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Hypothermia For Neuroprotection In Adults After Cardiopulmonary Resuscitation

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BACKGROUND: Good neurologic outcome after cardiac arrest is hard to achieve. Interventions during the resuscitation phase and treatment within the first hours after the event are critical. Experimental evidence suggests that therapeutic hypothermia is beneficial, and a number of clinical studies on this subject have been published.

OBJECTIVES: We performed a systematic review and meta-analysis to assess the effectiveness of therapeutic hypothermia in patients after cardiac arrest. Neurologic outcome, survival and adverse events were our main outcome parameters. We aimed to perform individual patient data analysis if data were available, and to from subgroups according to the cardiac arrest situation.

SEARCH STRATEGY: We searched the following databases: the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library, 2007 Issue 1); MEDLINE (1971 to January 2007); EMBASE (1987 to January 2007); CINAHL (1988 to January 2007); PASCAL (2000 to January 2007); and BIOSIS (1989 to January 2007).

SELECTION CRITERIA: We included all randomized controlled trials assessing the effectiveness of the therapeutic hypothermia in patients after cardiac arrest without language restrictions. Studies were restricted to adult populations cooled with any cooling method applied within six hours of cardiac arrest.

DATA COLLECTION AND ANALYSIS: Validity measures, the intervention, outcome parameters and additional baseline variables were entered into the database. Meta-analysis was only done for a subset of comparable studies with negligible heterogeneity. For these studies individual patient data were available.

MAIN RESULTS: Four trials and one abstract reporting on 481 patients were included in the systematic review. Quality of the included studies was good in three out of five included studies. For the three comparable studies on conventional cooling methods all authors provided individual patient data. With conventional cooling methods patients in the hypothermia group were more likely to reach a best cerebral performance categories score of one or two (CPC, five point scale; 1 = good cerebral performance, to 5 = brain death) during hospital stay (individual patient data; RR, 1.55; 95% CI 1.22 to 1.96) and were more likely to survive to hospital discharge (individual patient data; RR, 1.35; 95% CI 1.10 to 1.65) compared to standard post-resuscitation care. Across all studies there was no significant difference in reported adverse events between hypothermia and control.

AUTHORS' CONCLUSIONS: Conventional cooling methods to induce mild therapeutic hypothermia seem to improve survival and neurologic outcome after cardiac arrest. Our review supports the current best medical practice as recommended by the International Resuscitation Guidelines.

Arrich J, Holzer M, Herkner H, Müllner M. Hypothermia for neuroprotection in adults after cardiopulmonary resuscitation. Cochrane Database of Systematic Reviews 2009, Issue 4. Art. No.: CD004128.
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Sugammadex, a Selective Reversal Medication for Preventing Postoperative Residual Neuromuscular Blockade

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BACKGROUND: Sugammadex is the first selective relaxant binding agent that has been studied for reversal of neuromuscular blockade induced by rocuronium and other steroidal non-depolarizing neuromuscular blocking agents (NMBAs).

OBJECTIVES: To assess the efficacy and safety of sugammadex in reversing neuromuscular blockade induced by steroidal non-depolarizing NMBAs and in preventing postoperative residual neuromuscular blockade.

SEARCH STRATEGY: We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2008, Issue 3), MEDLINE (1950 to August 2008), and EMBASE (1980 to August 2008). In addition, we handsearched reference lists of relevant articles and meeting abstracts. Furthermore, we contacted the medication's manufacturer for more information.

SELECTION CRITERIA: All randomized controlled trials (RCTs) on adult patients (≥ 18 years old) in which sugammadex was compared with placebo or other medications, or in which different doses of sugammadex were compared with each other. We excluded non-randomized trials and studies on healthy volunteers.

DATA COLLECTION AND ANALYSIS: We independently performed determination of trial inclusion, quality assessment, and data extraction. We applied standard meta- analytic techniques.

MAIN RESULTS: We included18 RCTs (n = 1321 patients). Seven trials were published as full-text papers, and 11 trials only as meeting abstracts. All the included trials had adequate methods of randomization and allocation concealment. The results suggest that, compared with placebo or neostigmine, sugammadex can more rapidly reverse rocuronium-induced neuromuscular blockade regardless of the depth of the block. We identified 2, 4, and 16 mg/kg of sugammadex for reversal of rocuronium-induced neuromuscular blockade at T2 reappearance , 1 to 2 post-tetanic counts, and 3 to 5 minutes after rocuronium, respectively. The number of trials are very limited regarding vecuronium and pancuronium. Serious adverse events occurred in < 1% of all patients who received the medication. There was no significant difference between sugammadex and placebo in terms of the prevalence of drug-related adverse events (RR 1.20, 95% CI 0.61 to 2.37; P = 0.59, I2 = 0%, 5 RCTs). Also, no significant difference was found between sugammadex and neostigmine for adverse events (RR 0.98, 95% CI 0.48 to1.98; P = 0.95, I2 = 43%, 3 RCTs).

AUTHORS' CONCLUSIONS: Sugammadex was shown to be effective in reversing rocuronium-induced neuromuscular blockade. This review has found no evidence of a difference in the instance of unwanted effects between sugammadex, placebo or neostigmine. These results need to be confirmed by future trials on larger patient populations and with more focus on patient-related outcomes.

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