Table 1

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Hardy <i>et al</i> 1976 UK	30 unwell children with suspected UTI	Compared clean catch, bag specimen and suprapubic aspiration of urine	Pure growth or contamination	bag specimens 4/30 pure growth 22/30 contaminated. Clean catch specimens 2/30 pure growth 22/30 mixed growth. Suprapubic aspiration 4/30 pure growth, no contaminated specimens	Children were in-patients in paediatric ward having routine screening. No power study and small numbers. Authors actually found supra-pubic aspiration to be most effective (but not specifically the topic of this BET) More boys than girls
Alam <i>et al</i> 2005 Brazil	191 children, (125 were boys) <3 years without known UTI. All children had attempts at clean catch, urine bag and cotton wool pad sampling. If all three results were positive it was declared a positive UTI and excluded from the analysis.	Diagnostic study	Bacterial contamination of three methods of urine sampling. Missing samples (i.e. not obtainable by method)	Clean catch 14.7%, urine bag 26.6%, urine pad 29% (significantly higher than for clean catch $p<0.01$) clean catch (12%), bag (4%), pad (4%).	Exclusion of true UTIs may have biased results.

► CLINICAL BOTTOM LINE

One study has shown that clean catch is a better non-invasive method of obtaining a urine specimen, compared with bag urine, in non-toilet trained children.

Hardy JD, Furnell PM, Brumfitt W. Comparison of sterile bag, clean catch and suprapubic aspiration in the diagnosis of urinary tract infection in early childhood. *Br J Urol* 1976;**48**(4):279–83.

Alam MT, Coulter JB, Pacheco J, *et al*. Comparison of urine contamination rates using three different methods of collection: clean-catch, cotton wool pad and urine bag. *Annals of Tropical Paediatrics* 2005 Mar;**25**(1):29–34.

Intravenous magnesium in shock-resistant tachyarrhythmias

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A short cut review was carried out to establish whether intravenous magnesium is effective in cardiac arrest secondary to shock resistant tachyarrhythmias. 42 papers were found, of which five 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. The clinical bottom line is that magnesium has not been conclusively shown to be useful in shock-resistant tachyarrhythmias when measured against clinically important outcomes.

Three part question

Does [intravenous magnesium] lead to [return of spontaneous circulation] in [shock-resistant tachyarrhythmias]

Clinical scenario

A 65 year old man suffered a witnessed out-of-hospital cardiac arrest. He received 20 minutes of basic and advanced cardiac life support measures in the field. On arrival in the emergency department, the rhythm showed persistent ventricular fibrillation and he continued to be pulseless. You decide to continue another cycle of defibrillation and think of anti-arrhythmic drugs apart from correctable causes. You know that amiodarone is helpful. Your colleague

mentions the use of magnesium as per ALS guidelines. Is Magnesium really helpful in return to spontaneous circulation in refractory ventricular tachyarrhythmias?

Search strategy

MEDLINE OVID interface on the world wide web.
1966–Dec 2005

EMBASE 1980–2005

COCHRANE Library Issue 4, 2005

Search details

{exp MAGNESIUM/or magnesium.mp} AND {exp Ventricular Fibrillation/or ventricular fibrillation.mp OR exp Tachycardia, Ventricular/or ventricular tachycardia.mp OR ventricular tachyarrhythmia\$.mp OR exp Heart Arrest/or cardiac arrest.mp} AND {refractory.mp. OR shock-resistant.mp. OR intractable.mp OR irreversible.mp. OR resistant.mp. OR unresponsive.mp. OR non-responsive.mp. OR pulseless.mp OR persistent.mp OR Shock-refractory} LIMIT to {human and english language}

Search outcome

42 articles in total out of which five were relevant trials

Comments

Magnesium use in refractory ventricular tachyarrhythmias gained interest after case reports by Tobey, Craddock, Baraka and others which showed return of spontaneous circulation and neurological intact discharge. However, subsequent randomised trials dampened the enthusiasm. Based on current evidence, magnesium does not seem to effect return of spontaneous circulation or survival from hospital with neurologically intact parameters. However, the trials are all low powered with different other methodological issues involved. These should be addressed in large multi-centred trials before any further use. Ethical approval for such large multi-centred trials with different EMS systems will always be a major stumbling block.

► CLINICAL BOTTOM LINE

Magnesium has not been conclusively shown to be useful in shock-resistant tachyarrhythmias when measured against clinically important outcomes.

Miller B, Craddock L, Hoffenberg S, *et al*. Maines, Masick D Pilot study of intravenous magnesium sulfate in refractory cardiac arrest: safety data and recommendations for future studies. *Resuscitation* 1995 Aug;**30**(1):3–14.

Fatovich DM, Prentice DA, Dobb GJ. Magnesium in cardiac arrest (The MAGIC Trial). *Resuscitation* 1997 Nov;**35**(3):237–41.

