

## 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 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. The BETs published below were first reported at the Critical Appraisal Journal Club at the Manchester Royal Infirmary<sup>1</sup> or placed on the BestBETs web site. Each BET has been constructed in the four stages that have been described elsewhere.<sup>2</sup> The BETs shown here together with those published previously and those currently under construction can be seen at <http://www.bestbets.org><sup>3</sup> Eight BETs are included in this issue of the journal.

- ▶ Electrical stimulation and Bell's palsy
- ▶ White cell count and diagnosing appendicitis in children
- ▶ White cell count and diagnosing appendicitis in adults
- ▶ Serum amylase or lipase to diagnose pancreatitis in patients presenting with abdominal pain
- ▶ Management of acute ethylene glycol poisoning
- ▶ Bed rest after lumbar puncture
- ▶ Difficult intubation, the bougie and the stylet
- ▶ To stab or slash: the percutaneous dilatation or standard surgical approach to cricothyroidotomy in prehospital care

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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.

## Electrical stimulation and Bell's palsy

Report by Susan Buttress, *Research Physiotherapist*

Checked by Katrina Herren, *Research Fellow*  
**Abstract**

A short cut review was carried out to establish whether electrical stimulation had any advantages over facial exercises in promoting recovery after Bell's palsy. Altogether 270 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 50 year old presents with Bell's palsy. You have heard that physiotherapy is an effective treatment but wonder whether facial exercises produce a better outcome than treatment with electrical stimulation.

### Three part question

In [facial nerve palsy] are [facial exercises better than electrical stimulation] at improving [time to function/facial symmetry]?

### Search strategy

Medline and CINAHL 1966-06/02, AMED 1985-04/02 using the OVID interface. Medline and CINAHL: [{facial nerve palsy.mp OR exp facial paralysis OR exp bells palsy}] AND [{"trophic stimulation".mp OR exp physical therapy techniques OR "physiotherapy".mp OR exp electric stimulation/ OR exp electric stimulation therapy/ OR "electrical stimulation".mp OR electrotherapy.mp}] LIMIT to human AND English. AMED: {exp peripheral nerve disease} AND {exp electrotherapy}.

### Search outcome

Medline and CINAHL: 253 papers were identified, AMED: 17 papers found 11 of which were relevant, but 10 papers were excluded as these described electromyographic feedback (EMG feedback training), which is not a form of electrical stimulation. The remaining paper is shown in table 1.

### Comment(s)

No papers were found that involved physiotherapy treatment of Bell's palsy in the acute setting. The above paper describes significant differences in the outcomes used for patients with long term facial nerve palsy using electrical stimulation, however this was not a rigorous study.

### ▶ CLINICAL BOTTOM LINE

There is no evidence to suggest that either exercises or electrical stimulation is beneficial to patients with acute Bell's palsy. Evidence does exist to justify the use of electrical stimulation in patients with long term Bell's palsy, although the study could have been more rigorous.

**Farragher D**, Kidd GL, Tallis R. Eutrophic stimulation for Bell's palsy. *Clinical Rehabilitation* 1987;1:265-71.

## White cell count and diagnosing appendicitis in children

Report by Robert Williams, *Clinical Fellow*

Checked by Kevin Mackway-Jones, *Professor*  
**Abstract**

A short cut review was carried out to establish whether a single white cell count has clinical utility in the diagnosis of acute

Table 1

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Farragher D <i>et al</i> , 1987	40 patients. with a 74 months mean interval between onset and starting treatment. Stimulation v no stimulation	Clinical trial	FPRP (Facial Paralysis Recovery Profile)  FPRI (Facial Paralysis Recovery Index)	p<0.0001  p<0.0001	Not randomised

