

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 Infirmary¹ or placed on the BestBETs web site. 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.

- ▶ Seldinger technique chest drains and complication rate
- ▶ Antacids and diagnosis in patients with atypical chest pain
- ▶ Need for cervical spine imaging for alert children after trauma
- ▶ Cervical spine imaging in children under 9 after trauma
- ▶ Conservative management of asymptomatic cocaine body packers
- ▶ Acute myocardial infarction in cocaine induced chest pain presenting as an emergency

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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.

Seldinger technique chest drains and complication rate

Report by Jon Argall, Senior Clinical Fellow in Emergency Medicine

Checked by Joel Desmond, RCS Research Fellow

Abstract

A short cut review was carried out to establish whether the seldinger “over the wire” technique is better than other techniques of pneumothorax drainage. Altogether 28 papers were found using the reported search, of which three 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 30 year old man presents to the emergency department after a road traffic accident. On initial assessment you identify a haemothorax/pneumothorax on the left side of his chest; there are no signs of tension. You elect to place a chest drain and discover that you have a seldinger “over the wire” technique chest drain in front of you. You wonder whether this method of placement is better than any other at achieving successful management of the injury without complication.

Three part question

In [a patient requiring a chest drain after trauma] is [a seldinger “over the wire” technique better than other methods or chest drain placement] at [achieving pneumothorax resolution without complication]?

Search strategy

Medline 1966–12/02 using the OVID interface. [(exp chest tubes OR exp thoracostomy OR “chest drain\$.mp) AND (“seldinger”.mp OR “needle wire dilator”.mp OR “over wire”.mp OR “small bore”.mp OR pigtail.mp OR “pig tail”.mp)] LIMIT to human AND English.

Search outcome

Altogether 28 papers were found by the Medline search. No papers were directly relevant but three papers had some relevance to our clinical question. These are listed in table 1.

Comment(s)

There is no comparative work looking at the use of a seldinger technique for placement of chest drains in adult trauma patients. Of the papers that were found uncontrolled series reports document their comparatively safe use in adults and children in well controlled elective and intensive care settings. Complications such as recurrence of the pneumothorax, kinking of the drain do still occur as is seen in the open technique, but insertion complications or difficulties seem to be rare.

▶ CLINICAL BOTTOM LINE

There is no evidence to show that a seldinger over the wire insertion technique is superior to traditional methods.

Ahmed MY, Silver P, Nimkoff L, *et al*. The needle-wire-dilator technique for the insertion of chest tubes in pediatric patients. *Pediatr Emerg Care* 1995;**11**:252–4.

Patz EF Jr., McAdams HP, Erasmus JJ, *et al*. Sclerotherapy for malignant pleural effusions: a prospective randomized trial of bleomycin vs doxycycline with small-bore catheter drainage. *Chest* 1998;**113**:1305–11.

Roberts JS, Bratton SL, Brogan TV. Efficacy and complications of percutaneous pigtail catheters for thoracostomy in pediatric patients. *Chest* 1998;**114**:1116–21.

Table 1

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Ahmed MY <i>et al</i> , 1995, USA	24 children aged 4 months to 24 years from a single paediatric ICU. Drains inserted with deep sedation using size 10 to 20 F drains	Retrospective single centre case series	Time for insertion Complications	4 to 7 minutes 5 tubes became kinked, causing 4 pneumothoraces to recur. 2 drains had to be reinserted. Otherwise no major complications	No control group Retrospective Different scenario to the emergency department
Patz ER Jr <i>et al</i> , 1998, USA	106 patients having elective insertion of a small-bore catheter for sclerotherapy for malignant pleural effusion. 14 F small bore catheter was inserted by seldinger technique, with image guidance	Prospective case series	Success of insertion Infections Other complications	No insertion failures reported No infections reported Pain scores for insertion not done but stated that technique was well tolerated	Sub-study of a sclerotherapy trial Not directly relevant to our clinical question Outcome measures were not defined before study
Roberts JS <i>et al</i> , 1998, USA	133 chest catheters inserted into 91 children in ICU. Age range 0–18 years. Weight 1.8–66 kg 7 to 8.5 F percutaneous pigtail catheters inserted in conjunction with wire and dilator by seldinger technique	Retrospective case series	Pneumothorax resolution Complications	15 of 20 patients who had drain for pneumothorax had complete resolution (75%) Haemothorax (2%) Pneumothorax (2%) Emphysema (1%) Cannulation of hepatic vein (1 pt) Failure to drain pneumothorax (11%) Dislodgement (5%) 1/3rd of complications were in infants <5 kg	80% had congenital heart disease 67% intubated Not directly relevant to the emergency department Retrospective uncontrolled methodology

Antacids and diagnosis in patients with atypical chest pain

Report by Stewart Teece, *Clinical Research Fellow*

Checked by Ian Crawford, *Clinical Research Fellow*

Abstract

A short cut review was carried out to establish whether antacids can be used as a diagnostic test in atypical chest pain. Altogether 374 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 57 year old man presents with a one hour history of central chest pain the character of which he cannot describe. There is no radiation but there is mild sweating and subjective shortness of breath. He has a history of smoking, hypertension, angina, and a hiatus hernia; the pain came on after a curry. He has a normal ECG on admission and an unremarkable examination. You cannot decide whether this is cardiac or oesophageal in origin and wonder whether a single dose of antacid might relieve his pain and therefore clarify the diagnosis

Three part question

In [a patient with chest pain of uncertain aetiology] is [the use of antacids/alginates] useful for [differentiating between cardiac and gastro-oesophageal causes]?

