

BET 2: USEFULNESS OF EPINEPHRINE IN OUT-OF-HOSPITAL CARDIAC ARREST

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ABSTRACT

A short-cut review was carried out to establish whether prehospital adrenaline affects long-term morbidity or mortality after out-of-hospital cardiac arrest. Fifty-five papers were found using the reported search. Of these, three presented the best evidence to answer the clinical question. The author, date and country of publication, patient group studied, study type, relevant outcomes, results and study weaknesses of these best papers are tabulated. It is concluded that while epinephrine used as an adjunctive treatment during out-of-hospital cardiac arrest (OHCA) may improve return of spontaneous circulation (ROSC) and survival to hospital, it does not improve survival to discharge or neurological outcome.

CLINICAL SCENARIO

A 74-year-old man presents to the emergency department with out-of-hospital cardiac arrest. Paramedics administered epinephrine prior to arrival to the

hospital. The patient is unresponsive but has a faint pulse. You wonder about the long-term benefits of epinephrine, which is still recommended by the American Heart Association.

THREE-PART QUESTION

In [adults with out-of-hospital cardiac arrest] does [prehospital epinephrine] affect [long-term morbidity or mortality]?

SEARCH STRATEGY

Ovid MEDLINE® 1946 to January week 2 2016: (exp Epinephrine)/AND (exp out-of-hospital cardiac arrest). No limits applied.

SEARCH OUTCOME

Fifty-five papers were identified. Three were relevant to the clinical question including two large-scale clinical trials and one recent meta-analysis (table 2).

COMMENTS

Epinephrine is a fundamental part of advanced cardiac life support. It is said to increase coronary and cerebral perfusion. This alpha-adrenergic-mediated process is thought to contribute to ROSC in arrested patients. However, despite epinephrine's integral part in standard resuscitation protocols, there remains little evidence that

epinephrine directly impacts patient survival or favourable neurological outcome. There is growing concern that epinephrine may actually be harmful to long-term outcomes by increasing myocardial dysfunction and altering cerebral microcirculation.

Clinical bottom line

Epinephrine used as an adjunctive treatment during OHCA improves ROSC and survival to hospital but not survival to discharge or neurological outcome.

REFERENCES

- 1 Atksawedparit P, Rattanasiri S, McEvoy M, *et al*. Effects of prehospital adrenaline administration on out-of-hospital cardiac arrest outcomes: a systematic review and meta-analysis. *Crit Care* 2014;18:463.
- 2 Dumas F, Bougouin W, Geri G, *et al*. Is epinephrine during cardiac arrest associated with worse outcomes in resuscitated patients? *J Am Coll Cardiol* 2014;64:2360–7.
- 3 Lin S, Callaway CW, Shah PS, *et al*. Adrenaline for out-of-hospital cardiac arrest resuscitation: a systematic review and meta-analysis of randomized controlled trials. *Resuscitation* 2014;85:732–40.

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Table 2 Relevant papers

Author, date and country	Patient group	Study type	Outcomes	Key results	Study weaknesses
Atiksawedparit <i>et al</i> , ¹ 2014, Thailand	15 eligible papers (14 observational studies and 1 RCT) 13 papers were observational on adults and for each outcome between 4 and 8 were pooled	Systematic review and meta-analysis	Prehospital ROSC Overall ROSC Survival to discharge	RR 2.89 (95% CI 2.36 to 3.54) RR 0.93 (95% CI 0.5 to 1.74) RR 0.69 (95% CI 0.48 to 1)	Based on many observational studies
Dumas <i>et al</i> , ² 2014, France	1556 patients with non-traumatic out-of-hospital cardiac arrest that achieved successful ROSC between January 2000 and August 2012 1134 (73%) received epinephrine and 442 (27%) did not receive epinephrine Epinephrine vs no epinephrine	Prospective observational cohort	Good neurological outcome as measured a cerebral performance category of 1 or 2 Adjusted ORs of intact survival for patients by total dose of epinephrine received	17% (194/1134) 63% (255/422) p<0.001 aOR for 1 mg epinephrine, 0.48 (95% CI 0.27 to 0.84) For 2–5 mg epinephrine, 0.30 (95% CI 0.20 to 0.47) For >5 mg, 0.23 (95% CI 0.14 to 0.37)	This was an observational study and therefore the results could have been affected by unidentified or unreported confounders Additionally, all of the data from the study was gathered from a single data centre
Lin <i>et al</i> , ³ 2014, Canada	14 RCTs evaluating standard dose adrenaline to placebo, high-dose adrenaline, or vasopressin alone or in combination	Systematic review and meta-analysis	ROSC (standard dose adrenaline vs placebo) Survival to admission (standard dose adrenaline vs placebo) Survival to discharge Neurological outcome	RR 2.80 (95% CI 1.78 to 4.41) p<0.00001 RR 1.95 (95% CI 1.34 to 2.84) p=0.0004 RR 2.12 (95% CI 0.75 to 6.02) p=0.16 RR 1.73 (95% CI 0.59 to 5.11) p=0.32	Only one trial was placebo controlled and relevant to the question