Table 2

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Doraiswamy NV, 1979, UK	375 children admitted with clinical diagnosis of acute appendicitis 225 found to have acute appendicitis, 50 with a normal appendix, and 100 in whom symptoms resolved spontaneously	Diagnostic test study	WCC>15000 (0–10 years) or WCC>10000 (10–15 years)	Sens 42%; Spec 97%; LR+ 12.5; LR– 0.60	Unclear if blinded No gold standard No follow up of non-operative cases
Miskowiak J and Burcharth F, 1982, Denmark	238 patients admitted with suspected acute appendicitis 74 were below 15 years	Diagnostic test study, blinded	WCC>15000.	Sens 19%; Spec 85%; LR+ 1.26; LR– 0.95	No gold standard
Peltola H <i>et al</i> , 1986, Sweden	162 children (1.9–15.6) admitted with suspected acute appendicitis	Diagnostic test study	WCC>15000. Histology	Sens 60%; Spec 84%; LR+ 3.75; LR– 0.48	Unclear if blinded No gold standard No follow up of non-operative cases
Lau WY <i>et al</i> , 1989, Australia	1389 patients (1–87), with right lower abdominal pain, consistent with appendicitis 177 children (1–15) Non-operative group followed up at 2 and 6 weeks	Diagnostic test study, blinded	WCC>15000 (group 1–10). WCC>13000 (group 10–15). Histology	Sens 60.5%; Spec 100%; LR+ INF; LR– 0.35	No gold standard Not analysed by age specific WCC Raw data not available for analysis by age group

appendicitis in children. Altogether 100 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 6 year old child presents to the emergency department with a history and examination consistent of appendicitis. On referral, the duty surgeon requests a full blood count. You wonder whether it will aid the diagnosis.

#### Three part question

In [children with suspected appendicitis] does [a single white cell count] aid [diagnosis]?

#### Search strategy

Medline 1966–06/02 using the OVID interface. [{exp Appendicitis OR acute appendicitis.mp} AND {exp Haematological tests OR exp Leukocyte count OR leukocyte count\$.mp OR neutrophil count\$.mp OR white cell count\$.mp OR inflammatory parameter\$.mp} AND exp Diagnosis AND {exp adolescence OR exp child OR exp child of impaired parents OR exp child, abandoned OR exp child, exceptional OR exp child, hospitalised OR exp child, institutionalised OR exp child, preschool OR exp child, unwanted OR exp disabled children OR exp homeless youth/ OR exp infant OR exp only child OR child\$.mp OR exp Pediatrics OR pediatric\$.mp OR paediatric\$.mp}]. Limit to human AND English.

#### Search outcome

Altogether 100 papers were found of which 96 were irrelevant or of insufficient quality. The remaining four papers are shown in table 2.

#### Comment(s)

The majority of studies looked at absolute values of white cell counts in appendicitis and were of little use in evaluating its use as a diagnostic test. Although the paper by Lau *et al* is well constructed, it assesses two different ranges for the analysis, which may affect the results. Without data on the numbers within each group, their claim for 100% specificity, and infinite positive likelihood ratio must be interpreted with care.

#### ► CLINICAL BOTTOM LINE

A single white cell count is neither sensitive nor specific in the diagnosis of appendicitis in children.

**Doraiswamy NV.** Leucocyte counts in the diagnosis and prognosis of acute appendicitis in children. *Br J Surg* 1979;**66**:782–4.

**Miskowiak J, Burcharth F.** The white cell count in acute appendicitis. A prospective blind study. *Dan Med Bull* 1982;**29**:210–11.

**Peltola H, Ahlqvist J, Rapola J, et al.** C-reactive protein compared with white blood cell count and erythrocyte sedimentation rate in the diagnosis of acute appendicitis in children. *Acta Chir Scand* 1986;**152**:55–8.

**Lau WY, Ho YC, Chu KW, et al.** Leucocyte count and neutrophil percentage in appendicectomy for suspected appendicitis. *Aust N Z J Surg* 1989;**59**:395–8.

