COCHRANE CORNER

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Sodium bicarbonate in the treatment of out-of-hospital cardiac arrest

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Background

Out-of-hospital cardiac arrest is common and is associated with poor prognosis. One major physiological consequence of out-of-hospital cardiac arrest is the presence of increasing acidosis due to a prolonged "downtime". Since acidosis was considered detrimental during cardiac arrest, buffers (mainly sodium bicarbonate) have been in use for the management of cardiac arrest since the 1960's.¹ The use of sodium bicarbonate has been declining due to concerns associated with efficacy and potential adverse effects.^{2,3} The use of sodium bicarbonate in cardiac arrest remains controversial.

Data Source

The Cochrane Library 2004, Issue 1

Search Terms

[Prehospital Search Filter Version - 1.0⁴](#)

asystole, advanced cardiac life support, arrhythmia, buffer, cardiac arrest, cardiac massage, cardiopulmonary resuscitation, heart arrest, sodium bicarbonate, sudden death, ventricular fibrillation and ventricular tachycardia

Search Results

Protocols

None

Systematic Reviews

None

Clinical Trials

Dybvik et al., (1995) "Buffer therapy during out-of-hospital cardiopulmonary resuscitation".⁵

Dybvik et al., (1996) "Buffer therapy during out-of-hospital resuscitation".⁶

Commentary

Sodium bicarbonate has been widely used in the management of cardiac arrest since the 1960's.¹ Despite this, and the controversy surrounding its use, there have been no clinical trials evaluating the use of sodium bicarbonate in out-of-hospital cardiac arrest. Whilst it appears that there are two clinical trials evaluating buffer therapy in out-of-hospital cardiac arrest, it is the

same trial published twice. This trial did not evaluate sodium bicarbonate but rather Tribonat®, (a mixture of sodium bicarbonate, trometamol, disodium phosphate and acetate).⁵ Whilst this study was a well designed, prospective, randomised and blinded trial which did not demonstrate any statistically significant differences between buffer and saline with respect to resuscitation outcomes, there are several limitations of this study. Firstly, acidosis in the study population was mild with only minor differences in base excess and pH between buffer and saline treated patients differences. This is probably due to a short 'downtime' (mean response time 5.8 min) and bystander CPR in almost half the patients.⁷ Furthermore, the study appears under powered resulting in large confidence intervals in the regression analysis for the outcome of interest (OR 0.77 CI 0.43-1.41).⁷ Finally, there is little literature on the use of Tribonat®.⁷ It is uncertain if this study can (or should) be applied to other buffers including sodium bicarbonate. In as much, it would be unwise to make extrapolations to sodium bicarbonate which, to date, has not been subject to the rigors of a well designed clinical trial in the out-of-hospital setting. Sodium bicarbonate needs to be subjected to a well designed prospective randomised clinical trial to determine its usefulness (if any) in the management of out-of-hospital cardiac arrest.

The Bottom Line

There is a case for further randomised trials of high methodological rigour in order to define the true extent of benefit or harm from the administration of sodium bicarbonate in the management of out-of-hospital cardiac arrest.

References

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