

BEST EVIDENCE TOPIC REPORTS

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

Edited by K Mackway-Jones

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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. 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 Six BETs are included in this issue of the journal, the last two of which are negative.

- ▶ Abdominal radiography in “body packers”
- ▶ Use of heliox for acute asthma in the emergency department
- ▶ Cardiopulmonary bypass and the survival of patients in cardiac arrest
- ▶ Oral or intravenous thiamine in the emergency department
- ▶ Antibiotic prophylaxis for pretibial haematomas in the elderly population
- ▶ Prophylactic antibiotics for subungual hematoma

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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: Odds on favourite for evidence in emergency medicine reaches the worldwide web. *J Accid Emerg Med* 2000;17:235–6.

Abdominal radiography in “body packers”

Report by Jonathan Costello, *Specialist Registrar*
Checked by Will Townend, *Specialist Registrar*

doi: 10.1136/emj.2004.016527

Abstract

A short cut review was carried out to establish whether an abdominal radiograph has clinical utility in the management of patients who claim to have swallowed drug filled packages. Twelve 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 26 year old man in police custody is brought to the emergency department with abdominal pain. He claims to have ingested a large number of drug filled packages. He is tachycardic. Examination is otherwise normal. You wonder if plain abdominal radiography is indicated.

Three part question

In [patients suspected of internal drug carriage (“Body packers”, “body stuffers”)] is [plain abdominal radiography] of [diagnostic utility]?

Search strategy

Medline 1966-03/04 using the Ovid interface. [(Exp Radiography, Abdominal OR abdominal radiography.mp OR abdominal x-ray.mp OR plain abdominal x-ray.mp OR plain film abdomen.mp) AND (body packers.mp OR body stuffers.mp OR body pack\$.mp OR body stuff\$.mp)] LIMIT to human AND English language.

Search outcome

Altogether 12 papers were found of which two were relevant to the topic of interest (table 1).

Comment(s)

The possibility of internal carriage of drugs is an increasingly frequent presentation to urban emergency departments. A diagnostic dilemma is usual because of the credibility of the presentation. It is important, therefore, that clinicians understand the utility of any investigations used. In particular the failure to appreciate the possibility of a false negative result might prove fatal.

▶ CLINICAL BOTTOM LINE

A single abdominal radiograph is insufficiently sensitive to rule out abdominal drug carriage. However, specificity is high and a positive finding is diagnostic.

Karhunen PJ, Suoranta H, Penttila A, *et al*. Pitfalls in the diagnosis of drug smuggler's abdomen. *J Forensic Sci* 1991;36:397–402.

Hierholzer J, Cordes M, Tantow H, *et al*. Drug smuggling by ingested cocaine-filled packages: conventional x-ray and ultrasound. *Abdom Imaging* 1995;20:333–8.

Use of heliox for acute asthma in the emergency department

Report by Michelle Jacobs, *Specialist Registrar*
Checked by Cilla Reid, *Consultant*, John Butler, *Consultant*

doi: 10.1136/emj.2004.016535

Abstract

A short cut review was carried out to establish whether heliox is of benefit in patients with an exacerbation of asthma

Table 1

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Karhunen PJ <i>et al</i> , 1992, Finland	82 patients suspected of internal drug carriage	Prospective observational series	Detection of internal drug packages using abdominal radiography	Sensitivity 90% Specificity 97%	Small numbers. No blinding
Heirholzer J <i>et al</i> , 1995, Germany	12 patients suspected of internal drug carriage	Prospective observational series	Detection of internal drug packages	7 of 12 cases detected	Small study. Questionable gold standard applied

resistant to standard treatments. Eighteen 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 20 year old man attends the emergency department with a moderate to severe exacerbation of his asthma. He does not improve after repeated doses of nebulised salbutamol and atrovent. You have a feeling that heliox might be beneficial in just this sort of situation but wonder whether this is based on evidence or marketing hype.

Three part question

In [patients with an acute exacerbation of asthma] is [heliox] beneficial in [reducing the severity of the exacerbation]?

Search strategy

Medline 1966-03/04 using the Ovid interface. The Cochrane Library Issue 1, 2004.

