BEST EVIDENCE TOPIC REPORTS

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

Edited by K Mackway-Jones, Professor

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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 practicing 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 which 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 website. 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 5 BETs are included in this issue of the journal, the last two of which are negative.

- ▶ Glucagon infusion in refractory anaphylactic shock in patients on beta-blockers
- ▶ Topical analgesia for pain reduction in arterial puncture
- ▶ Antifibrinolytics for the initial management of sub arachnoid haemorrhage
- ▶ Anticoagulation before cardioversion of acute atrial fibrillation in the emergency department
- ▶ Anticoagulation post-cardioversion of acute atrial fibrillation in the emergency department

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;15:220–222.

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;15:222–226.

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.

Glucagon infusion in refractory anaphylactic shock in patients on beta-blockers

Report by Martin Thomas, *Specialist Registrar*
Checked by Ian Crawford, *Senior Clinical Fellow*

doi: 10.1136/emj.2005.023507

Abstract

A short cut review was carried out to establish whether a glucagon infusion is of benefit in patients with refractory anaphylaxis. 62 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 53 year old man attends the emergency department with a severe allergic reaction, having been stung by a wasp. You note that he takes atenolol for angina. Despite adequate treatment with adrenaline and intravenous fluids, he remains hypotensive and subsequently dies. Afterwards, you hear that a glucagon infusion may have been of benefit and wonder if there is any evidence for this.

Three part question

In [anaphylactic shock for patients on regular beta-blockers] does [the use of a glucagon infusion] improve [outcome]?

Search strategy

Medline 1966-12/04 using the OVID interface. ([exp Glucagon OR glucagon.af] AND [exp Hypersensitivity OR anaphyla\$.af. OR allerg\$.af]) LIMIT to human AND English language.

Author, date, and country	Patient group	Study type (level of evidence)	Key results	Outcomes	Study weaknesses
Zaloga GP <i>et al</i> , 1986, USA	A 75 year old white male with refractory anaphylactic shock following injection of a radiocontrast dye. Daily medications included atenolol 50 mg daily.	Case report	Improvement in BP following administration of glucagon.	Resolution	Case report
Javeed N <i>et al</i> , 1996, USA	A 52 year old white male with refractory anaphylactic shock following injection of a radiocontrast dye. Daily medications included atenolol 50 mg daily.	Case report	Improvement in BP following administration of glucagon.	Resolution	Case report

Search outcome

Altogether 62 papers were found, of which two were directly relevant to the three part question.

Comment(s)

Although there is a pathophysiological rationale for the use of glucagon in anaphylactic patients on beta-blockers the clinical evidence is limited to case reports only. This is not surprising as the situation rarely arises and it is probably unlikely that large series will be published. Although the two reports indicate success, such reports are subject to publication bias and as such should be interpreted with caution.

► CLINICAL BOTTOM LINE

Although the evidence is of limited quality, a glucagon infusion may be of benefit in anaphylactic shock for patients on regular beta-blockers when all other, more well-recognised, treatments have failed.

Zaloga GP, Delacey W, Holmboe E, *et al.* Glucagon reversal of hypotension in a case of anaphylactoid shock. *Ann Intern Med* 1986;**105**(1):65–6.

Javeed N, Javeed H, Javeed S, *et al.* Refractory anaphylactoid shock potentiated by beta-blockers. *Cathet Cardiovasc Diagn* 1996;**39**(4):383–4.

Topical analgesia for pain reduction in arterial puncture

Report by Debbie Dawson, *Clinical Research Nurse*
Checked by Kerstin Hogg, *Clinical Research Fellow*

doi: 10.1136/emj.2005.023515

Abstract

A short cut review was carried out to establish whether topical local anaesthetic reduces the pain of arterial puncture. 431 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 56 year old man presents to the emergency department with a 2 day history of pleuritic chest pain and shortness of breath. Pulse oximetry reveals oxygen saturations of 92%, although he does not appear to be acutely short of breath. The patient has had routine blood samples sent to the laboratory but is hesitant to agree to any other blood tests. You wonder therefore, if prior to taking an arterial blood gas sample, application of a topical local anesthetic, would reduce pain and discomfort.

