BEST EVIDENCE TOPIC REPORTS

Towards evidence based emergency medicine: best BETs from the Manchester Royal Infirmary

Edited by S D Carley

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Best evidence topic reports (BETs) summarise the evidence pertaining to particular clinical questions. They are not systematic reviews, but rather contain the best (highest level) evidence that can be practically obtained by busy practising clinicians. The search strategies used to find the best evidence are reported in detail in order to allow clinicians to update searches whenever necessary. Each BET is based on a clinical scenario and ends with a clinical bottom line that indicates, in the light of the evidence found, what the reporting clinician would do if faced with the same scenario again. The BETs published below were first reported at the Critical Appraisal Journal Club at the Manchester Royal Infirmary¹ or placed on the BestBETs web site. Each BET has been constructed in the four stages that have been described elsewhere.² The BETs shown here together with those published previously and those currently under construction can be seen at <http://www.bestbets.org>.³ Four BETs are included in this issue of the journal.

- ▶ Endotracheal intubation in γ -hydroxybutyric acid intoxication and overdose.
- ▶ No clinical evidence for gastric lavage in lithium overdose
- ▶ Paddle position in emergency cardioversion of atrial fibrillation
- ▶ Reinsertion of the stylet prior to needle removal in diagnostic lumbar puncture

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- 1 Carley SD, Mackway-Jones K, Jones A, et al. Moving towards evidence based emergency medicine: use of a structured critical appraisal journal club. *J Accid Emerg Med* 1998;15:220–2.
- 2 Mackway-Jones K, Carley SD, Morton RJ, et al. The best evidence topic report: a modified CAT for summarising the available evidence in emergency medicine. *J Accid Emerg Med* 1998;15:222–6.
- 3 Mackway-Jones K, Carley SD. [bestbets.org](http://www.bestbets.org): Odds on favourite for evidence in emergency medicine reaches the worldwide web. *J Accid Emerg Med* 2000;17:235–6.

Endotracheal intubation in γ -hydroxybutyric acid intoxication and overdose

Report by Helen Michael, *Medical Student*
Checked by Magnus Harrison, *Clinical Research Fellow*

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Abstract

A short cut review was carried out to establish whether intubation is always required in patients presenting with a decreased conscious level after γ -hydroxybutyrate ingestion. Altogether 95 papers were found using the reported search, of which two 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. A clinical bottom line is stated.

Clinical scenario

A comatose 20 year old man is brought to the emergency department with a GCS of 3/15 and in respiratory arrest. Acute overdose with γ -hydroxybutyric acid is suspected. Ventilation is initially assisted with a bag and mask. Your anaesthetic colleagues are very reluctant to intubate the patient as they state that the patient will wake up soon and there are no beds in the intensive care unit.

Three part question

In [patients with presumed GHB intoxication and respiratory depression] is [endotracheal intubation more effective than non-invasive airway management] at [reducing the complications of an unprotected airway]?

Search strategy

Medline 1966–09/04 using the OVID interface. [exp Hydroxybutyrates OR gamma hydroxybutyric acid.mp. OR GHB.mp] AND [exp Poisoning OR intoxication.mp OR exp Overdose OR overdose.mp] LIMIT to English language.

Search outcome

Altogether 95 papers were found. Two papers were relevant to the three part question (see table 1).

Comment(s)

The evidence for and against endotracheal intubation is scanty. These reports show no evidence for aspiration but the numbers involved (of non-intubated patients) are small. There is insufficient evidence here to change the standard approach to airway management in the unconscious patient. The reduced GCS is an indication for airway protection that would normally be achieved using a rapid sequence induction of anaesthesia.

▶ CLINICAL BOTTOM LINE

In patients with suspected GHB toxicity, reduced GCS and a threatened airway, rapid sequence induction and intubation should be performed.

Li J, Stokes SA, Woekener A. A tale of novel intoxication: seven cases of gamma-hydroxybutyric acid overdose. *Ann Emerg Med* 1998;31:723–8.
Chin RL, Sporer KA, Cullison B, et al. Clinical course of gamma-hydroxybutyrate overdose. *Ann Emerg Med* 1998;31:716–22.