## White cell count and diagnosing appendicitis in adults

Report by Robert Williams, *Clinical Fellow*

Checked by Katrina Herren, *Research Fellow*

#### Abstract

A short cut review was carried out to establish whether a single white cell count has clinical utility in the diagnosis of

Table 3

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Miskowiak J <i>et al</i> , 1982, Denmark	238 patients (>15) admitted with suspected acute appendicitis	Diagnostic test study, blinded	WCC>9000. Histology	Sens 84%; Spec 66%; LR+ 1.26; LR- 0.95	No gold standard
Lau WY <i>et al</i> , 1989, Australia	1389 patients (1–87), with right lower abdominal pain, consistent with appendicitis 769 aged 15–65 Non-operative group followed up at 2 and 6 weeks	Diagnostic test study, blinded	WCC>10000 (group 15–65). Histology	Sens 88%; Spec 76%; LR+ 3.7; LR- 0.29	No gold standard
Dueholm S <i>et al</i> , 1989, USA	204 patients (15–45) admitted with suspected acute appendicitis	Diagnostic test study, blinded	WCC>11000 WCC>9000. Histology	Sens 76%; Spec 74 %; LR+ 2.92; LR- 0.32 Sens 83%; Spec 50%; LR+ 1.66; LR- 0.34	No gold standard
Amland PF <i>et al</i> , 1989, Sweden	110 patients (13–33) admitted with suspected acute appendicitis	Diagnostic test study, blinded	WCC>10000. Histology	Sens 68%; Spec 69%; LR+ 2.19; LR- 0.69	No gold standard
Andersson RE <i>et al</i> , 1999, USA	502 patients (10–86) admitted with suspected acute appendicitis	Diagnostic test study	WCC>10000. Histology	Sens 78%; Spec 68%; LR+ 2.44; LR- 0.33	No gold standard Unblinded Includes children

acute appendicitis in adults. Altogether 176 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 24 year old man presents to the emergency department with a history and examination consistent with appendicitis. On referral, the duty surgeon requests a full blood count. You wonder whether it will aid the diagnosis.

### Three part question

In [adults with suspected appendicitis] does [a single white cell count] aid [diagnosis]?

### Search strategy

Medline 1966–06/02 using the OVID interface. [(exp Appendicitis OR acute appendicitis.mp) AND (exp Haematological tests OR exp Leukocyte count or leukocyte count\$.mp OR neutrophil count\$.mp OR white cell count\$.mp OR inflammatory parameter\$.mp or white blood count\$)]. Limit to human and English.

### Search outcome

Altogether 176 papers were found, of which 171 were irrelevant or of insufficient quality for inclusion. The remaining five papers are shown in table 3.

### Comment(s)

All the reviewed studies have the weakness of no gold standard diagnostic test against which to compare the non-operative group. Only one study undertakes follow up of its non-operative group, with a single study formally recognising the fact that some abdominal pain, not requiring laparotomy, may have originated from the appendix. While all the studies seem to produce broad agreement as to the sensitivity and specificity of an isolated white cell count, they are not truly comparable because of the differing selection criteria of patients, age ranges, and clinical management. In addition there is a wide prevalence of disease between the groups.

### ► CLINICAL BOTTOM LINE

A single white cell count is neither sensitive nor specific in the diagnosis of appendicitis.

**Miskowiak J**, Burcharth F. The white cell count in acute appendicitis. A prospective blind study. *Dan Med Bull* 1982;**29**:210–11.

**Lau WY**, Ho YC, Chu KW, *et al*. Leucocyte count and neutrophil percentage in appendicectomy for suspected appendicitis. *Aust N Z J Surg* 1989;**59**:395–8.

**Dueholm S**, Bagi P, Bud M. Laboratory aid in the diagnosis of acute appendicitis. A blinded, prospective trial concerning diagnostic value of leukocyte count, neutrophil differential count, and C-reactive protein. *Dis Colon Rectum* 1989;**32**:855–9.

**Amland PF**, Skaane P, Ronningen H, *et al*. Ultrasonography and parameters of inflammation in acute appendicitis. A comparison with clinical findings. *Acta Chir Scand* 1989;**155**:185–9.

**Andersson RE**, Hugander AP, Ghazi SH, *et al*. Diagnostic value of disease history, clinical presentation, and inflammatory parameters of appendicitis. *World J Surg* 1999;**23**:133–40.