Table 2

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Miller <i>et al</i> 1995 USA	In-hospital cardiac arrest, patients in arrest after initial ACLS steps, patients with poisoning, minors, pregnancy excluded, 62 patients included; Pilot study of 5 g MgSO ₄ administration and ACLS (n=29) versus standard ACLS (n=33)	Pilot study	Survival to discharge between two groups Resuscitation or return of spontaneous circulation	1 patient in each group survived 34% (3/33) in patients with ACLS and Magnesium versus 21% (6/29) only ACLS; p=0.17	Not a randomised controlled, blinded study, pilot study In-hospital witnessed arrests, all rhythms included Small sample size
Fatovich <i>et al</i> 1997 Australia	All victims of out-of-hospital cardiac arrest eligible for inclusion, excluded if dead, not receiving CPR, resuscitated, arrest due to non-cardiac etiology; Prospective randomised double blind placebo controlled trial using high dose 5 g of MgSO ₄ (31 patients) and placebo (936 patients)	Prospective randomised double blind placebo controlled trial	ROSC Survival to leave ED Survival to leave hospital	23%(Mg) and 22%(no Mg) 13% (Mg) vs 11%(no Mg) 1 patient (Mg)	Out-of-hospital arrests, magnesium administered only when in hospital, different rhythms included Low powered study, no mention of randomisation method
Thel <i>et al</i> 1997 USA	All patients greater than 18 yrs, in-patient in the hospital treated for cardiac arrest; Randomised double-blind study of 2 g magnesium sulphate bolus followed by infusion of 2 g/24 hours (n=76) versus placebo (n=80) in hospital in-patients, excluded emergency, prehospital patients with cardiac arrest, different rhythms included, end points of ROSC, for at least 1 hour.	Randomised controlled double-blind study	Difference in ROSC 24 hr survival survival to discharge Karnofsky performance index	54% in those who had Magnesium, 60% no Magnesium, p=0.44 43(Mg) vs 50%(no Mg) p=0.41 21 vs 21% p=0.98 Higher in Mg group	Hospital in-patients and witnessed cardiac arrests, emergency and prehospital excluded, all rhythms included Low powered study, no allocation concealment explained, at the time of arrest most patients were very ill, in ICU and with malignant diseases, time of administration not measured, low dose of magnesium given.
Allegra 2001 USA	All patients with non-traumatic cardiac arrest greater than 18 and had VF refractory to 3 electroshocks in prehospital set-up. Total of 116 patients, 58 Mg/58 placebo, enrolled between 1992 and 1996. 109 available for analysis.	Prospective double blind, placebo controlled multi-center prehospital clinical trial; 58 received magnesium and 58 placebo	time to study drug administration ROSC Admission discharge	25.5 min for magnesium group, 30.4 for placebo group placebo 18.5 vs Mg 25.5%, P=0.38 16.7 (placebo) vs 16.4%(Mg) P=1.0 placebo 3.7% vs Mg 3.6%, P=1.0	Time of administration of study drug greater than 25 mins, low dose of magnesium administered, low powered study. Study closed prematurely as it became difficult to enroll patients when Magnesium became class IIB agent in AHA guidelines for VF treatment
T B Hassan, C Jagger, D B Barnett 2002 UK	Patients in Cardiac Arrest with refractory or recurrent VF treated in the prehospital phase by the county emergency medical services and/or in the A&E department. 52 given Mg, 53 given placebo.	A randomised, double blind, placebo controlled trial	ROSC Patients alive to discharge Odds Ratio for ROSC in patients treated with Mg versus placebo	17%(Mg) and 13% (placebo) (CI -10% to +18%) 4%(Mg) and 2% (placebo) (CI -7% to +11%) 1.69 (0.54 to 5.30)	Possible that a type II error occurred, dose of magnesium given during CA may have been inadequate. Individual factors such as the incidence of bystander CPR, the response time to the first defibrillatory shock, protocol violations and even the aggressiveness of care provided in hospital both within the A&E department and particularly on the ICU can have major influences. Study population is small, response time could have been a significant factor in magnesium's seeming lack of efficacy in treating refractory VF in this study population

Thel MC, Armstrong AL, McNulty SE, *et al*. Randomized trial of magnesium in in-hospital cardiac arrest. *Lancet* 1997 Nov 1;**350**(9087):1272-6.

Allegra J, Lavery R, Cody R, *et al*. Magnesium sulfate in the treatment of refractory ventricular fibrillation in the prehospital setting. *Resuscitation* 2001 Jun;**49**(3):245-9.

Hassan TB, Jagger C, Barnett DB. A randomised trial to investigate the efficacy of magnesium sulphate for refractory ventricular fibrillation. *Emergency Medicine Journal* 2002 Jan;**19**(1):57-62.

Intranasal naloxone in suspected opioid overdose

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Abstract

A short cut review was carried out to establish whether intranasal naloxone is effective in suspected opiate overdose.

596 papers were screened, of which eight 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. The clinical bottom line is that it is likely that intranasal Naloxone is a safe and effective first line prehospital intervention in reversing the effects of an Opioid overdose and helping to reduce the risk of needle stick injury. A large, well conducted trial into its usage is however required to confirm this.

Three part question

In a [patient with a suspected opioid overdose] is the [intranasal administration of Naloxone] a safe and effective method of [reversing the effects of the overdose]

Clinical scenario

A 25 year old male is brought into the emergency department by ambulance with a history of respiratory arrest following a suspected Opioid overdose. One of the paramedics describes struggling and failing to achieve peripheral venous access,