (CCB) were introduced in the United States in 1981. Indications for use of these drugs include angina, hypertension, arrhythmia and migraine prophylaxis. However, calcium channel blocker overdoses have emerged as one of the most lethal drug ingestions and are commonly implicated in fatal poisonings.

Common cardiovascular effects resulting from calcium antagonists include peripheral vasodilation, negative chronotropy, negative inotropy, negative dromotropy. The two classes of calcium antagonists include dihydropyridines eg. amlodipine, lercanidipine, nifedipine and phenylalkylamines such as verapamil.



Intralipid Emulsion
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CASE REPORTS

CASE ONE

A 35 year-old Polish man presented to the ED following an intentional overdose of 200mg of Lercanidipine (Zanidip) and alcohol. He had recently been diagnosed with hypertension. He was alert and awake, initial ECG showed sinus tachycardia. He was taken to the resuscitation room and treated supportively with activated charcoal, calcium gluconate 10% infusion in accordance with ToxBASE recommendations. The patient was discharged from ICU the following day and made a full recovery.

CASE TWO

A 38 year-old Irish male presented with a deliberate overdose of verapamil 1600mg 1 hour previously. He was profoundly hypotensive and bradycardic on presentation. An initial ECG showed atrial fibrillation with a slow ventricular response. Arterial blood gases revealed a profound metabolic acidosis with a raised serum anion gap. This patient was resuscitated aggressively with atropine IV, calcium gluconate, glucagon, adrenaline and external and transvenous cardiac pacing. The patient continued to deteriorate and died following an asystolic cardiac arrest.

DISCUSSION

Antidotal therapies for calcium antagonist overdose include calcium replacement, glucagon, atropine, inotropic support and ventricular pacing. However, these treatments may be ineffective in cases of severe toxicity.

Intralipid emulsion therapy (ILE) has emerged as a therapy for CCB overdose. Several non-randomized observational case series show a large positive treatment effect (1). ILE therapy has been introduced as a recognised therapy for the management of local anaesthetic toxicity (2). Postulated mechanism of actions of ILE include: an expanded plasma lipid phase, thus reducing the free drug levels; overcoming of the inhibition of acyl carnitine transferase used to transport free fatty acids into cardiac myocytes and a direct positive inotropic effect on myocardial cells (1). Current recommendations advise the use of an initial bolus of Intralipid 20% 1.5ml kg⁻¹ followed by an infusion of 0.25 ml⁻¹ kg⁻¹ min⁻¹ (2).

CONCLUSIONS

- Calcium antagonists are potentially lethal when taken in overdose
- Standard therapies are often limited
- ILE is a novel therapeutic antidote that has shown promise in the treatment of CCBs

REFERENCES

- 1 Intravenous lipid emulsion as antidote beyond local anesthetic toxicity: a systematic review. **Cave G, Harvey M.** Acad Emerg Med. 2009 Sep;16(9):815-24. Review.
- 2 AAGBI Safety Guideline -Management of Severe Local Anaesthetic Toxicity http://www.aagbi.org/sites/default/files/la_toxicity_notes_2010_0.pdf