## Serum amylase or lipase to diagnose pancreatitis in patients presenting with abdominal pain

Report by John Butler, Specialist Registrar  
Checked by Kevin Mackway-Jones, Professor

### Abstract

A short cut review was carried out to establish whether serum amylase was better than serum lipase in the diagnosis of pancreatitis in patients presenting with abdominal pain. Altogether 320 papers were found using the reported search, of which seven 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 45 year old woman attends the emergency department with a four hour history of acute onset of epigastric pain. She has a history of alcohol use. On examination you can elicit tenderness in the epigastrium but no peritonism. You are concerned that the patient may have pancreatitis. You wonder whether a serum lipase might be better than serum amylase as a diagnostic marker for pancreatitis in this patient.

### Three part question

In [patients with abdominal pain] is [a single serum lipase better than a serum amylase] as [a diagnostic marker of pancreatitis]?

### Search strategy

Medline 1966–06/02 and EMBASE using OVID interface. [{exp Abdominal pain/ OR abdominal pain.mp} OR {exp

Table 4

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Steinberg WM <i>et al</i> , 1985, USA	166 patients with abdominal pain. 39 cases with confirmed pancreatitis v 127 Emergency dept attenders with abdominal pain. Gold standard - CT findings, ultrasound or laparotomy	Diagnostic study	Amylase upper limit Lipase upper limit Amylase best cut off Lipase best cut off	Spec 89%. Sens 95%. Spec 99%. Sens 86%. Spec 99%. Sens 95%. Spec 99%. Sens 87%.	Different gold standards Selected patient groups
Kasmierczak S <i>et al</i> , 1991, USA	151 consecutive patients on whom serum amylase or lipase had been ordered	Diagnostic study	Diagnosis of pancreatitis	Similar ROC curves for amylase and lipase.	No gold standard Not all patients had test
Gumaste VV <i>et al</i> , 1993, USA	170 patients with abdominal pain	Diagnostic study	Amylase Lipase	Spec 99%. Sens 72% Spec 99%. Sens 100%	No gold standard Unblinded
Clave P <i>et al</i> , 1995, Spain	384 patients admitted with abdominal pain	Diagnostic study	Diagnosis of pancreatitis	Area under ROC curve similar for serum amylase and lipase, Diagnostic efficiency 91%, Sens 94%, Spec 95%	No gold standard Admitted patients
Chase CW <i>et al</i> , 1996, USA	306 patients admitted with abdominal pain	Diagnostic study	Amylase Lipase	Sens 85%, Spec 91%	No gold standard
Kempainen EA <i>et al</i> , 1997, Finland	500 consecutive patients with abdominal pain attending emergency departments in 2 centres	Diagnostic study	Lipase Amylase	Sens 94%, Spec 95%	
Keim V <i>et al</i> , 1998, Germany	253 patients with acute abdominal pain Gold standard was CT scan/US scan of abdomen abdominal pain	Diagnostic study looking at serum amylase and lipase.	Diagnosis of pancreatitis	Amylase sensitivity of 95% at 0-1 days, lipase 100%. ROC curve slightly superior for lipase.	

Pancreatitis/ OR exp Pancreatitis, Acute Necrotizing OR exp pancreatitis, alcoholic/ OR pancreatitis.mp} AND {exp Amylases OR amylase.mp} AND {exp Lipase OR lipase.mp} AND exp Diagnosis OR diagnosis.mp] LIMIT to human AND English.

#### Search outcome

Altogether 320 papers were found in total of which 313 were irrelevant or of insufficient quality for inclusion. The remaining seven papers are shown in table 4.

#### Comment(s)

Concern has been expressed about the use of serum amylase to diagnose pancreatitis. Hyperamylasaemia has been reported in numerous abdominal conditions that can be confused with pancreatitis. Acute pancreatitis has also been reported in patients with a normal amylase. The studies mentioned suggest that serum amylase and lipase both have high levels of sensitivity and specificity for pancreatitis, although few studies looked directly at patients attending the emergency department with abdominal pain. On the whole comparative studies show serum lipase to be slightly superior to amylase as a diagnostic marker when used to rule in or out pancreatitis. Further work is needed to look at diagnostic assays in patients attending the emergency department with abdominal pain.

