Table 5

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Bernard SA *et al*, 1997, Australia	22 adults who remained unconscious after return of spontaneous circulation after out of hospital cardiac arrest Hypothermia group cooled to 33˚C for 12 h and rewarmed over 6 h to 36˚C	Prospective study with historical control group.	Good neurological recovery (Glasgow outcome scale 1 or 2) Survival	Hypothermia gp 11/22 versus Normothermia gp 3/22, p<0.05 Hypothermia gp 12/22 versus Normothermia gp 5/22, p<0.05	Prospective study with 22 historical controls rather than a randomised control trial
Yanagawa Y *et al*, 1998, Japan	13 adults with out of hospital cardiac arrest and return of spontaneous circulation Core temperature 33–34˚C for 48 h. Rewarmed to 37˚C at 1 ˚C/day. Control group 15 patients treated before the hypothermia protocol was started	Prospective study	Good neurological recovery (GOS 1) Survival	Hypothermia gp 3/13 versus Normothermia gp 1/15 Hypothermia gp 7/13 versus Normothermia gp 5/15, p=0.27	Historical controls rather than randomised study
Bernard SA *et al*, 2002, Australia	77 adults who remained unconscious after resuscitation from out of hospital cardiac arrest hypothermia to 33˚C for 12 h versus normothermia	Randomised control trial	Good neurological recovery (GOS 1–2) Survival	Hypothermia gp 21/43 versus normothermia gp 9/34, p=0.046 Hypothermia gp 21/43 versus normothermia 11/34, p=0.145	Odd and even day prehospital randomisation
The Hypothermia after Cardiac Arrest Study Group, 2002, Europe	275 adults with out of hospital cardiac arrest and return of spontaneous circulation Hypothermia to 32–34˚C for 24 h then passive rewarming over 8 h versus normothermia	Randomised controlled trial with blinded assessment of outcome.	Good neurological outcome at 6 months (GOS 1 or 2) Survival at 6 months	Hypothermia gp 75/136 versus normothermia gp 54/137, p =0.009 80/136 versus normothermia gp 61/137, p=0.02	Enrolment rate slower than expected. Study ended when funds ran out

endorsed by the International Liaison Committee on Resuscitation.

Bernard SA, Jones BM, Horne MK. Clinical trial of induced hypothermia in comatose survivors of out-of-hospital cardiac arrest. *Ann Emerg Med* 1997;**30**:146–53.
Yanagawa Y, Ishihara S, Norio H, *et al*. Preliminary clinical outcome study of mild resuscitative hypothermia after out-of-hospital cardiopulmonary arrest. *Resuscitation* 1998;**39**:61–6.
Bernard SA, Gray TW, Buist MD, *et al*. Treatment of comatose survivors of out-of-hospital cardiac arrest with induced hypothermia. *N Engl J Med* 2002;**346**:557–63.
The Hypothermia after Cardiac Arrest Study Group. Mild therapeutic hypothermia to improve the neurologic outcome after cardiac arrest. *N Engl J Med* 2002;**346**:549–56.
Nolan JP, Morley PT, Vanden Hoek TL, *et al*. Therapeutic hypothermia after cardiac arrest. An advisory statement by the Advanced Life Support Task Force of the International Liaison Committee on Resuscitation. *Resuscitation* 2003;**57**:231–5.
Nolan JP, Morley PT, Vanden Hoek TL, *et al*. Therapeutic hypothermia after cardiac arrest. An advisory statement by the Advanced Life Support Task Force of the International Liaison Committee on Resuscitation. *Circulation* 2003;**108**:118–21.

Gastric lavage in aspirin and non-steroidal anti-inflammatory drug overdose

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Abstract

A short cut review was carried out to establish whether gastric lavage was better than activated charcoal alone at reducing toxicity after aspirin or other non-steroidal anti-inflammatory drug (NSAID) overdose. Altogether 72 papers were found using the reported search, of which one presented the best evidence to answer the clinical question. A further relevant paper was found on scanning the references of papers identified. The author, date and country of publication, patient group studied, study type, relevant outcomes, results and study weaknesses of these best papers are tabulated. A clinical bottom line is stated.

Clinical scenario

A 53 year old widow attends the emergency department having taken 20 aspirin and 20 ibuprofen 1.5 hours previously. You remember that NSAIDs slow gastric emptying and wonder whether gastric lavage would be of use in toxicity reduction..

Three part question

[In overdose with aspirin or other non-steroidal anti-inflammotory drugs] is [gastric lavage better than activated charcoal] at [reducing toxicity]?

Search strategy

Medline 1966-05/04 using the Ovid interface. [{exp gastric lavage OR gastirc lavage.mp OR exp gastric emptying OR gastric emptying.mp OR exp irrigation OR lavage.mp OR empt$.mp OR irrigat$.af OR washout.af OR wash-out.af} AND {exp poisoning OR exp overdose OR exp suicide OR exp Self-Injurious Behavior/ OR poiso$.af OR overdos$.af OR suicid$.af OR (deliberate adj5 self adj5 harm).af OR dsh.af} AND {exp aspirin OR exp anti-inflammatory agents, non-steroidal OR salic$.af OR nsaid.mp OR ketoprofen.af OR diclofenac.af OR aceclofenac.af OR acemetacin.af OR

Table 6

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Danel V *et al*, 1988, UK	12 healthy volunteers given 1.5 g aspirin acting as own controls treated with nothing, charcoal and lavage	Prospective controlled study	Salicylate recovered in urine over 24 h	Control 13.3% lavage 8.8% charcoal 7.0%	Statistical significance not assessed Dose fairly small Number of patients small
Lapatto-Reiniluoto O *et al*, 1999, Finland	Nine healthy volunteers as own controls given 400 mg ibuprofen. Treated with water (control), charcoal or charcoal followed by lavage	Prospective controlled trial	AUC plasma ibuprofen as % of control	Control 100% charcoal alone 70% ($p<0.05$) charcoal + lavage 51% ($p<0.05$). No statistical significance between control groups	Small numbers Therapeutic ibuprofen dose

azapropazone.af OR celecoxib.af OR dexketoprofen.af OR diflunisal.af OR etodolac.af OR fenbrufen.af OR fenoprofen.af OR flurbiprofen.af OR indometacin.af OR indomethacin.af OR ketoprofen.af OR mefenamic acid.af OR meloxicam.af OR nabumetone.af OR naproxen.af OR phenylbutazone.af OR piroxicam.mp OR exp piroxicam OR rofecoxib.af OR sulindac.af OR tenoxicam.af OR tiaprofenic acid.af}] LIMIT to human AND English language.

Search outcome

Altogether 72 papers were found 71 of which failed to answer the three part question. A further reference was found after scanning of paper references. The two papers are shown in the table 6.

Comment(s)

There are no large scale trials performed in this area, however those that exist show that at best lavage is no better if not slightly worse than charcoal at reducing salicylate toxicity. Lavage although better than nothing has an element of risk involved in its practice and charcoal must therefore be treatment of choice.

► CLINICAL BOTTOM LINE

Gastic lavage is no better than charcoal alone at reducing toxicity after aspirin or NSAID overdose.

Danel V, Henry JA, Gluckman E. Activated charcoal,emesis and gastric lavage in aspirin overdose. *BMJ Clin Res Ed* 1988;**296**:1507.
Lapatto-Reiniluoto O, Kivisto KT, Neuvonen PJ. Effect of activated charcoal alone or given after gastric lavage in reducing the absorption of diazepam, ibuprofen and citalopram. *Br J Clin Pharmacol* 1999;**48**:148–53.