

BEST EVIDENCE TOPIC REPORTS

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.¹ Each BET has been constructed in the four stages that have been described elsewhere.² The four topics covered in this issue of the journal are:

- Signs and symptoms of oesophageal coins
- Immobilisation of suspected scaphoid fractures
- Activated charcoal in tricyclic antidepressant overdose
- Acute analgesia in non-traumatic abdominal pain

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.

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Signs and symptoms of oesophageal coins

Report by Vincent Choudhery, *Specialist Registrar*

Search checked by Sue Maurice, *Consultant*

Clinical scenario

A 3 year old boy is brought into the emergency department by his mother. She says that he swallowed a coin two hours earlier. The boy is asymptomatic. You wonder whether any investigation needs to be done to exclude oesophageal impaction.

Three part question

In [children who have swallowed coins] is [history and examination] accurate at [ruling out oesophageal impaction]?

Search strategy

Medline 1966 to 12/99 using the OVID interface. ({exp numismatics OR coin\$.mp OR exp foreign bodies OR foreign body.mp OR foreign bodies.mp} AND {exp pediatrics OR pediatric\$.mp OR paediatric\$.mp OR child\$.mp} AND {ingest\$.mp OR swallow\$.mp OR exp esophagus OR esophagus.mp OR esopha-

Table 1

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Hodge <i>et al</i> , 1985, USA ¹	92 children attending an emergency department with a history of coin ingestion. 25 oesophageal coins	Retrospective survey	Proportion of oesophageal coins that were asymptomatic	11 of 25 (44%) asymptomatic	
Caravati <i>et al</i> , 1989, USA ²	66 children attending for chest x ray with a history of coin ingestion. 11 oesophageal coins	Prospective survey	Proportion of oesophageal coins that were asymptomatic	2 of 11 (18%) asymptomatic	
Schunk <i>et al</i> , 1989, USA ³	52 children attending an emergency department with a history of coin ingestion. 30 oesophageal coins	Prospective survey	Proportion of oesophageal coins that were asymptomatic	9 of 30 (32%) asymptomatic	
Suita <i>et al</i> , 1989, Japan ¹	141 children attending an emergency department with a history of ingested foreign body. 11 oesophageal coins	Retrospective survey	Proportion of oesophageal coins that were asymptomatic	7 of 11 (64%) asymptomatic	
Stringer <i>et al</i> , 1991, UK ³	50 children with a history of coin ingestion. 15 oesophageal coins	Retrospective survey	Proportion of oesophageal coins that were asymptomatic	9 of 15 (60%) asymptomatic	
Connors <i>et al</i> , 1995, USA ⁴	73 children with oesophageal coins	Retrospective survey	Proportion of oesophageal coins that were asymptomatic	5 of 73 (7%) asymptomatic	
Macpherson <i>et al</i> , 1996, USA ⁷	118 children with 123 episodes of retained oesophageal foreign bodies. 85 oesophageal coins	Retrospective survey	Proportion of oesophageal foreign bodies that were asymptomatic	20% asymptomatic	Not only coins studied and results for coins alone not clear

geal.mp OR oesophagus.mp OR oesopha-
geal.mp}) LIMIT to human AND english.

Search outcome

Altogether 435 papers were found of which 428 were irrelevant or of insufficient quality. The remaining seven papers are shown in table 1.

Comments

All studies show that a significant number of children with oesophageal coins are asymptomatic.

Clinical bottom line

All children with a history of coin ingestion

should have further investigation to exclude oesophageal impaction.

