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

Edited by K Mackway-Jones

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 Infirmary or placed on the BestBETs website. Each BET has been constructed in the four stages that have been described elsewhere. The BETs shown here together with those published previously and those currently under construction can be seen at http://www.bestbets.org. Five BETs are included in this issue of the journal.

- Amiodarone or flecainide for cardioversion in acute onset atrial fibrillation
- The sensitivity of a normal chest radiograph in ruling out aortic dissection
- Antibiotics in acute exacerbations of chronic obstructive pulmonary disease
- Intravenous magnesium in chronic obstructive pulmonary disease
- Intra-articular corticosteroid injections in acute rheumatoid monoarthritides

Amiodarone or flecainide for cardioversion in acute onset atrial fibrillation

Report by Jon Argall, Senior Clinical Fellow

A short cut review was carried out to establish whether amiodarone is better than flecainide at restoring sinus rhythm in patients with atrial fibrillation. Altogether 42 papers were found using the reported search, of which four presented the best evidence to answer the clinical question. The authors, 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 50 year old woman presents to the emergency department with acute onset of palpitations of less than two hours duration. She does not have chest pain, her heart rate is about 140–160 with a good systolic blood pressure, and respiratory examination is normal. An ECG confirms the rhythm to be atrial fibrillation. You consider which method of pharmacological cardioversion would be most suitable as the medical and cardiological opinions differ between amiodarone and flecainide.

Three part question
In [acute onset atrial fibrillation] is [amiodarone better than flecainide] at [restoring normal sinus rhythm]?

Search strategy

Search outcome
Altogether 42 papers were found of which four were directly relevant to the three part question (see table 1).

Comment(s)
There were no significant differences in the patient groups or adverse effects in all studies. Most adverse effects were mild and self limiting, with no fatal events reported.

Clinical bottom line
In the stable patient with acute onset atrial fibrillation and uncompromised left ventricular function, flecainide is the most efficacious drug at restoring normal sinus rhythm expediency. However about 60% of patients will revert with no treatment.


The sensitivity of a normal chest radiograph in ruling out aortic dissection

Report by Kerstin Hogg, Clinical Research Fellow

A short cut review was carried out to establish the sensitivity of a normal chest radiograph as a rule out test for aortic...
aneurysm. Altogether 557 papers were found using the reported search, of which four 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 52 year old man attends the emergency department with central chest tightness and left arm heaviness. ECG shows anterior ST elevation of 3 mm in three consecutive leads. He has a normal mediastinum on chest radiograph, but as you administer the thrombolytic agent, you wonder just how sensitive this investigation is in ruling out an aortic dissection.

Three part question
In a [patient with chest pain] what is the [sensitivity of a normal chest radiograph] in ruling out [aortic dissection]?

Search strategy

Search outcome
Altogether 557 papers were found. One recent literature review included the relevant papers with the exception of three additional papers (see table 2).

Comment(s)
All these studies are of poor quality. There is an enormous lack of quality prospective studies recruiting consecutive patients presenting to the emergency department with chest pain.

CLINICAL BOTTOM LINE
The classic chest radiological findings of a wide mediastinum or abnormal aortic contour do not seem sufficiently sensitive to rule out aortic dissection in a patient with chest pain.


Klompas M. Does this patient have an acute thoracic aortic dissection? JAMA 2002;287:2262-72.
A short cut review was carried out to establish whether antibiotics improve recovery in patients with acute exacerbations of COPD. Altogether 200 papers were found using the reported search, of which four 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 78 year old man with a history of COPD attends the emergency department with a recent increase in shortness of breath, cough, and wheeze. You diagnose him as suffering from an exacerbation of COPD and treat him with oxygen, nebulised salbutamol, and corticosteroids. You wonder if a course of antibiotics would also be of benefit.

### Three part question
In [a patient with an acute exacerbation of COPD] does [administration of a course of antibiotics] improve [outcome and hasten recovery]?