#### ► CLINICAL BOTTOM LINE

Serum amylase and lipase are high sensitivity and specific diagnostic markers of acute pancreatitis. Some studies suggest serum lipase is better.

**Steinberg WM**, Goldstein SS, Davis ND, *et al*. Diagnostic assays in acute pancreatitis. A study of sensitivity and specificity. *Ann Intern Med* 1985;**102**:576-80.

**Kazmierczak SC**, Van Lente F, Hodges ED. Diagnostic and prognostic utility of phospholipase A activity in patients with acute pancreatitis: comparison with amylase and lipase. *Clin Chem* 1991;**37**:356-60.

**Gumaste VV**, Roditis N, Mehta D, *et al*. Serum lipase levels in nonpancreatic abdominal pain versus acute pancreatitis. *Am J Gastroenterol* 1993;**88**:2051-5.

**Clave P**, Guillaumes S, Blanco I, *et al*. Amylase, lipase, pancreatic isoamylase, and phospholipase A in diagnosis of acute pancreatitis. *Clin Chem* 1995;**41**:1129-34.

**Chase CW**, Barker DE, Russell WL, *et al*. Serum amylase and lipase in the evaluation of acute abdominal pain. *Am Surg* 1996;**62**:1028-33.

**Kempainen EA**, Hedstrom JI, Puolakkainen PA, *et al*. Rapid measurement of urinary trypsinogen-2 as a screening test for acute pancreatitis. *N Engl J Med* 1997;**336**:1788-93.

**Keim V**, Teich N, Fielder F, *et al*. A comparison of lipase and amylase in the diagnosis of acute pancreatitis in patients with abdominal pain. *Pancreas* 1998;**16**:45-9.

## Management of acute ethylene glycol poisoning

Report by Paul Wallman, *Specialist Registrar*  
Checked by Kerstin Hogg, *Clinical Research Fellow*

#### Abstract

A short cut review was carried out to establish whether methylpyrazole is better than ethanol and/or haemodialysis in the treatment of ethylene glycol poisoning. Altogether 524 papers were found using the reported search, of which none presented any evidence to answer the clinical question. Two papers reported relevant case series. The author, date, and country of publication, patient group studied, study type, relevant outcomes, results, and study weaknesses of these papers are tabulated.

#### Clinical scenario

A 29 year old man attends the emergency department having ingested an unknown quantity of car anti-freeze liquid. His airway, breathing, and circulation are satisfactory. He is normoglycaemic. He appears intoxicated, has a depressed level of consciousness with no evidence of injury. You have heard that there is a new treatment available and wonder whether this (methylpyrazole) is better than the standard approach of ethanol and/or haemodialysis.

#### Three part question

In [patients poisoned with ethylene glycol] is [methylpyrazole better than ethanol with or without haemodialysis] at [preserving renal function and reducing mortality]?

Table 5

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Borron SW <i>et al</i> , 1999, France	38 acute poisonings of which 11 patients had plasma ethylene glycol concentrations of 0.20 g/l or more.	Prospective observational	Death Serum creatinine	1/38 patients died 0/7 patients who had a normal renal function at presentation had no further deterioration in serum creatinine 4/38 experienced	Simple case series- all patients received fomepizole, no controls Details regarding patient demographics and outcomes inadequate No account taken of confounding alcohol ingestion
Brent J <i>et al</i> , 1999, USA	23 acute poisonings of which 19 met inclusion criteria including a plasma ethylene glycol concentration of >20 mg per decilitre	Prospective observational	Death Serum creatinine  Ethylene glycol metabolites  Cranial neuropathies Side effects	1/19 patients died 17/19 underwent haemodialysis as per study protocol, 3/19 had an increased serum creatinine at last study reading All patients demonstrated progressive reduction in blood glycolate concentration 0/19 patients 2 patients had seizures, 2 patients experienced headaches, 2 patients became bradycardic	Simple case series studying the metabolic progress of patients All patients received fomepizole - no controls Authors cannot conclude that fomepizole is safe and effective

### Search strategy

Medline 1966–06/02 using the OVID interface. (exp Ethylene Glycol/ or ethylene glycol.mp OR ethylene.mp OR antifreeze.mp OR antifreeze.mp) AND (exp ethanol or ethanol.mp OR exp Renal Dialysis/ or haemodialysis.mp OR exp pyrazoles or pyrazoles.mp OR fomepizole.mp OR methylpyrazole.mp OR exp antidotes OR antidote\$.mp OR pyrazol\$.mp) LIMIT to human AND English.

