

Treatment of calcium channel blocker poisoning: a systematic review



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Disclosure

We have no relevant financial or nonfinancial relationships to disclose except...

Duracell Bunny
arrested;
charged with
battery.



Introduction

- Burden of calcium channel blocker poisoning
- Third increased rate exposure (Bronstein et al., 2010)
- Mortality 6% / Morbidity 50% (St-Onge et al., 2012)



Objective

Evaluate the efficacy of interventions considered for the treatment of CCB poisoning

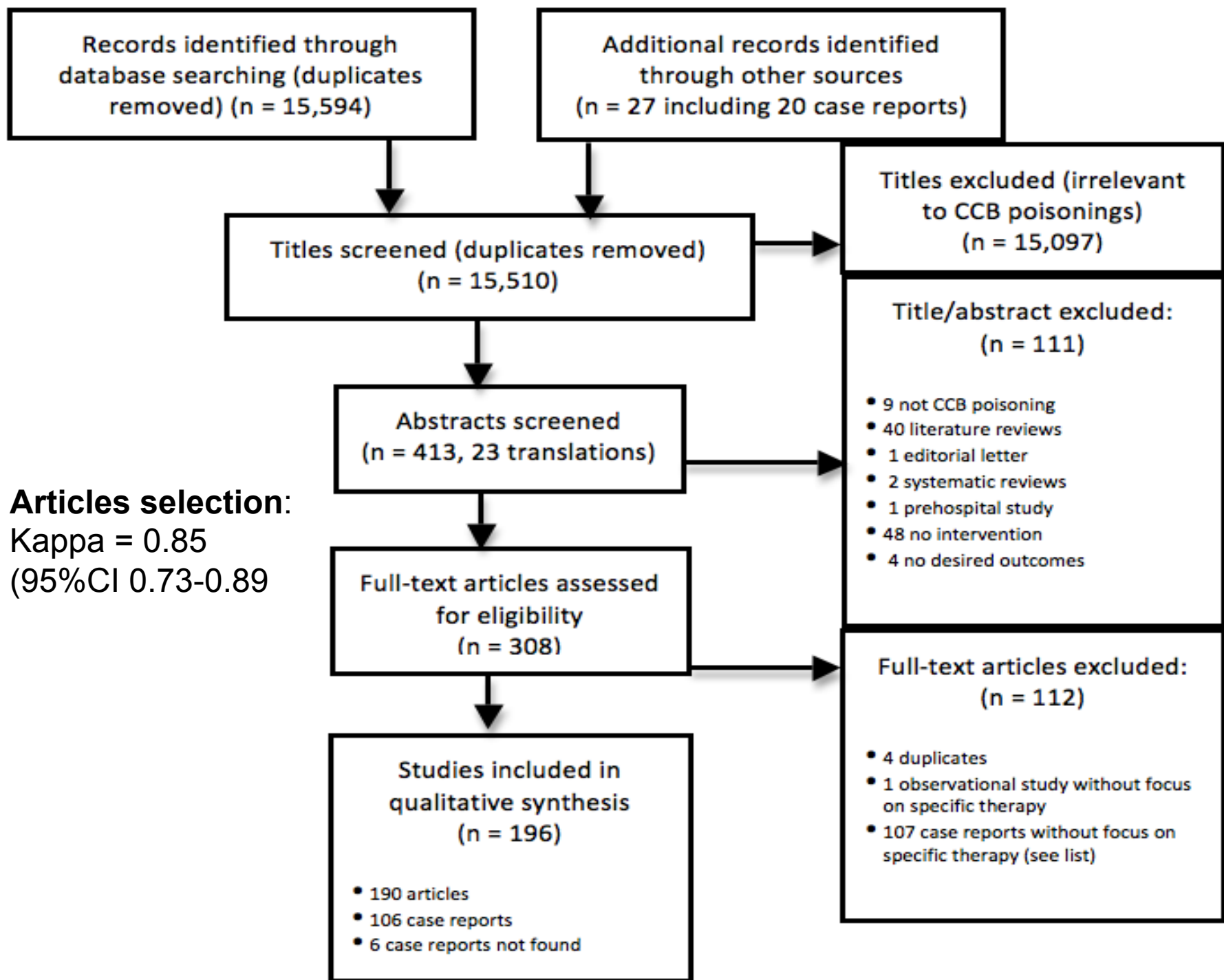


Research question

- P:** In adults poisoned with a CCB
- I:** which intervention(s)
- C:** when compared to no-intervention or to other intervention(s)
- O:** improve primary outcomes (mortality, hemodynamics, functional outcomes) or secondary outcomes
- S:** as shown by any type of study?