Medline: [(asthma.mp OR exp asthma OR exp asthma, exercise-induced OR exp bronchial spasm OR bronchospasm\$.mp OR wheeze\$.mp OR exp bronchial hyperreactivity OR exp respiratory hypersensitivity OR status asthmaticus\$.mp OR exp status asthmaticus OR acute asthma\$.mp) AND (exp helium OR helium\$.mp OR heliox\$.mp OR (helium AND oxygen).mp)] LIMIT to human AND English language.

Cochrane: 'heliox'

Search outcome

Altogether 207 papers were found, of which six were considered to be original research of high quality (randomised controlled trials) suitable for inclusion. Secondary citations from these papers were also scanned. These six papers have since been subject to meta-analysis by the Cochrane Review Group. The review was first published in 2000 with the most recent substantive amendment made in November 2002 (see table 2).

Comment(s)

The individual trials examined in the Cochrane review vary widely in the type of patients recruited (age, severity of asthma), delivery of heliox and outcome measures.

Outcomes vary between heliox having a beneficial effect and having no effect. There are very few side effects of heliox reported.

► CLINICAL BOTTOM LINE

At the moment the evidence does not support the use of heliox in the emergency department treatment of acute asthma exacerbations.

Rodrigo G, Pollack C, Rodrigo C, *et al*. Heliox for nonintubated acute asthma patients. *Cochrane Library*. Issue 1. Oxford: Update Software, 2004.

Cardiopulmonary bypass and the survival of patients in cardiac arrest

Report by Joel Dunning, *RCS Research Fellow*
Checked by Adrian Levine, *Consultant*

doi: 10.1136/emj.2004.016543

Abstract

A short cut review was carried out to establish whether cardiopulmonary bypass improves survival and function after cardiac arrest resistant to ACLS. Altogether 387 papers were found using the reported search, of which nine 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

You are the arrest team leader for a 56 year old patient that has just been brought in by emergency ambulance. He collapsed suddenly in the town centre, but had early, effective bystander CPR. Fourteen minutes have elapsed since and he remains in VF despite three prehospital DC

Table 2

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Rodrigo G <i>et al</i> , 2004	Six RCTs including 369 patients with acute asthma (five studies involving adults, one study dealing only with children)	Meta-analysis	Spirometric measurements (PEF l/min, PEF % predicted, FEV ₁ L, FEV ₁ % predicted)	Use of heliox did not improve pulmonary function compared with standard care (SMD=0.13; 95% CI: -0.09 to 0.34)	Surrogate end points