### Search outcome

Altogether 524 papers were found of which only two looked at newer treatments and none were comparative. These two papers are shown in table 5.

### Comment(s)

Ethylene glycol poisoning is not common and small number studies are justified. The studies shown above are observational rather than randomised trials with established practice. Furthermore in the second study 17 of 19 patients underwent haemodialysis as well as receiving fomepizole. A satisfactory randomised trial with fomepizole and “non-fomepizole” arms is needed. Both the studies shown above were supported by grants from the manufacturers of fomepizole (Antizol).

### ► CLINICAL BOTTOM LINE

There is no evidence comparing the effectiveness of haemodialysis, ethanol, or fomepizole in treating ethylene glycol poisoning. Local guidance should be followed.

**Borron SW**, Megarbane B, Baud FJ. Fomepizole in treatment of uncomplicated ethylene glycol poisoning. *Lancet* 1999;**354**:831.

**Brent J**, McMartin K, Phillips S, *et al*. Fomepizole for the treatment of ethylene glycol poisoning. *N Engl J Med* 1999;**340**:832–8.

## Bed rest after lumbar puncture

Report by Stewart Teece, *Clinical Research Fellow*

Checked by Ian Crawford, *Research Fellow*

### Abstract

A short cut review was carried out to establish whether a period of bed rest reduces the incidence of headache or other complications in patients undergoing diagnostic lumbar puncture. Altogether 85 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 27 year old woman attends the emergency department with a two day history of headache with mild neck stiffness. She appears otherwise well. Her CT scan is normal and you feel that if a lumbar puncture is normal she can be discharged. The duty physician advises you that the patient will require four hours bed rest after the lumbar puncture. The duty anaesthetist overhears and says that the patient will be able to go home immediately. You wonder if either of them is right.

### Three part question

In [patients undergoing diagnostic lumbar puncture] does [a period of bed rest] reduce [the incidence of headache or other complications].

### Search strategy

Medline 1966 to 06/02 using the Ovid Interface. {[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 posture OR posture.af OR supine.af OR flat.af OR immobilis\$.af OR recumben\$.af OR (bed adj5 rest).af] AND [exp headache OR exp headache disorders OR headache.af]} LIMIT to human AND English Language.

### Search outcome

Altogether 85 papers were found five of which were relevant to the three part question. These are shown in table 6.

### Comment(s)

Most of the papers have found no statistical significance between the two groups. A rough calculation based on the data available shows that ambulant patients developed headache 31.7% (95% CI 27.4 to 36.1) of the time while those having bed rest suffered from this symptom 35.8% (95% CI 31.3 to 40.3) of the time. The confidence intervals overlap. Any difference between the two groups is likely to be so small that the sample size necessary to reveal it would be huge. The studies excluded patients with preceding headache. However, the question posed is about a patient undergoing a lumbar puncture to aid in the diagnosis of headache. A study by Kuntz *et al*<sup>26</sup> has shown a 21% higher incidence of post lumbar puncture