No clinical evidence for gastric lavage in lithium overdose

Report by Stewart Teece, *Clinical Research Fellow*
Checked by Ian Crawford, *Clinical Research Fellow*

doi: 10.1136/emj.2004.021162

Table 1

Author, date and country	Study type (level of evidence)	Patient group	Outcomes	Key results	Study weaknesses
Li J <i>et al</i> , 1998, USA	7 patients with GHB ingestion, identified by urine spectrometry	Case report	Prehospital GCS	6 had GCS <9, 1 had GCS >9	Case report
			Intubation	4 intubated	Small number of patients
			Time to extubation	Time to extubation 6, 4, 2, and 2 hours. 1 patient required sedation	No record of any adverse events
			Attempted intubation	2 failed intubations, patients observed thereafter	
Chin RL <i>et al</i> , 1998, USA	88 patients with GHB ingestion. 1993–1996. Single ED in San Francisco. 11 of 88 patients were intubated.	Retrospective note review over a three year period	No intubation	1 patient not intubated	
			Aspiration	No record of aspiration	
			Aspiration	No record of aspiration in any patient	Retrospective analysis. GHB ingestion confirmed from case notes, not toxicological testing.
			Time to regaining consciousness	Intubation related to recovery time: mean time to recovery among non-intubated = 146 mins (16–389). Mean time to recovery among intubated = 274 mins (161–439)	Clinical picture of GHB intoxication often complicated by other substances.
			GCS	28% (25) GCS = 3, 32% (28) GCS = 4–8, 40% (35) GCS = 9–15	Differences in recovery time may reflect use of sedative agents during intubation, or the initial severity of presentation among intubated group.
			Co-ingestion of other drugs	Co-ingestion: 39% (34) alcohol, 28% (25) other drugs	
			Intubation	13% (11) intubated. 73% (8) of those intubated had GCS 3, 27% (3) had GCS 4–7. 73% also had bradycardia. Mean duration of intubation = 179 min. 9 of these were admitted for 24 hours. 2 were discharged directly.	

Abstract

A short cut review was carried out to establish the published evidence for gastric lavage in lithium overdose. Altogether 20 papers were found using the reported search, of which none presented the best evidence to answer the clinical question. A clinical bottom line is stated.

Three part question

In [overdose of lithium salts] is [gastric lavage better than charcoal or nothing] at [reducing toxicity]?

Clinical scenario

A 25 year old television producer with bipolar disorder attends the emergency department after taking his months supply of lithium carbonate over the past two hours. They are not sustained release tablets. You wonder whether gastric lavage would be of benefit.

Search strategy

Medline 1966–09/04 using the OVID interface. [(exp gastric lavage OR exp gastric emptying OR exp irrigation OR lavage.af OR empt\$.af OR irrigat\$.af OR washout.af OR wash-out.af) AND (exp poisoning OR exp overdose OR exp suicide OR exp poisoning 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 lithium OR exp lithium compounds OR exp lithium carbonate OR exp lithium chloride OR lithium.af OR Li+.af OR camcolit.af OR priadel.af OR liskonum.af OR li-liquid.af)] LIMIT to English language.

Search outcome

Altogether 20 papers were found all of which failed to answer the three part question.

Comment(s)

There is no currently available clinical evidence to support the use of gastric lavage in lithium overdose. UK Poisons Centre advice (<http://www.spib.axl.co.uk/>) suggests that gastric lavage should be considered for non-sustained release preparations if more than 4 g has been ingested by an adult within one hour, or definite ingestion of a significant amount by a child. Lavage is thought to be of limited use in sustained release preparations as they do not disintegrate in the stomach and therefore are unlikely to be retrieved.

► CLINICAL BOTTOM LINE

As there is no evidence from clinical trials national guidelines should be followed (<http://www.spib.axl.co.uk/>).

Paddle position in emergency cardioversion of atrial fibrillation

Report by Katherine Potier de la Morandiere,
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Checked by Henry Morriss, Specialist Registrar

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Abstract

A short cut review was carried out to establish whether the antero-lateral or antero-posterior paddle position is best at reverting acute atrial fibrillation to sinus rhythm. Altogether 954 papers were found using the reported search, 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. A clinical bottom line is stated.

Clinical scenario

A 60 year old man presents to the emergency department with a history of sudden onset palpitations. This is associated with some mild chest discomfort and breathlessness. On examination he is in atrial fibrillation at a rate of 180, and has a blood pressure of 95/60. He looks pale and sweaty. You feel he needs urgent electrical cardioversion and wonder whether the paddle position used will affect your success rate.

Three part question

In [a patient with new onset AF who needs urgent electrical cardioversion] is [antero-posterior better than antero-lateral paddle position] at [reverting the patient to sinus rhythm]?