### Search strategy
Medline 1966-11/03 using the Ovid interface. In addition the Cochrane Database of Systematic Reviews was searched and the National Institute of Clinical Excellence web site was searched for relevant guidelines. {}
exp hospitals, chronic disease OR chronic.mp) AND (exp lung disease, obstructive OR obstructive.mp) OR exp emphysema OR exp pulmonary emphysema OR emphysema.mp OR exp bronchitis OR bronchitis.mp OR exp COPD.mp OR COAD.mp OR airway obstruction.mp] AND [exp acute disease OR acute.mp OR exacerbation.mp] AND [exp antibiotics OR antibiotic$.mp] AND [exp Meta-analysis OR meta-analysis.mp OR exp review literature OR Review.mp OR systematic review.mp OR guideline$.mp OR exp clinical protocol OR protocol.mp]

Table 3

<table>
<thead>
<tr>
<th>Author, date and country</th>
<th>Patient group</th>
<th>Study type (level of evidence)</th>
<th>Outcomes</th>
<th>Key results</th>
<th>Study weaknesses</th>
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<tbody>
<tr>
<td>Saint S et al, 1995, USA</td>
<td>9 randomised trials (n = 1101) including inpatients and outpatients with exacerbations of COPD</td>
<td>Meta-analysis</td>
<td>Mortality benefit of antibiotics v placebo, (effect size transformed into units of standard deviation)</td>
<td>Change in peak expiratory flow rate</td>
<td>English language search only</td>
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<td>British Thoracic Society 1997</td>
<td>Initiated by the Standards of Care Committee of the British Society. A core group of individuals produced background papers that were collated into a single document. This was discussed over a two day period by a larger group which included respiratory physicians from both teaching and teaching and district general hospitals across the UK, geriatricians, general practitioners, nurses, and public health physicians</td>
<td>Systematic review and guideline</td>
<td>Situations in which antibiotics are proven to be of use in hospital and non-hospital settings</td>
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<td>Mccroy DC et al, 2001</td>
<td>Systematic review conducted by a joint panel from the American College of Physicians (ACP)-American Society for Internal Medicine (ASIM) and the American College of Chest Physicians (ACCP)</td>
<td>Systematic review</td>
<td>Findings from 11 RCTs looking at antibiotics v placebo (They found two additional papers to the meta-analysis of Saint et al)</td>
<td>Three papers found a statistical benefit, 3 papers found a non-significant benefit and the remainder showed no benefit.</td>
<td></td>
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<td>NICE 2003</td>
<td>Full NICE guideline for the management of patients with COPD</td>
<td>Systematic review</td>
<td>Grade A recommendations</td>
<td>Antibiotics should be used to treat exacerbations of COPD associated with a history of purulent sputum</td>
<td>Study effects were not summarised by meta-analysis</td>
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<td></td>
<td>Note: currently only in its 2nd draft. 270 received antibiotics, 92 did not.</td>
<td></td>
<td>Grade B recommendations</td>
<td>Antibiotics are more likely to be helpful in patients with more severe underlying disease. Patients with exacerbations without purulent sputum do not need antibiotic therapy unless there is consolidation on a chest radiograph or clinical signs of pneumonia</td>
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Intravenous magnesium in chronic obstructive pulmonary disease

Report by Rachel Jenner, Specialist Registrar
Checked by Richard Body, Senior House Officer

A short cut review was carried out to establish whether the addition of intravenous magnesium to standard treatments improved outcome in patients with exacerbations of COPD. Altogether 465 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 65 year old man presents to the emergency department with an exacerbation of COPD. You are aware that intravenous magnesium is used as a bronchodilator in acute severe asthma and wonder if it would benefit this patient.

Three part question
In [patients with an exacerbation of COPD] does [the addition of intravenous magnesium to conventional treatments] improve [PEFR or discharge rate or morbidity or mortality]?

Search strategy
Medline 1966-11/03 using the Ovid interface, including non-indexed citations and Medline in progress. [exp Magnesium or magnesium.mp] AND [exp Pulmonary Disease, Chronic Obstructive OR COPD.mp OR COAD.mp OR exp Lung Diseases] LIMIT to human AND English

Search outcome
Altogether 465 papers were found of which one was relevant (see table 4).

Comment(s)
There is only one small study addressing this question and it excludes patients with acute infection, which is one of the commonest causes of exacerbation of COPD. However, it does show a small significant improvement in PEFR with intravenous magnesium. The clinical significance of this change may be small but seems to show a non-significant trend towards a reduced rate of admission. A larger trial including patients with signs of acute infection would be helpful.