- 1 Hodge D, Tecklenburg F, Fleisher G. Coin ingestion: does every child need a radiograph? *Ann Emerg Med* 1985;14:443–6.
- 2 Caravati EM, Bennett DL, McElwee NE. Pediatric coin ingestion. A prospective study on the utility of routine roentgenograms. *Am J Dis Child* 1989;143:549–51.
- 3 Schunk JE, Corneli HC, Bolte R. Pediatric coin ingestions. *Am J Dis Child* 1989;143:546–8.
- 4 Suita S, Ohgami H, Nagasaki A, et al. Management of pediatric patients who have swallowed foreign objects. *Am Surg* 1989;55:585–90.
- 5 Stringer MD, Capps SNJ. Rationalising the management of swallowed coins in children. *BMJ* 1991;302:1321–2.
- 6 Conners GP, Chamberlain JM, Ochsenchlager DW. Symptoms and spontaneous passage of esophageal coins. *Arch Pediatr Adolesc Med* 1995;149:36–9.
- 7 Macpherson RI, Hill JG, Othersen HB, et al. Esophageal foreign bodies in children: diagnosis, treatment and complications. *Am J Radiol* 1996;166:919–24.

Immobilisation of suspected scaphoid fractures

Report by Kathryn Gow, *Medical Student*

Search checked by Rob Williams, *Clinical Fellow*

Clinical scenario

A 25 year old man attends the emergency department with a one day old wrist injury caused by falling onto his outstretched hand. He is tender in his anatomical snuff box and also on longitudinal thumb compression, but he is in very little pain on normal everyday movements. You send him for a scaphoid series of x rays which reveal no fracture. You arrange for him to return to the department in two weeks time for a repeat radiological and clinical examination. You wonder whether his wrist should be immobilised in a plaster cast or whether a simple elastic support bandage will suffice.

Three part question

In [patients with clinical signs of scaphoid fracture but no fracture on first x ray] is [plaster casting] necessary for [immediate management and the prevention of long term complications]?

Search strategy

Medline 1966 to 12/99 using the OVID interface. [(exp fractures OR exp fractures, closed OR exp fractures, malunited OR exp fractures, ununited OR fracture\$.mp) AND scaphoid\$.mp) AND (exp casts, surgical OR cast\$.mp OR plaster.mp OR exp splints OR splint\$.mp OR exp immobilisation OR immo-

bilisation.mp}] LIMIT to human AND english.

Search outcome

Altogether 131 papers were found of which 127 were irrelevant to the study question or of insufficient quality for inclusion. The remaining four papers are shown in table 2.

Comment

There is no direct evidence to answer the questions posed. The only prospective randomised controlled trial shows that patients return to work sooner if they are treated with a supportive bandage, but the follow up was too short to show any complications of this approach. It appears that the adverse event rate (fracture) is low (1%–5%) in the target population. In this subpopulation of fractures the adverse event rate (delayed union or non-union) is also low (10%–20%)—thus the overall long term complication rate for clinically suspected scaphoid fractures is tiny (0.1%–1%). None of the studies include enough patients to show any effect on this.

Clinical bottom line

There is no evidence to answer the question posed. Further work is needed in this area.

- 1 Duncan DS, Thurston AJ. Clinical fracture of the carpal scaphoid—an illusionary diagnosis. *J Hand Surg (Br)* 1985;10:375–6.
- 2 DaCruz DJ, Bodiwala GG, Finlay DB. The suspected fracture of the scaphoid: a rational approach to diagnosis. *Injury* 1988;19:149–52.
- 3 Sjolín SU, Andersen JC. Clinical fracture of the carpal scaphoid—supportive bandage or plaster cast? *J Hand Surg (Br)* 1988;13:75–6.
- 4 Jacobsen S, Hassani G, Hansen D, et al. Suspected scaphoid fractures. Can we avoid overkill? *Acta Orthop Belg* 1995;61:74–8.