Search strategy

Medline 1966–09/04 using the OVID interface and Cochrane database 2004 Issue 3, using NeLH link. Medline: ([exp atrial fibrillation OR AF.mp] AND [exp electric countershock OR electrode position.mp OR electrical cardioversion.mp OR DC cardioversion.mp]) LIMIT to human, English language AND adults. Cochrane: [Paddle] next [Position].

Search outcome

Altogether 954 papers were found in Medline of which five were relevant to the question (see table 2). No additional papers were found in the Cochrane library.

Comment(s)

AF is a common problem encountered in the emergency department. These papers shows that some good quality

Table 2

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Mathew TP <i>et al</i> , 1999, UK	90 patients Elective Antero-lateral (AL) v Antero-posterior (AP) 100J then 200J, 300J, 360J	Prospective, randomised	Cardioversion success rate Mean (SD) energy used Mean (SD) thoracic impedance on first shock	38/45 success for AL v 33/45 for AP p=0.42. 223 (96.1) J for AL v 232 (110) J for AP 77.5 (18.4) Ohms AL v 73.7 (18.7) Ohms AP p=0.34	No power Randomisation method not explicit Elective patients
Botto GL <i>et al</i> , 1999, Italy	301 patients with stable AF AL v AP 3J/kg then 4J/kg then 4J/kg in alternative position	Prospective randomised controlled trial	Success rate at initial 3J/kg shock Cumulative success rate after first 4J/kg shock Cumulative success after second 4J/kg shock	87/151 success for AL v 100/150 for AP. 114/151 for AL v 131/150 for AP (p=0.013) 140/150 for AL v 140/150 for AP p=NS	No power calculation Randomisation method not explicit All elective with chronic AF
Alp NJ <i>et al</i> , 2000, UK	59 patients with persistent AF AP v AL (360 J)	RCT cross-over	Cardioversion success rate on first 360J DC shock. Cardioversion second 360J shock	With first 360J AL more successful 18/30 v 10/29 for AP (p=0.048). 4/19 for AL v 5/12 for AP p=0.22	Small numbers Elective Patients with persistent AF
Kirchhof P <i>et al</i> , 2002, Germany	108 patients with persistent AF Elective cardioversion (50–360J) AP v AL	RCT cross-over (if no response in initial paddle position at 360J)	Cardioversion success rate in initial paddle positions Cardioversion if initial position failed	50/52 for AP v 44/56 for AL p=0.009. 8/12 cardioverted when crossed from AL to AP. No success in those AP to AL (2 patients)	Elective patients with persistent AF
Chen CJ and Guo GB, 2003, Japan	70 patients with persistent AF (>1 month). AL (31 patients) v AP (39 patients) Step up protocol 100, 150, 200, 300, 360 joules	Randomised controlled trial	Cardioversion success at 100J Cumulative cardioversion success at 150J Cumulative cardioversion success at 200J Cumulative cardioversion success at 300J Cumulative cardioversion success at 360J	AP v AL 23% v 19.4% p=NS AP v AL 41% v 45.2% p=NS AP v AL 66.7% v 74.2% p=NS AP v AL 79.5% v 77.4% p=NS AP v AL 84.6% v 83.9% p=NS	Small, low powered study Only looks at those with persistent AF in an elective setting (excluded those with new onset AF, one month) No randomisation details

Table 3

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Strupp M <i>et al</i> , 1998, Germany	600 neurology patients undergoing diagnostic LP randomly assigned (patient blinded) 300 to stylet replacement before needle removal, other 300 not reinserted. Similar sex and age. Used 21 gauge atraumatic needle	Prospective randomised controlled trial	Post-lumbar puncture syndrome (headache, tinnitus, dizziness) reproducible by position and improved laying down, over seven days	Not reinserted 49/300 (16%) post-lumbar puncture syndrome v 15/300 (5%) when stylet reinserted. Post-lumbar puncture syndrome was also less severe (2.8 v 4.5 scale of 10) if stylet reinserted	Excluded patients with headache before LP Post-lumbar puncture syndrome intensity scale not clearly defined Follow up not clearly described

research has been done on cardioversion but not in the emergency setting. The five best papers show conflicting results regarding the positioning of paddles in elective cardioversion, the most recent showing no difference between the two positions. In our clinical scenario the AP position may be difficult to achieve in such an unwell, shocked patient.