Search strategy

Medline 1966–12/02 using the OVID interface. [exp chest pain OR exp angina pectoris OR exp angina, unstable OR exp coronary disease OR exp myocardial infarction OR chest pain.af OR angina.af OR coronary.af OR myocardial.af OR cardiac.af OR myocard\$.af] AND [exp alginates OR exp antacids OR algin\$.af OR antacid.af OR antacids.af OR gaviscon.af OR algicon.af OR gastrocote.af OR peptac.af OR topical.af OR indigestion.af OR heartburn.af OR dyspepsia.af] LIMIT to human AND English language.

Search outcome

Altogether 374 papers were found only two of which directly addressed the three part question (table 2).

Comment(s)

Both studies are small, however in the Henderson paper if the 95% confidence intervals are calculated (81.5% to 100% typical, 9% to 30.2% atypical) there is a distinct difference between the two groups despite all the patients having normal ETTs and angiography. A further paper by Davies *et al* has shown that the instillation of acid into the stomach decreases the angina threshold on exercise testing. The above tests would suggest that reflux affects angina and vice versa. The vagus nerve has been suggested as the common link between the two.

► CLINICAL BOTTOM LINE

Antacids are useful in the relief of pain that is clearly oesophageal in origin but the effect is insufficiently specific to be of value in aiding diagnosis.

Henderson RD, Wigle ED, Sample K, *et al*. Atypical chest pain of cardiac and esophageal origin. *Chest* 1978;**73**:24–7.

Simpson FG, Kay J, Aber CP. Chest pain—indigestion or impending heart attack. *Postgrad Med J* 1984;**60**:338–40.

Davies HA, Rush EM, Lewis MJ, *et al*. Oesophageal stimulation lowers exertional angina threshold. *Lancet* 1985;i:1011–14.

Table 2

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Henderson RD <i>et al</i> , 1978, Canada	100 patients with typical reflux pain. 43 with atypical pain and investigations showing oesophageal disease and normal coronary arteries	Clinical trial	Relief of pain with antacids	95% relief in typical reflux group. 18% atypical pain group	Small numbers No blinding Statistical significance not assessed Antacid type/dose not described
Simpson FG <i>et al</i> , 1984, UK	46 patients with proven MI	Survey	Pain felt to be indigestion Relief of pain in those that had taken antacids	21/46 (45%) 5/17 (29%)	Small numbers Statistical significance not assessed

Need for cervical spine imaging for alert children after trauma

Report by Andreas Kontos, Savvas Omorphos, *Medical students*

Checked by Joel Desmond, *RCS Research Fellow*

Abstract

A short cut review was carried out to establish whether clinical examination can be used to exclude cervical spine injury in alert children. Altogether 298 papers were found using the reported search, of which three 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

An 11 year old boy is brought to the emergency department by paramedics after falling off his bicycle. They have immobilised his cervical spine with a hard collar. He has no visible external injury, is fully alert and cooperative and does not complain of any neck pain. You are aware of the "trend" for radiographic cervical spine imaging in virtually all blunt trauma patients, as unrecognised cervical spine injury can lead to disastrous neurological sequelae. However, you wonder whether imaging in this case is really necessary.

Three part question

In [alert children with suspected cervical trauma] is [clinical examination without cervical radiography] adequate to [exclude significant cervical injury]?

Search strategy

Medline 1966–12/02 using the OVID interface. [(exp spinal cord injuries) OR (cervical spine injur\$.mp)] AND [(exp x-rays) OR (x-rays.mp) OR (radiograph\$.mp)] AND [Best-BETs Paediatric filter] LIMIT to human AND English.

Search outcome

Altogether 298 papers were identified of which two were relevant. In addition NICE are undergoing a systematic review of head and cervical spine injury, and checking their search results, we found one additional paper that has not yet been indexed by Medline. These three papers are shown in table 3.

Comment(s)

Although the issue of radiographic assessment of children with suspected cervical injury has been addressed in several

studies, there is still insufficient evidence to support diagnostic standards, as the incidence of cervical injuries among paediatric samples is low. To date, the Nexus criteria (absence of: (1) midline cervical tenderness, (2) altered alertness, (3) intoxication, (4) neurological deficit, and (5) painful distracting injury) provide the most reliable instrument for assessing the need for cervical spine radiography in paediatric blunt trauma victims. However, in doubtful individual cases, decision should be at the clinician's discretion, as these criteria may not be 100% sensitive, because of the wide confidence interval around these findings.