Three part question

In [patients who require non-urgent arterial blood gas analysis] does [topical anesthetic] reduce [pain and discomfort]?

Search strategy

Medline 1966-12/04 using the OVID interface. [(exp lidocaine OR lidocaine.mp OR exp topical, administration OR exp anesthetics, local OR exp anesthesia, local OR emla.mp OR ametop.mp OR tetracaine OR lignocaine.mp OR prilocaine OR amethocaine.mp) AND (exp arterial puncture.mp OR exp

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Tran NQ <i>et al</i> , 2002, Australia	Topical use of 4% amethocaine gel applied for 30 mins prior to arterial puncture for blood gas analysis	RCT	Primary outcome was pain experienced (measured on a visual analogue scale, 0–100)	Amethocaine group-mean score 16.0 (SD 23.3). Placebo group-mean score 20.7 (SD 18.5)	Amethocaine can cause blanching to the skin, which may affect blinding by introducing bias, though this was not commented on in the paper as one of the reported side effects. Women of "child bearing potential" were excluded from the study. Does this mean that all pre-menopausal women were not included, and if so why?
			Number of passes through the skin	These differences were not statistically significant	
			Heart rate before, during and after arterial puncture	These differences were not statistically significant	
Aaron AD, <i>et al</i> , 2003, Canada	81 adult patients. 42 received amethocaine gel and 39 received a placebo gel	RCT	Side effects of the gel	Small number of minor irritations reported in both groups	
			Patient's perception of pain (visual analogue scale, 0–100)	Tetracaine group-mean score 26.2+/-32.6 The placebo group-mean score 23.8+/-27.4 (p=0.78)	
			Mean time from skin puncture to procurement of 1 ml of arterial blood	Tetracaine group-mean time 70+/-103 seconds. Placebo group-mean time 49+/-48 seconds. (p=0.40)	
			Difficulty performing the test (graded scale)	Identical for both groups (p=0.86)	

blood gas analysis OR exp blood specimen collection OR arterial blood.mp) NOT (BestBETs paediatric filter)] LIMIT to English language AND human.

Search outcome

Altogether 431 papers were identified, of which 429 were found not to answer the question directly, the remaining two papers were found to be relevant.

Comment(s)

Previous studies looking at the use of EMLA in pain reduction with venepuncture have highlighted that an application time of 60–90 minutes is necessary for adequate anaesthesia; the manufacturers of tetracaine recommend 45 mins application prior to venepuncture. It may be necessary that longer application times are needed for deeper structures.

► CLINICAL BOTTOM LINE

The papers found in this search provide little evidence for the effectiveness of topical analgesia in reducing the pain and discomfort of arterial puncture. Further studies with longer application times would be useful.

Tran NQ, Pretto JJ, Worsnop CJ. A randomized trial of the effectiveness of topical amethocaine in reducing pain during arterial puncture. *Chest* 2002;**122**(4):1357–60.

Aaron AD, Vandemheen KL, Sheila NA, *et al*. Topical tetracaine prior to arterial puncture: a randomized, placebo-controlled trial. *Respiratory Medicine* 2003;**97**:1195–1199.

Antifibrinolytics for the initial management of sub arachnoid haemorrhage

Report by Simon Carley, *Locum Consultant in Emergency Medicine*

Checked by Ayan Sen, *Clinical Fellow*

doi: 10.1136/emj.2005.023523

Abstract

A short cut review was carried out to gather the evidence for and against the use of tranexamic acid to patients who have suffered subarachnoid bleeding. 267 papers were found using the reported search, of which one 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 this best paper are tabulated. A clinical bottom line is stated.

Clinical scenario

A 24 year old man presents to the emergency department following a sudden headache and collapse. He is GCS 14 on arrival with no localising signs. CT scan demonstrates a sub arachnoid haemorrhage. In a previous hospital you were advised to give tranexamic acid to prevent rebleeding. You suggest this to the neurosurgical SpR on call who thinks you are talking rubbish and strongly advises against it.

You wonder if he is an evidence based neurosurgeon ... or whether he is behind the times?

Three part question

[In patients with confirmed SAH] are [antifibrinolytics better than placebo] at [reducing rebleeding, improving survival, or improving morbidity]

Search strategy

Medline 1966-12/04 using the Ovid interface. The Cochrane Library Issue 4, 2004.

Medline: [exp Subarachnoid Hemorrhage/OR subarachnoid haemorrhage.mp OR exp Aneurysm, Ruptured/OR SAH.mp] AND [exp Antifibrinolytic Agents/OR antifibrinolytics.mp OR exp Tranexamic Acid/OR tranexamic acid.mp OR exp Aminocaproic Acids/OR aminocaproic acid.mp OR exp 6-Aminocaproic Acid/OR epsilon aminocaproic acid.mp OR epsilon amino-caproic acid.mp OR antifibrinolytic\$.mp]

Cochrane: subarachnoid hemorrhage OR subarachnoid haemorrhage.

Search outcome

Altogether 267 references found including one recent Cochrane review. No papers after the publication of the Cochrane review were found. The summary of the Cochrane review is presented here.

Comment(s)

A well constructed review article answers the question. Although there appears to be a reduction in the rate of rebleeding this is not matched by an improvement in patient outcome. The authors of this review postulate that the increase in cerebral ischaemia seen in most of the trials may account for this.

From a clinical perspective there appears to be little to be gained from the administration of antithrombotics in confirmed SAH.

Patient group	Author, date, and country	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Roos YBWEM <i>et al</i> , 2003, Netherlands	9 trials involving 1399 patients included. Papers sourced through electronic and hand searching methods. RCTs of IV or oral agents included. Only confirmed SAH patients.	Systematic review and Meta analysis	Poor outcome (defined as death, vegetative state or severe disability)	Non significant. OR of 1.12 (CI 0.88–1.43) for poor outcome with treatment	This is a well researched review. The studies match the clinical problem well. Of 21 trials found only 9 satisfied the quality filter of the authors which suggests some rigour in the approach used). One of the review authors' own study was included in the review.
			Rebleeding at end of follow up	Less with treatment OR=0.55 (CI 0.42–0.71)	
			Risk of cerebral ischaemia	Worse with treatment OR=1.39 (CI 1.07–1.82)	
			Risk of death	Non significant. OR=0.99 (CI 0.79–1.24)	
			Rate of hydrocephalus	Non significant. OR=1.14 (CI 0.86–1.51)	

► CLINICAL BOTTOM LINE

Antithrombotics are not indicated in the emergency management of sub-arachnoid haemorrhage.

Roos YBWEM, Rinkel GJE, Vermeulen M, *et al.* Antifibrinolytic therapy for aneurysmal subarachnoid haemorrhage (Cochrane Review). In: *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons, Ltd.

Anticoagulation before cardioversion of acute atrial fibrillation in the emergency department

Report by Katherine Potier, *Specialist Registrar in Emergency Medicine*

Checked by Richard Parris, *Locum Consultant*

doi: 10.1136/emj.2005.023531

Abstract

A short cut review was carried out to establish whether anticoagulation is indicated prior to emergency department cardioversion of a patient with acute onset atrial fibrillation. 54 papers were found using the reported search, of which none presented any evidence to answer the clinical question. It is concluded that there is no evidence available to answer this question. Further research is needed.

Clinical scenario

A 58 year old man presents to the emergency department with a 24 hour history of new onset AF. You decide to cardiovert him in the department (chemically or electrically) and wonder whether he needs to be anticoagulated prior to this to reduce any thromboembolic risks.

Three part question

In a patient with [acute atrial fibrillation undergoing cardioversion in the emergency department] does [anticoagulation immediately before cardioversion] [reduce the incidence of thrombo-embolism]?