Table 6

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Carbaat PA and van Crevel H, 1981, Netherlands	100 neurological patients undergoing LP all done by same investigator with 18G needle. 50 ambulant, 50-24 hour bed rest.	Controlled trial	Incidence of headache	ambulant- 38% bed rest- 36% (NS)	p not stated small numbers
Dieterich M and Brandt T, 1985, Germany	160 patients undergoing LP for ? MS. 78 with 30 minute prone with head down tilt, 82 immediately ambulant. 20G and 22G needles used	Controlled trial	Incidence of headache Headache described as above	ambulant 41% head down tilt 44% ambulant 18% head down tilt 14%	Statistical significance not assessed. Patients with prior headache excluded. Substudy of needle size may complicate results. Difficult LP excluded.
Vilming ST <i>et al</i> , 1988, Norway	150 men 150 women for neurological investigation. 75 men and 75 women ambulant. Remainder 3 h prone then 3 h supine. All 22G using needle.	PRCT	Headache Nausea	ambulant 35% bed rest 39% (NS) ambulant 23% bed rest 13% (p<0.05)	Significance headache calculated but not stated. Patients with preceding headache excluded.
Spriggs DA <i>et al</i> , 1992, UK	110 patients undergoing diagnostic LP. 54 ambulant 56 bed rest for 4 hours	PRCT	Incidence of headache	Ambulant 32% Bed rest 31% (NS)	Statistical significance assessed but not given. Small discrepancies between two groups for needle size and operator experience. Patients with headache excluded.
Vimala J <i>et al</i> , 1998, Country not stated but ? India	204 patients undergoing diagnostic LP. 100 ambulant 104 24 hour bed rest.	PRCT	Incidence of headache Headache considered severe	ambulant 15% (95% CI 12 to 22%) bed rest 18% (95% CI 8 to 22%) Ambulant 57% Bed rest 12% (p=0.02)	Randomisation method unclear but possibly highly flawed. Discrepancies in needle size and operator experience.

symptoms in those with preceding headache. A further study is therefore required to assess the question in patients with pre-existing headache.

#### ► CLINICAL BOTTOM LINE

Bed rest does not decrease the incidence of post lumbar puncture headache.

**Carbaat PA**, van Crevel H. Lumbar puncture headache: controlled study on the preventive effect of 24 hours' bed rest. *Lancet* 1981;ii:1133-6.

**Dieterich M**, Brandt T. Is obligatory bed rest after lumbar puncture obsolete? *Eur Arch Psychiatr Neural Sci* 1985;235:71-5.

**Vilming ST**, Schrader H, Monstad I. Post lumbar-puncture headache: the significance of body posture. A controlled study of 300 patients. *Cephalalgia* 1998;8:75-8.

**Spriggs DA**, Burn DJ, French J, *et al*. Is bed rest useful after diagnostic lumbar puncture? *Postgrad Med J* 1992;68:581-3.

**Vimala J**, Peter JV, Jeyaseelan L, *et al*. Post lumbar puncture headache: Is bed rest essential? *J Assoc Physicians India* 1998;46:930-2.

\***Kuntz KM**, Kokmen E, Stevens JC, *et al*. Post lumbar puncture headaches: experience in 501 consecutive procedures. *Neurology* 1992;42:1884.

## Difficult intubation, the bougie and the stylet

Report by Ian Jones, Registered Paramedic

Checked by Katherine Roberts, Research officer

#### Abstract

A short cut review was carried out to establish whether a gum elastic bougie is more effective than a stylet at improving the success rate in difficult intubation. Altogether 32 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 paramedic ambulance is dispatched to a 36 year old woman who has fallen from a horse. On arrival the rider is not wearing a helmet, is unconscious, and has laboured diaphragmatic

breathing. A cervical spine injury is suspected and orotracheal intubation is indicated because of the reduced respiratory effort, possible head injury, and the long transport time to the nearest emergency department. The patient has a grade 3 laryngoscopic view (Cormack and Lehane). You wonder whether intubation would be made easier if you had a gum elastic bougie or stylet.

#### Three part question

In a [restricted view intubation] is the [gum elastic bougie more effective than a stylet] at [improving the intubation success rate]?

#### Search strategy

Medline and HealthStar 1966-06/02 using the OVID interface. [{exp intubation, intratracheal OR intubat\$.mp OR intubation\$.mp OR exp intubation OR exp laryngoscopy OR laryngoscopy.mp} AND {introducer.mp OR bougie\$.mp OR gum elastic.mp OR stylet\$.mp}] LIMIT to human AND English.

#### Search outcome

Altogether 334 papers found of which one was relevant. This is shown in table 7.