Methods

- Search strategy planned with 2 librarians
- Articles selection by 2 blinded reviewers
- Data abstraction by qualified independent reviewers using pilot tested forms
- Quality analysis by independent reviewers:
 - STROBE checklist and Thomas tool
 - Institute of Health Economics tool
 - ARRIVE checklist and NRCNA checklist



Quality of included trials

Interventions (n= number of articles including case reports (CR))	Observational studies			Case series		Animal studies		
	n	STROBE checklist (/22)	THOMAS' tool	n	Institute of Health Economics (IHE) tool (/20)	n	ARRIVE checklist (/20)	NRCNA checklist (/16)
High-dose Insulin (n = 33, 22 CR)	3	6 (4-9)	Weak	4	6 (4-13)	4	15 (11-18)	8 (6-9)
Extracorporeal life support (n = 11, 7 CR)	1	17	Weak to moderate	3	11 (9-15)	0		
Calcium (n = 38, 20 CR)	0			10	6 (2-10)	8	12 (5-16)	5 (3-7)
Vasopressors (n = 27, 10 CR)	0			8	6 (2-10)	9	14 (11-18)	6 (4-9)
Decontamination (n = 8, 2 CR)	0			6	6 (3-8)	0		
Pacemaker (n = 7, 2 CR)	0			5	7 (4-10)	0		
Glucagon (n = 16, 10 CR)	0			3	7 (3-9)	3	13 (11-15)	6 (6-6)
Atropine (n = 5, 0 CR)	0			3	7 (3-10)	2	11 (11-11)	6 (5-6)
4-aminopyridine (n = 10, 0 CR)	0			2	9 (8-9)	8	14 (10-17)	6 (5-8)
Lipid emulsion (n = 20, 16 CR)	0			1	8	3	14 (13-15)	7 (6-7)
Levosimendan (n = 8, 3 CR)	0			1	8	4	16 (14-16)	6 (5-8)
Plasma exchange (n = 3, 2 CR)	0			1	9	0		

Reported survival benefit

- Observational studies:
 - High-dose insulin (2) : type of HDI protocols
 - Extracorporeal life-support (1): ECLS vs not
- Case series (CS) and Animal studies (AS):
 - Calcium (5 CS and 5 AS)
 - Epinephrine, dopamine, norepinephrine (5 CS, 7 AS)
- Animal studies:
 - Lipid emulsion for IV CCB intoxication (3)

Reported hemodynamic improvement

- Observational studies:
 - High-dose insulin (2): type of HDI protocols
 - Extracorporeal life-support (1): ECLS vs not
- Case series (CS) and Animal studies (AS):
 - Epinephrine, dopamine, norepinephrine (3 CS, 8 AS)
 - Levosimendan (1 CS, 3 AS)
 - 4-aminopyridine (2CS, 7 AS)
 - Plasma exchange (1 CS)
- Animal studies:
 - Lipid emulsion (3), liposomes (1)

Summary

- High-dose insulin:
 - Hemodynamic improvement and possible survival benefit
 - Risks: hypoglycemia, hypokalemia
 - Level of evidence: low
- ECLS:
 - Possible survival benefit in patients in severe refractory shock or cardiac arrest
 - Risks: bleeding, thrombosis, limb ischemia
 - Level of evidence: low

Summary

- Dopamine, norepinephrine, epinephrine:
 - Hemodynamic improvement
 - Risks: ischemic complications
 - Level of evidence: very low
- Calcium:
 - Hemodynamic improvement (some inconsistency)
 - Risks: hypercalcemia
 - Level of evidence: very low

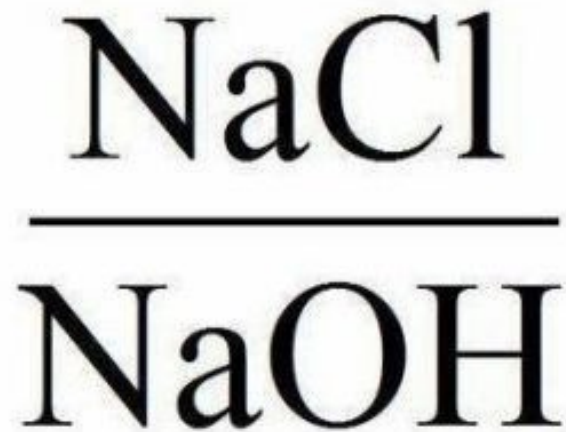
Conclusion

- First systematic review concerning the effects of treatments for CCB poisoning.
- Head-to-head comparisons in human clinical trials should be done concerning the use of HDI, ECLS and vasopressors.
- The future: International guideline for the treatment of CCB poisoning.



QUESTIONS?

Red alert! Red alert!



The base is under a salt!