► CLINICAL BOTTOM LINE

Cervical spine radiography is not necessary in paediatric blunt trauma victims over the age of 9 who are fully alert, conversant, show no signs of intoxication, have no neurological deficit, no midline cervical tenderness, and no painful distracting injury.

Laham JL, Cotcamp DH, Gibbons PA, *et al*. Isolated head injuries versus multiple trauma in pediatric patients: Do the same indications for cervical spine evaluation apply? *Pediatr Neurosurg* 1994;**21**:221–6.

Vicellio P, Simon H, Pressman BD, *et al*. A prospective multicenter study of cervical spine injury in children. *Pediatrics* 2001;**108**:E20.

American Association of Neurological Surgeons and the Congress of Neurological Surgeons. Management of pediatric cervical spine and spinal cord injuries. *Neurosurgery* 2002;**50** (suppl 3):S85–99.

Cervical spine imaging in children under 9 after trauma

Report by Savvas Omorphos, Andreas Kontos, *Medical students*

Checked by Joel Desmond, *RCS Research Fellow*

Abstract

A short cut review was carried out to establish whether the odontoid peg view is useful to radiologically exclude cervical spine injury in children under 9 years of age. Altogether 156 papers were found using the reported search, of which two presented the best evidence to answer the clinical question. In addition recent guidelines are noted. 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 have just read a recent important publication by the American Association of Neurological Surgeons and the Congress of Neurological Surgeons who recommend that in the under 9 age group, children requiring radiological assessment of their cervical spine need only undergo an AP or lateral cervical spine view. It is your current practice to perform three

Table 3

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Laham JL <i>et al</i> , 1994, USA	268 children aged 0–19, with apparent isolated head injuries defined by clinical and radiographic evidence in a single children's hospital. Low risk criteria for c-spine injury: capable of verbal communication and no neck pain	Retrospective cohort study	Performance of low risk criteria for excluding c-spine injury	No cervical spine injuries in the low risk group (n=135). 10 (7.5%) cervical injuries in the high risk group. (n=133) Sensitivity 100% Specificity 52%	The entry criteria of: significant head injury needing admission was made at the discretion of the PICU triage officer. GCS was not consistently recorded in these children 215 children had cervical radiographs (80%)
Viccellio P, <i>et al</i> , 2001, USA	Multicenter evaluation of 3065 children (age <18) with suspected c-spine injury who underwent clinical evaluation before c-spine radiography. Low risk criteria (Nexus criteria) were defined as absence of: (1) midline cervical tenderness, (2) painful distracting injury, (3) altered alertness, (4) neurological deficit, and (5) intoxication	Prospective cohort Study	Performance of low risk criteria for excluding c-spine injury	No child in the low risk group of 603 patients had a c-spine injury. Nexus criteria identified all cases of cervical injury diagnosed by radiography Sensitivity 100% (CI 87.8% to 100%) Specificity 19.8%	Number of children with cervical spine injury under nine was very low (only 4) Total number of children with cervical injury was only 30 (0.98%), therefore, CI for sensitivity was wide (87.8% to 100.0%) Caution is suggested for applying the Nexus criteria for children under 9 years.
American Association of Neurological Surgeons and the Congress of Neurological Surgeons, 2002, USA	Search of Medline (1966–2001) in the following subject headings: "spinal injuries" and "child" were reviewed with "cervical vertebrae", "spinal injuries" and "child". Altogether, 58 relevant articles were identified	Systematic review	Guidelines for the management of acute cervical spine and spinal cord injuries	In children experiencing trauma who are alert, conversant, have no neurological deficit, no midline cervical tenderness, no painful distracting injury and not intoxicated, cervical spine radiographs not recommended. This is a recommendation from grade 3 evidence papers except Nexus paper, which is grade 2	Search strategy is not reproducible. No mention of searching the grey literature or contacting experts for papers.

view radiography but you realise that getting the odontoid peg view can be very difficult in non-compliant children. You wonder on what evidence this specific guideline was based.

Three part question

In [children under 9 years old with suspected cervical spine injury] is [the odontoid peg view needed in addition to lateral and antero-posterior views] to [radiologically clear the cervical spine]?

Search strategy

Medline 1966–12/02 using the OVID interface. [(exp Spinal Cord Injuries) OR (spinal cord injur\$.mp) OR (cervical spine injur\$.mp) OR (spinal fractur\$.mp) OR (exp x-rays) OR (x-rays.mp) OR (radiograph\$.mp)] AND [(exp odontoid process) OR (odontoid.mp)] AND [BestBETs Paediatric filter] LIMIT to Human AND English.

Search outcome

Altogether 156 papers were identified of which two were relevant. The reference list of the guidelines were also searched but these were the only two papers of direct relevance. The two papers and the guidelines are summarised in table 4.

Comment(s)

The comprehensive review of the literature by the American Association of Neurological surgeons in 2002 come to the conclusion that odontoid peg views in the under 9 age group are unnecessary. However, