

BEST EVIDENCE TOPIC REPORTS

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

Edited by S D Carley

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 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 Four BETs are included in this issue of the journal.

- ▶ Buccal midazolam as an alternative to rectal diazepam for prolonged seizures in childhood and adolescence
- ▶ Aspirin in the treatment of acute pulmonary embolism
- ▶ Bone Injection Gun placement of intraosseous needles
- ▶ Nebulised levalbuterol or albuterol for lowering serum potassium

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.

Buccal midazolam as an alternative to rectal diazepam for prolonged seizures in childhood and adolescence

Report by Richard Body, *Senior House Officer*
Checked by Mawra Ijaz, *Staff Grade*

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Abstract

A short cut review was carried out to establish whether buccal midazolam is better than rectal diazepam for treating prolonged seizures in childhood and adolescence. Eight 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.

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Clinical scenario

An 11 year old girl, known to be epileptic, is brought to the Emergency Department with a prolonged seizure. You have no intravenous access at this point. A colleague recently mentioned that buccal midazolam is an available alternative to rectal diazepam. You are aware that this would be easier and more socially acceptable in the situation, but wonder if it would be as efficacious.

Three part question

In [children with prolonged seizures] does [buccal midazolam or rectal diazepam] lead to [quicker resolution of seizures]?

Search strategy

Medline 1966-01/2005 using the OVID interface and the *Cochrane Library*, Issue 4, 2004. Medline: [exp status epilepticus OR status epilepticus.mp OR exp seizures/ OR exp seizures, febrile/ or seizure.mp OR fit\$.mp] AND [exp midazolam/ OR midazolam.mp OR exp Benzodiazepines] AND [exp Mouth Mucosa/ OR buccal.mp OR exp administration, buccal/] AND [exp diazepam OR diazepam.mp] AND [rectal.mp OR exp Rectum/ OR per rectum.mp OR exp Administration, Rectal] LIMIT to human AND English language. Cochrane: status epilepticus OR buccal.

Search outcome

Medline: Eight papers were identified, two of which were relevant to the three part question (table 1). Cochrane: Nine hits, none of which was relevant.

Comment(s)

Buccal midazolam is gaining in popularity as a treatment for prolonged seizures in children. It overcomes many of the disadvantages associated with rectal diazepam, including difficulty of administration in wheelchair users and in tonic seizures, potentially unpredictable absorption with constipation and bowel movements and social unacceptability, particularly in older children. Nasal midazolam has also been used,³ although the greater surface area of the buccal mucosa could potentially confer advantages with regard to absorption.

One small trial suggests that buccal midazolam is at least as effective as rectal diazepam and one suboptimally designed telephone survey suggested a degree of parental satisfaction with the drug. However, the patient group in the randomised controlled trial is very different from that presenting to emergency departments. There remains a paucity of evidence regarding this topic.

▶ CLINICAL BOTTOM LINE

Buccal midazolam may be equal or superior to rectal diazepam for treatment of prolonged seizures in children but more evidence is needed for emergency patients.

Scott RC, Besag FMC, Neville BGR. Buccal midazolam and rectal diazepam for treatment of prolonged seizures in childhood and adolescence: a randomised trial. *Lancet* 1999;353:623–6.