► CLINICAL BOTTOM LINE

There is little evidence to suggest that paddle position significantly influences the success of cardioversion emergency department patients with AF.

Mathew TP, Moore A, McIntyre M, *et al*. Randomised comparison of electrode positions for cardioversion of atrial fibrillation. *Heart* 1999;**81**:576–9.

Botto GL, Politi A, Bonini W, *et al*. External cardioversion of atrial fibrillation: role of paddle position on technical efficacy and energy requirements. *Heart* 1999;**82**:726–30.

Alp NJ, Rahman S, Bell JA, *et al*. Randomised comparison of antero-lateral versus antero-posterior paddle positions for DC cardioversion of persistent atrial fibrillation. *Int J Cardiol* 2000;**75**:211–16.

Kirchhof P, Eckardt L, Loh P, *et al*. Anterior-posterior versus anterior-lateral electrode positions for external cardioversion of atrial fibrillation: a randomised trial. *Lancet* 2002;**360**:1275–9.

Chen CJ, Guo GB. External cardioversion in patients with persistent atrial fibrillation: a reappraisal of the effects of electrode pad position and transthoracic impedance on cardioversion success. *Jpn Heart J* 2003;**44**:921–32.

Reinsertion of the stylet before needle removal in diagnostic lumbar puncture

Report by Matthew Deibel, Senior Resident
Checked by Jeffrey Jones, Michael Brown,
Research Director and Director of the Emergency
Medicine Residency programme respectively

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Abstract

A short cut review was carried out to establish whether reinsertion of the stylet before needle removal changed the incidence of post-lumbar puncture syndrome and headache. Altogether 235 papers were found using the reported search, of which two 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. A clinical bottom line is stated.

Clinical scenario

A 31 year old woman presents to the emergency department with a sudden onset severe headache. After a normal head computed tomogram, you prepare for lumbar puncture with a small gauge non-traumatic needle. You remember a colleague telling you it is also important to replace the stylet before

removing the needle to prevent a post-lumbar puncture headache. You wonder what is found in the literature.

Three part question

In [patients undergoing diagnostic lumbar puncture] does [reinsertion of the stylet prior to needle removal] reduce [the incidence of post-lumbar puncture headache]?

Search strategy

Medline 1966-09/04 using the OVID interface and Cochrane database 2004 Edition 3 via NeLH. Medline: [exp spinal puncture OR (spinal adj5 tap).af OR (spinal adj5 puncture).af OR (spinal adj5 injection).af OR (lumbar adj5 tap).af OR (lumbar adj5 puncture).af OR (lumbar adj5 injection).af OR (dural adj5 tap).af OR (dural adj5 puncture).af OR (dural adj5 injection).af] AND [exp headache OR exp headache disorders OR headache.af OR post-lumbar puncture syndrome.mp OR PDPH.mp OR PLPS.mp] AND [needle.mp OR exp needles OR stylet.mp] LIMIT to human AND English language. Cochrane: [lumbar] next [puncture].

Search outcome

Altogether 235 papers were found, two of which addressed the three part question (same article published as correspondence then full study) (table 3). No additional references were found in the Cochrane database.

Comment(s)

The theory is when CSF is removed, strands of arachnoid enter the needle. When the needle is removed, the strand may then be threaded back through the dural defect and produce prolonged CSF leakage resulting in the post-lumbar puncture syndrome. This was postulated on the finding that the post-lumbar puncture syndrome is much lower after spinal anaesthesia than after diagnostic lumbar puncture. Replacing the stylet would then push out or cut off any strand of arachnoid. The authors also rotated the needle 90 degrees before removal (see Evans). This is the only study performed looking at replacing the stylet. Some aspects of the study are not clearly described—randomisation, intensity scale, follow up. Nevertheless, there seems to be minimal risk and likely benefit in replacing the stylet prior to removing the needle.

► CLINICAL BOTTOM LINE

Replacing the stylet before removal of the spinal needle may help decrease the incidence of post-lumbar puncture headaches.

Strupp M, Brandt T. Should one reinsert the stylet during lumbar puncture? *N Engl J Med* 1997;**336**:1190.

Strupp M, Brandt T, Muller A. Incidence of post-lumbar puncture syndrome reduced by reinserting the stylet: a randomized prospective study of 600 patients. *J Neurol* 1998;**245**:528–9.

Evans RW. Complications of lumbar puncture. *Neurol Clin* 1998;**16**: 83–105.