Table 3

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Tisherman SA <i>et al</i> , 1990, USA	28 year old woman brought to the emergency department with recurrent VF CPS instituted after 46 min of CPR	Case report	CPB duration Outcome	15 hours Survival to discharge, normal neurologically	Small study No patients with out of hospital arrest
Rees MR <i>et al</i> , 1992, UK	Percutaneous cardiopulmonary support (CPS) started in four patients in cardiogenic shock, four patients in asystole, and one patients in resistant VF Four asystolic patients arrested in catheter lab. Patient in VF arrested on the ward 24 h after angioplasty CPS established 25–40 min after arrest	Case series	Survival in arrest group Survival in cardiogenic shock group Duration of CPS	All five patients reverted to sinus rhythm after angioplasty on CPS, and three survived to discharge One death due to aortic root rupture and one due to bronchopneumonia after 2 months 60% survival All four patients died. All had evidence of MI 5–24 h before CPS. three had angioplasty on CPS, one had AVR, and one had a large irreparable VSD 40 min to 29 h of successful support	
Martin GB <i>et al</i> , 1998, USA	10 patients attending the ED with out of hospital cardiac arrest unresponsive to conventional methods, placed on Fem fem CPB CPB weaned after 2 hours	Case series	Long term survivors Weaning from CPB	No long term survivors, mean survival 48 hours 7 successfully weaned from CPB with spontaneous circulation Mean time 32 min	No definitive interventions attempted while on CPB
Karmy-Jones R <i>et al</i> , 1999	29 year old woman whom, while undergoing an elective gynaecological procedure, acutely arrested. ACLS ineffective. CPB was started	Case report	Cardiac arrest to CPB Outcome	Restoration of sinus rhythm after 40 min of CPB and discharge home after 2 months	
Jaski BE <i>et al</i> , 1999, USA	10 patients who had an out of hospital acute myocardial infarction and cardiac arrest were placed on percutaneous CPB All patients had revascularisation after start of extracorporeal cardiopulmonary bypass	Case series	Long term survival Cause of death Mean CPR time prior to CPB Return of spontaneous circulation	4 or 10 patients are long term survivors 40% survivors Neurological insufficiency in two, ineffective CPB in two, recurrent collapse after weaning in two 17 min in survivors and 54 min for non-survivors 32 or 36 patients had return of spontaneous circulation	One surviving patient required an above knee amputation for leg ischaemia
Nagao K <i>et al</i> , 2000, Japan	36 patients arriving in the ED after out of hospital arrest, if return of spontaneous circulation could not be achieved in patients with VF after unsynchronised electric shocks, with the second administration of epinephrine, or in patients without VF after the second administration of epinephrine, emergency CPB and intra-aortic balloon pumping (IABP) were immediately performed in the emergency room.	Prospective cohort study			Poorly presented data on CPS patients
Fujimoto K <i>et al</i> , 2001,	Nine patients suffering circulatory collapse after AMI refractory to ACLS resuscitation put on CPS All in-hospital patients	Case series	Long term survival Procedures under CPB	4 survivors although one had a poor neurological outcome All patients required a surgical procedure, including VSD repair in 4 and free wall rupture in 2	
Kurusz M <i>et al</i> , 2002, USA	Review of clinical reports of CPB in cardiac arrest or cardiogenic shock 13 papers found reporting CPB after cardiac arrest and 17 papers reporting CPB after cardiogenic shock	Review	Survival after cardiac arrest Survival after cardiogenic shock Poor survival	88 of 407 reported in the literature (21%) 137 of 335 (41%) Patients with unwitnessed cardiac arrest or CPR over 30 min	Not systematic, search strategies not reported Some papers missed

Table 3 Continued

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Schwarz B <i>et al</i> , 2003, USA	46 patients supported with venoarterial cardiopulmonary bypass, 25 because of cardiogenic shock unresponsive to pharmacologic therapy and 21 because of cardiopulmonary arrest unresponsive to ACLS	Case series	Successful weaning from CPS Survival to discharge	28 of 46 patients weaned 19 of 25 patients with cardiogenic shock, 3 of 21 patients with cardiopulmonary arrest 14% survival after cardiac arrest	Not out of hospital patients

shocks. A single additional DC shock at 360 J restores sinus rhythm with an output.

Your ICU colleague informs you four days later that this patient has severe anoxic brain damage and is unlikely to be discharged from hospital. You feel that failure has been snatched from the jaws of success and wonder whether some other intervention, such as cardiopulmonary bypass support, might have improved his chances of functional survival.

Three part question

In [patients with cardiac arrest refractory to ACLS intervention] is [institution of cardiopulmonary bypass] of any benefit in [improving survival and neurological function]?

Search strategy

Medline 1966-03/04 using the OVID interface. [exp Heart Arrest/OR exp life support care/OR cardiac arrest.mp OR cardiac massage.mp OR CPR.mp] AND [exp Cardiopulmonary Bypass/OR Cardiopulmonary Bypass.mp OR cardiopulmonary support.mp] LIMIT to human AND English language.

Search outcome

Altogether 387 papers were found one of which was a review summarising 35 papers. Eight papers not included in this review were also found. Thus nine relevant papers are summarised in the table 3.

Comment(s)

There is a large variability in the reported papers. The prior clinical status of the patient is one very important factor in determining survival, as a patient with known coronary arterial disease arresting in the catheter lab will clearly have a superior survival to an out of hospital arrest with unknown pathology. However, some studies relied only on cardiopulmonary bypass and gradually weaned the patient after a number of hours, whereas other investigators immediately took the patient to the catheter lab to establish a diagnosis or to theatre for a definitive procedure. In addition there were differences in technique in the method of cardiopulmonary bypass. One important difference is whether the venous return adequately drains the right atrium, as failure to do this will cause the heart to distend and cause pulmonary oedema.