Table 1

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Scott RC <i>et al</i> , 1999, UK	79 seizure episodes in 24 young people aged 5–22 years with severe epilepsy living at a residential centre	PRCT	Termination of seizure within 10 minutes of drug administration	Response to midazolam in 30 (75%) of 40 episodes; response to rectal diazepam in 23 (59%) of 39 episodes ($p=0.016$)	Small sample size (no power calculation)
	Randomised to receive either 2 ml (10 mg) buccal midazolam or 10 mg rectal diazepam upon having a seizure lasting longer than three minutes		Mean time to termination of seizure	Six minutes for midazolam and eight minutes for diazepam ($p=0.31$)	Nearly half the seizure episodes occurred in the same two patients
Wilson MT <i>et al</i> , 2004, UK	53 young people aged 3–21 years identified from hospital prescriptions for nasal/buccal midazolam over a 16 month period	Telephone survey	Parental preference	24 of 40 families had used both rectal diazepam and buccal/nasal midazolam: 20/24 (83%) preferred midazolam	Aims of the study were to evaluate effectiveness and convenience of nasal/buccal midazolam in terminating prolonged seizures in the community. The study was not appropriately designed to investigate either outcome.
			Termination of seizures	33/40 who used midazolam (83%)	Patient group selected having already had midazolam prescribed. This may be because they had already stated a preference for midazolam, introducing selection bias. Further, not all prescriptions may have been identified. No sample size calculation and no statistical analysis Not all results were reported (for example parents were asked to grade ease of use from 1 to 5, no results were given)

Wilson MT, Macleod T, O'Regan ME. Nasal/buccal midazolam use in the community. *Arch Dis Child* 2004;**89**:50–51.
<http://www.bestbets.org/cgi-bin/bets.pl?record=00161>

Aspirin in the treatment of acute pulmonary embolism

Report by Caroline Lee, *Senior Clinical Fellow*
Checked by Craig Ferguson, *Clinical Research Fellow*

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Abstract

A short cut review was carried out to establish whether aspirin is a useful adjunct in the treatment of acute pulmonary embolism. No papers were found using the reported search to answer the clinical question. A clinical bottom line is stated.

Clinical scenario

A 50 year old woman presents to the emergency department with shortness of breath and pleuritic chest pain, following a flight from Australia. Examination is unremarkable except for tachypnoea and mild hypoxia. Chest x ray is also normal, so you aim to treat for suspected pulmonary embolus (PE). You know that aspirin is used in the treatment of other acute thromboembolic conditions such as stroke or myocardial infarction, and in the prophylaxis of deep vein thrombosis/PE. You wonder if aspirin would also be beneficial in the treatment of acute PE?

Three part question

In [a patient with suspected acute pulmonary embolus] is [aspirin] effective in [reducing morbidity and mortality]?

Search strategy

Medline 1966-12/04 using the OVID interface and the *Cochrane Library*, Issue 3, 2004.

Medline: [exp ASPIRIN OR aspirin.mp OR exp Antifibrinolytic Agents OR Acetylsalicylic acid.mp] AND [exp Pulmonary Embolism OR pulmonary embol\$.mp OR PE.mp] LIMIT to human AND English language. Cochrane: Aspirin or Pulmonary Embolism.

Search outcome

Altogether 267 papers were found. The majority discussed the use of aspirin in prophylaxis. None of these papers addressed the question of use in acute PE.

Comment(s)

Poullis suggests in a letter that aspirin administration after diagnosis of PE in combination with heparin could have beneficial effects but needs further study. Although this question has been raised many times in our clinical practice there appears to be little discussion in the literature. One possibility may be, as some haematologists suggest, that aspirin is more likely to be useful when the final occluding event is a platelet clump. This is more common in the presence of arterial atheromatous plaques which rupture and attract platelets to the site. This occurs in coronary artery disease and in the carotid vessels where aspirin is advocated. In venous disease, where the vessel walls are relatively smooth and stasis is more important, clots are more likely to occur as a result of the activation of the clotting system. Another consideration is that patients with proved PE are generally anticoagulated initially with heparin, and then with warfarin. The additional benefit of aspirin is therefore likely to be small. Such a small benefit must be weighed against the additional bleeding complications from concomitant aspirin use.

► CLINICAL BOTTOM LINE

There is no published evidence to support the use of aspirin in the treatment of acute pulmonary embolism.

Poullis M. Aspirin for the treatment of pulmonary embolism: vasoconstriction versus physical obstruction. *Am Heart J* 2000;**140**:E22.