Table 2

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Duncan and Thurston, 1985, UK ¹	108 patients with a diagnosis of clinical fracture of the scaphoid	Retrospective survey	Proportion of patients found to have a fracture	0 of 108 (0%)	
DaCruz et al, 1988, UK ²	150 wrists immobilised on plaster with suspected scaphoid fracture	Retrospective survey	Fracture rate	8 of 150 (5.33%)	
Sjolín and Andersen, 1988, Denmark ³	108 clinically suspected scaphoid fractures Plaster cast v supportive bandage	PRCT	Fracture rate Sick leave for manual workers	7 of 108 14 v 4 days	Only 2 weeks follow up
Jacobsen et al, 1995, Denmark ⁴	231 clinically suspected scaphoid fractures	Retrospective survey	Proportion of patients found to have a fracture	3 of 231 (1.3%)	

PRCT = prospective randomised controlled trial.

Table 3

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Crone <i>et al</i> , 1977, UK ¹	Health volunteers given 75 mg nortriptyline 10 g medicinal at 30 min	Experimental	Plasma nortriptyline level	60% decreased	Small dose of TCA
Crome <i>et al</i> , 1983, UK ²	48 patients with suspected TCA overdose. All had gastric lavage 10 g medicinal <i>v</i> nothing	PRCT	Plasma TCA concentration Clinical signs	No difference in rate of fall noted No significant difference	Small numbers with complications. Small charcoal dose. 18 patents excluded
Karkkainen and Neuvonin, 1986, Germany ³	6 healthy volunteers. Each took 75 mg amitriptyline 50 g charcoal within 5 min	Experimental	Plasma TCA absorption	Decreased by 99%	Small dose of TCA Unrealistic time to charcoal
Hulten <i>et al</i> , 1988, Multinational ⁴	77 patients over 14 years old with TCA overdose. All had gastric lavage 20 g charcoal <i>v</i> nothing	PRCT	Plasma TCA concentration Clinical signs	No significant difference in peak or half life No significant difference	Control group differed from charcoal group at baseline

PRCT = prospective randomised controlled trial.

Activated charcoal in tricyclic antidepressant overdose

Report by Claire Park, *Medical Student*

Search checked by Katrina Richell-Herren, *Research Fellow*

Clinical scenario

A 25 year old woman attends the emergency department having taken an overdose of amitriptyline. You wonder whether she will benefit from treatment with activated charcoal.

Three part question

In [adults who have taken a tricyclic antidepressant (TCA) overdose] is [activated charcoal] effective at [reducing drug absorption and reducing complication rates]?

Search strategy

Medline 1966 to 12/99 using the OVID interface. ([Exp antidepressant, tricyclic OR tricyclic\$.mp OR TCA\$.mp OR exp desipramine OR exp nortriptyline OR desipramine OR amitriptyline] AND [exp charcoal OR charcoal.mp]) LIMIT to human AND english.

Search outcome

Altogether 79 papers were found of which 69 were irrelevant and six of insufficient quality for inclusion. The remaining four papers are shown in table 3.

Comment

There are two types of study reported. The first is experimental and shows significant effect from rapid administration of charcoal to volunteers taking therapeutic doses of TCAs. The second type is clinical and show no benefit from charcoal administered at various times after overdose of TCAs. However both clinical studies use low charcoal doses after gastric lavage.

Clinical bottom line

There is no convincing evidence that activated charcoal is effective in preventing TCA absorption or complication rates after TCA overdose. More work is needed in this area.

- 1 Crome P, Dawlings S, Braithwaite RA, *et al*. Effect of activated charcoal on the absorption of nortriptyline. *Lancet* 1977;ii:1203-5.
- 2 Crome P, Adams R, Ali C, *et al*. Activated charcoal in tricyclic antidepressant poisoning: pilot controlled clinical trial. *Human Toxicology* 1983;2:205-9.
- 3 Karkkainen S, Neuvonin PJ. Pharmacokinetics of amitriptyline influenced by oral charcoal and urinary pH. *Int J Clin Pharmacol* 1986;24:326-32.
- 4 Hulten BA, Adams R, Askenasi R, *et al*. Activated charcoal in tricyclic antidepressant poisoning. *Human Toxicology* 1988; 7:307-10.