► CLINICAL BOTTOM LINE

Around 15%–25% of selected patients who suffer witnessed cardiac arrest and who are not responsive to ACLS resuscitation may be successfully resuscitated with the assistance of cardiopulmonary bypass.

Tisherman SA, Grenvik A, Safar P. Cardiopulmonary-cerebral resuscitation: advanced and prolonged life support with emergency cardiopulmonary bypass. *Acta Anaesthesiol Scand Suppl* 1990;**94**:63–72.

Rees MR, Browne T, Sivananthan UM, *et al*. Cardiac resuscitation with percutaneous cardiopulmonary support. *Lancet* 1992;**340**:513–14.

Martin GB, Rivers EP, Paradis NA, *et al*. Emergency department cardiopulmonary bypass in the treatment of human cardiac arrest. *Chest* 1998;**113**:743–51.

Karmy-Jones R, Hamilton A, *et al*. The management of non-traumatic cardiac arrest in the operating room with cardiopulmonary bypass. *Resuscitation* 1999;**40**:107–10.

Jaski BE, Lingle RJ, Overlie P, *et al*. WP Long-term survival with use of percutaneous extracorporeal life support in patients presenting with acute myocardial infarction and cardiovascular collapse. *ASAIO J* 1999;**45**:615–18.

Nagao K, Hayashi N, Kanmatsuse K, *et al*. Cardiopulmonary cerebral resuscitation using emergency cardiopulmonary bypass, coronary reperfusion therapy and mild hypothermia in patients with cardiac arrest outside the hospital. *J Am Coll Cardiol* 2000;**36**:776–83.

Fujimoto K, Kawahito K, Yamaguchi A, *et al*. Percutaneous extracorporeal life support for treatment of fatal mechanical complications associated with acute myocardial infarction. *Artif Organs* 2001;**25**:1000–3.

Kurusz M, Zwischenberger JB. Percutaneous cardiopulmonary bypass for cardiac emergencies. *Perfusion* 2002;**17**:269–77.

Schwarz B, Mair P, Margreiter J, *et al*. Experience with percutaneous venoarterial cardiopulmonary bypass for emergency circulatory support. *Crit Care Med* 2003;**31**:758–64.

Oral or intravenous thiamine in the emergency department

Report by Rupert Jackson, *Consultant*
Checked by Stewart Teece, *Clinical Research Fellow*

doi: 10.1136/emj.2004.016550

Abstract

A short cut review was carried out to establish whether parenteral thiamine was more effective than an oral preparation at replacing thiamine in alcoholics without encephalopathy. Twenty five 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 attends the emergency department with cellulitis in his left leg. He is unkempt and drinks heavily. The cellulitis can be treated as an outpatient with oral antibiotics, but you suspect he is thiamine deficient as a result of long term alcohol misuse. You are therefore about to prescribe an intravenous infusion of thiamine as you have always given it this way. This will commit you to an inpatient admission and beds are at a premium. You wonder whether there is any basis for your prescribing practice—perhaps oral thiamine would be just as effective.

Table 4

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Tallaksen CME <i>et al</i> , 1993, Norway	Six healthy volunteers IV v oral bolus 50 mg doses	Crossover study	Unphosphorylated		Small numbers inconsistencies in calculations as shown Statistical significance not assessed
Baines M <i>et al</i> , 1988, UK	25 healthy alcoholics 250 mg thiamine daily IM v oral	Controlled trial	Thiamin diphosphate levels at one day Thiamin diphosphate levels at five days	Increase in both groups. Only statistically significant in IM group Statistically significant and identical increase in both groups	Reporting appears biased

Three part question

In [thiamine deficient patients without Wernickes encephalopathy] is [parenteral delivery of thiamine better than the oral route] at [achieving bioavailability without side effects]?

Search strategy

Medline 1966-03/04 using the OVID interface. [(exp thiamine OR thiamine.af OR (vitamin adj5 b1).af) AND (exp infusions, intravenous/OR exp injections, intravenous OR intravenous.af OR exp infusions, parenteral OR parenteral.af) AND (exp administration, oral OR oral.af OR exp tablets OR tablet.af OR po.af)] LIMIT to human AND English Language.

Search outcome

Altogether 25 papers were found of which two were relevant to the three part question (table 4).