#### Comment(s)

The use of simulated views is less than ideal. Despite this drawback the results clearly answer the question posed. A further study comparing the bougie, the lighted and unlighted stylet in both grade 3 and grade 4 views would be useful.

#### ► CLINICAL BOTTOM LINE

The gum elastic bougie is superior to the stylet at increasing the intubation success rate, when tested on simulated grade 3 views.

**Gataure PS**, Vaughan RS, Latto IP Simulated difficult intubation. Comparison of the gum elastic bougie and the stylet. *Anaesthesia* 1996;51:935-8.

Table 7

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Gataure PS <i>et al</i> , 1996, UK	100 patients undergoing elective surgery randomly split into 2 equal groups. Group 1 were intubated using 2 attempts with a bougie followed by a stylet while group 2 were intubated with 2 attempts with a stylet followed by a bougie. Simulated grade 3 views were used. Bougie v stylet	RCT	Success rate after 2 attempts  Mean time for 2 intubation	48/50 (96%) v 33/50 (66%) p<0.001  30.1 sec v 36.6 sec	Not tested with grade 4 views. The study did not compare lighted stylets against bougies and unlighted stylets The study used simulated difficult intubations rather than actual difficult intubations

## To stab or slash: the percutaneous dilatation or standard surgical approach to cricothyroidotomy in prehospital care

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### Abstract

A short cut review was carried out to establish whether surgical or percutaneous dilatation techniques offer better success rates in emergency cricothyroidotomy. Altogether 114 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 paramedic ambulance is dispatched to a 24 year old man who has been ejected through the windscreen of his car. On arrival at the scene the patient is found to have major maxillo-facial injuries with a seriously compromised airway. Airway control cannot be achieved by manual techniques and endotracheal intubation is not possible. You decide to attempt cricothyroidotomy and wonder whether the surgical technique is preferable to the percutaneous dilatation technique.

### Three part question

In an [adult requiring emergency cricothyroidotomy] is [the standard surgical approach more effective than a percutaneous dilatation method] at [achieving an open airway and minimising complications]?

### Search strategy

Medline 1966–06/02 using the OVID interface. [{cricothyroid.mp OR surgical airway.mp} AND {percutaneous.mp OR needle.mp OR surgical}] LIMIT to human AND English.

### Search outcome

Altogether 144 papers found of which 142 were irrelevant to the study. The two remaining papers are shown in table 8.

### Comment(s)

The study by Johnson *et al* found statistically significant differences in the insertion times and the subjective ease of use of the procedure, which were both in favour of the surgical approach. This study was of a lower quality than the Eisenburger study, which found no statistically significant differences between the techniques.

### ► CLINICAL BOTTOM LINE

There is no convincing evidence that either technique is superior in the prehospital environment. The operator should use the technique with which they are most familiar.

**Johnson DR**, Dunlap A, McFeely P, *et al*. Cricothyrotomy performed by prehospital personnel: a comparison of two techniques in a human cadaver model. *Am J Emerg Med* 1993;**11**:207–9.

**Eisenburger P**, Iaczkia K, List M, *et al*. Comparison of conventional surgical versus Seldinger technique emergency cricothyrotomy performed by inexperienced clinicians. *Anesthesiology* 2000;**92**:687–90.

Table 8

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Johnson DR <i>et al</i> , 1993, USA	Human adult cadavers. SA v PD.	Controlled trial	Insertion success:  Insertion times:  Ease of method (0 to 10 scale)	86% v 73% (p=0.186)  55+/-35 sec v 148+/-96 sec (p<0.01) 3.0+/-1.5 v 5.1+/-3.3 (p<0.01)	The use of pig skin instead of human skin. Some of the procedures performed on violated cricothyroid membranes because of lack of cadavers
Eisenburger P <i>et al</i> , 2000, Austria	40 consecutive unembalmed adult human cadavers, who had died 4–24 hours previously SA v Seldinger cricothyroidotomies	Controlled trial	Insertion success:  Insertion times:  Ease of method (1 to 5 scale)	70% v 60%  102+/-42 v 100+/-46 2.2 v 2.4	Limited size of the trial