Analgesia and assessment of abdominal pain

Report by Kevin Mackway-Jones, *Consultant*

Search checked by Magnus Harrison, *Research Fellow*

Clinical scenario

A 12 year old girl presents to the emergency department with "tummy ache". The history and examination are suggestive of appendicitis. You call the surgical team but they are unable to attend for one hour as they are busy in theatre. You wonder if giving analgesia will affect the accuracy of the surgical diagnosis.

Three part question

In a [patients with abdominal pain] does [analgesia prior to surgical consultation] affect [the accuracy of surgical diagnosis]?

Search strategy

Medline 1966 to 12/99 using the OVID interface. ([exp abdominal pain OR abdominal pain\$.mp OR exp peritonitis OR peritonitis.mp] OR {[exp pain OR pain\$.mp] AND [abdom\$.mp OR exp stomach OR stomach.mp OR tummy.mp]}) AND [exp analgesia OR exp morphine OR exp analgesia, opioid OR analgesi\$.mp] AND maximally sensitive RCT filter LIMIT to human and english.

Table 4

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Zoltie and Cust, 1986, UK ¹	288 patients with acute abdominal pain Buprenorphine 200 µg v buprenorphine 400 µg v placebo	PRCT	Pain relief Clinical diagnosis	Proportional to dosage Not affected	
Attard <i>et al</i> , 1992, UK ²	100 consecutive patients admitted to a surgical firm Papaveretum 20 mg v normal saline	PRCT	Pain score Tenderness score Incorrect diagnosis	Significantly better with papaveretum (p<0.0001) Significantly better with papaveretum (p<0.0001) 2 after papaveretum v 9 after saline	Papaveretum no longer used
Pace and Burke, 1996, USA ³	71 adult patients with acute, atraumatic abdominal pain in an emergency department Morphine IV (35) v normal saline (36)	PRCT	Pain score Accuracy of provisional diagnosis Accuracy of final diagnosis	Significantly better with morphine (p<0.001) No difference No difference	
LoVecchio <i>et al</i> , 1997, USA ⁴	48 patients with acute abdominal pain Morphine 10 mg v morphine 5 mg v placebo	PRCT	Change in physical examination Delay in diagnosis	Significant changes in both morphine groups No diagnostic delay in any group	Very small numbers
Vermeulen <i>et al</i> , 1999, Switzerland ⁵	340 patients aged 16 years or more with suspected appendicitis Morphine IV (175) v placebo (165)	PRCT	Pain relief Sensitivity and specificity of ultrasound diagnoses Appropriateness of the decision to operate	Greater in morphine group No significant difference No significant difference	

PRCT = prospective randomised controlled trial.

Search outcome

Altogether 78 papers were found of which 73 were irrelevant or of insufficient quality for inclusion. The remaining five papers are shown in table 4.

Comment

All the studies show considerable benefit to the patient from pain relief with either no change in diagnostic accuracy or an improvement.

Clinical bottom line

Patients with acute, atraumatic abdominal pain should have analgesia administered without delay.

- 1 Zoltie N, Cust MP. Analgesia in the acute abdomen. *J R Coll Surg Engl* 1986;68:209–10.
- 2 Attard AR, Corlett MJ, Kidner NJ, *et al*. Safety of early pain relief for acute abdominal pain. *BMJ* 1992;305:554–6.
- 3 Pace S, Burke TF. Intravenous morphine for early pain relief in patients with acute abdominal pain. *Acad Emerg Med* 1996;3:1086–92.
- 4 LoVecchio F, Oster N, Sturmman K, *et al*. The use of analgesics in patients with acute abdominal pain. *J Emerg Med* 1997;15:775–9.
- 5 Vermeulen B, Morabia A, Unger PF, *et al*. Acute appendicitis: influence of early pain relief on the accuracy of clinical and US findings in the decision to operate—a randomized trial. *Radiology* 1999;210:639–43.

The BMA library supplied the papers.