Comment(s)

Clearly concordance with treatment also has to be considered. This has not been considered at all in the papers found.

► CLINICAL BOTTOM LINE

Oral thiamine administration is as effective as parenteral administration after five days. In compliant alcoholics without encephalopathy oral administration is the route of choice.

Tallaksen CME, Sande A, Bohmer T, *et al*. Kinetics of thiamin and thiamin phosphate esters in human blood, plasma and urine after 50 mg intravenously or orally. *Eur J Clin Pharmacol* 1993;44:73-8.

Baines M, Bligh JG, Madden JS. Tissue thiamin levels of hospitalised alcoholics before and after oral or parenteral vitamins. *Alcohol Alcohol* 1988;23:49-52.

Antibiotic prophylaxis for pretibial haematomas in the elderly population

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

doi: 10.1136/emj.2004.016568

Abstract

A short cut review was carried out to establish whether prophylactic antibiotics reduce infections and other complications in elderly patients with pretibial haematomas.

Altogether 65 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 95 year old woman attends the emergency department having slipped against her zimmer frame, hitting her right shin. Examination shows a 10 cm haematoma with no break to the skin. Given the site and size of the haematoma you feel there is a risk of infection developing in the haematoma before it resolves. You therefore arrange clinic follow up and give her prophylactic flucloxacillin. On discussing the case the next day it becomes apparent that a number of colleagues would not have bothered with the antibiotics. You decide to check the literature to see who is right.

Three part question

In [elderly patients with a large pretibial haematoma] does [the prophylactic use of antibiotics] give [a reduction in infective complications]?

Search strategy

Medline 1966-03/04 and CINAHL 1980-03/04 using the OVID interface. Medline: [{exp Hematoma OR haematoma.af OR hematoma.af OR exp CONTUSIONS OR contusion.af} AND {exp TIBIA OR tibia\$.af OR shin.af OR exp LEG OR leg.af} AND {exp Anti-Bacterial Agents OR antibiotic.af. OR anti-biotic.af. OR infection.af}] LIMIT to English language. CINAHL: [{exp Hematoma OR haematoma.af OR hematoma.af OR exp CONTUSIONS OR contusion.af} AND {exp TIBIA OR tibia\$.af OR shin.af OR exp LEG OR leg.af} AND {exp Antibiotics OR antibiotic.af. OR anti-biotic.af. OR infectious.af}] LIMIT to English language.

Search outcome

Altogether 65 papers found on Medline, 30 on CINAHL none of which answered the three part question.

Comment

There are no trials of any kind looking at the use of prophylactic antibiotics on the incidence of infections or complications in patients with pretibial haematomas.

► CLINICAL BOTTOM LINE

There is no evidence to confirm/refute the use of antibiotics in pretibial haematoma, local guidelines should be followed.

Prophylactic antibiotics for subungual haematoma

Report by Jonathan Costello, *Specialist Registrar*
Checked by Marten Howes, *Specialist Registrar*

doi: 10.1136/emj.2004.016576

Abstract

A short cut review was carried out to establish whether antibiotic prophylaxis is indicated after trephining of a subungual haematoma. Two papers were found using the reported search, of which neither 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 25 year old labourer presents to the emergency department with a subungual haematoma of acute onset. After trephination, the patient requests antibiotics. You wonder if such prophylaxis is indicated.

Three part question

In [the management of subungual hematoma] are [prophylactic antibiotics] indicated to [improve outcome]?

Search strategy

Medline 1966-03/04 using the OVID interface. (Exp antibiotics OR antibiotic\$.mp OR exp antibiotic prophylaxis OR antibiotic prophylaxis.mp OR prophylactic antibiotics.mp) AND (exp hematoma OR hematoma.mp OR haematoma.mp OR clot.mp) AND (exp nails OR exp Nail Diseases OR nail\$.mp OR unguis\$.mp OR subungual\$.mp)

Search outcome

Two papers were found neither of which were relevant.

Comment(s)

There are no trials of any kind looking at the use of antibiotics on the incidence of infections or complications after subungual trephination.

► CLINICAL BOTTOM LINE

There is no evidence for antibiotic prophylaxis in the management of uncomplicated subungual haematoma.

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