Table 4

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<tr>
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<th>Study weaknesses</th>
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</thead>
<tbody>
<tr>
<td>Skorodin MS et al, 1995, USA</td>
<td>72 adults (70 male) presenting to ED with exacerbation COPD randomised to 1.2 g magnesium sulphate or placebo after receiving 2.5 mg nebulised salbutamol</td>
<td>Double blinded PRCT</td>
<td>Change in PEFR at 30 min and 45 min</td>
<td>25.1 l/min better for MgSO₄ at 30 min, 7.4 l/min better for MgSO₄ at 45 min (p = 0.03)</td>
<td>Male bias</td>
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<td></td>
<td>Change in % PEFR at 30 min and 45 min</td>
<td>22.4% for MgSO₄ at 30 min, 6.1% at 45 min (p = 0.01)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Need for hospitalisation</td>
<td>28.1% for MgSO₄ group v 41.9% for placebo (p = 0.25)</td>
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Intravenous magnesium in chronic obstructive pulmonary disease

Report by Rachel Jenner, Specialist Registrar
Checked by Richard Body, Senior House Officer
Intra-articular corticosteroid injections in acute rheumatoid monoarthritis

Report by Jane Sholsberg, Medical Student
Checked by Rupert Jackson, Consultant

A short cut review was carried out to establish whether intra-articular corticosteroid injections were effective at reducing pain in patients with acute rheumatoid monoarthritis. Altogether 215 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 42 year old woman known to suffer from rheumatoid arthritis presents to the emergency department with an acutely inflamed swollen knee. The patient is given an intra-articular corticosteroid injection. You know this is a standard treatment but wonder how effective it actually is.

Three part question
In [patients with acute rheumatoid monoarthritis] are [intra-articular corticosteroid injections] effective in [reducing pain and swelling and improving mobility]?

Search strategy
Medline 1966-11/03 using the Ovid interface, including Medline in progress and non-indexed citations. (exp arthritis, rheumatoid/OR monoarthritis.mp. OR exp arthritis OR exp rheumatic diseases/OR monoarthropathy.mp.) AND (exp steroids/or steroid$'.mp. OR exp methylprednisolone/OR methylprednisolone.mp OR exp hydrocortisone/OR hydrocortisone.mp OR exp prednisolone/OR prednisolone.mp) AND (exp injections, intra-articular/) LIMIT to human AND English AND abstracts.

Search outcome
Altogether 215 papers found of which 214 were irrelevant or of insufficient quality. The remaining paper is shown in table 5.

Comment(s)
Acute rheumatoid monoarthritis are commonly treated with intra-articular corticosteroid injections. Although this paper indicates a favourable outcome using intra-articular rimexolone injections particularly at 40 mg, the small number used in each group may have introduced bias and the high drop out rate in the placebo group in the later stages of the study prevents efficacious comparisons to be made.

Clinical Bottom line
The available evidence suggests that a single intra-articular injection of 40 mg rimexolone significantly reduces pain, tenderness and stiffness, and increases mobility in patients with acute rheumatoid arthritis.


Table 5

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<td>Van Vliet-Daskalopoulou E et al, 1987, Netherlands</td>
<td>137 patients with classic or definite RA involving at least one knee joint requiring local treatment. Single intra-articular injection of rimexolone. 34 given placebo, 32 given 10 mg, 33 given 20 mg, 31 given 40 mg. 7 patients did not fulfil protocol requirement</td>
<td>Placebo controlled double blind multicentre clinical trial</td>
<td>Assessment of pain, tenderness, morning stiffness, swelling, range of movement and walking ability at days 7, 28, 56, and 84 after injection</td>
<td>Statistically superior clinical improvement for most variables with rimexolone at 20 mg and 40 mg than placebo. With the 10 mg dose of rimexolone only reduction of tenderness was significantly superior. Duration of improvement longest with 40 mg rimexolone. One single intra-articular injection of this dose significantly reduces pain, tenderness and stiffness and improved range of movement and walking ability for 8–12 weeks</td>
<td>There was a significant drop out rate (66% of 10 mg group, 72% of 20 mg, and 71% of 40 mg groups remained for rimexolone groups at the end of the study. Only 44% of placebo treated patients were still under study with the rest not accounted for.</td>
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130 patients distributed over four groups with no sample size calculation No indication of effort made to standardise clinical variables. As this is a multicentre trial questionable reliability and validity