Search strategy

Medline 1966-12/04 using the OVID interface and The Cochrane Library, Issue 4, 2004.

Medline: [exp Atrial fibrillation OR AF.mp OR atrial fibrillation.mp] AND [exp electric countershock OR cardioversion.mp OR exp anti arrhythmia agents/OR chemical cardioversion.mp] AND [exp heparin OR heparin.mp OR exp heparin, low molecular weight OR low molecular weight heparin.mp OR fractionated heparin.mp OR bemiparin.mp OR certoparin.mp OR dalteparin.mp OR oxaparin.mp OR reviparin.mp OR tinzaparin.mp OR fragmin.mp OR clexane.mp] LIMIT to human AND English language.

Cochrane: (atrial fibrillation) AND (anticoagulation) AND (cardioversion)

Search outcome

Altogether 54 papers were found, of which none are relevant to the question.

Relevant paper(s)

No relevant papers given.

Comment(s)

Anticoagulation is recommended before cardioversion of AF lasting more than 2 days to avoid thromboembolic complications. However there is little evidence from the literature to support its use in AF of shorter duration.

► CLINICAL BOTTOM LINE

There is no evidence at present to support using anticoagulation prior to the (medical or electrical) cardioversion of new onset AF.

Anticoagulation post-cardioversion of acute atrial fibrillation in the emergency department

Report by Katherine Potier, *Specialist Registrar, Emergency Medicine*

Checked by Richard Parris, *Locum ED Consultant*

doi: 10.1136/emj.2005.023549

Abstract

A short cut review was carried out to establish whether anticoagulation is indicated after emergency department cardioversion of a patient with acute onset atrial fibrillation. 243 papers were found using the reported search, of which none presented any evidence to answer the clinical question. It is concluded that there is no evidence available to answer this question. Further research is needed.

Clinical scenario

A 45 year old man who presented to your emergency department with new onset AF has been successfully chemically cardioverted. You wonder whether he needs anti-coagulating on discharge to prevent any longer term thromboembolic complications.

Three part question

In a [patient with acute atrial fibrillation who has cardioverted to sinus rhythm] does [anticoagulation post-cardioversion] [reduce the incidence of thromboembolic complications]?

Search strategy

Medline 1966-12/04 using the OVID interface and The Cochrane Library, Issue 4, 2004. Medline: [exp Atrial fibrillation OR AF.mp OR atrial fibrillation.mp] AND [exp electric countershock OR cardioversion.mp OR exp anti arrhythmia agents OR chemical cardioversion.mp] AND [exp heparin OR heparin.mp OR exp heparin, low molecular weight OR low molecular weight heparin.mp OR fractionated heparin.mp OR bemiparin.mp OR certoparin.mp OR dalteparin.mp OR oxaparin.mp OR reviparin.mp OR tinzaparin.mp OR fragmin.mp OR clexane.mp OR exp warfarin or warfarin.mp OR exp coumarins OR coumarins.mp OR exp aspirin OR aspirin.mp] LIMIT to human AND English language.

Cochrane: (atrial fibrillation) AND (anticoagulation) AND (cardioversion)

Search outcome

A total of 243 papers were found, none of which answered the three part question.

Relevant paper(s)

No relevant papers given.

Comment(s)

It has been recommended that patients with AF lasting more than 2 days should be anticoagulated for at least 1 month post cardioversion. This is because of the formation of

intratrial thrombus and the potential for embolic events with atrial stunning. However, there is no evidence to support this approach in AF of shorter duration as the likelihood of cardioversion related thromboembolism is thought to be very low.

► CLINICAL BOTTOM LINE

There is no evidence to support the anticoagulation of patients with new onset AF on discharge, who have been successfully cardioverted in the emergency department (whether this be chemically, electrically, or spontaneously).

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- Working with *Clinical Evidence* editors to ensure that the final text meets epidemiological and style standards.
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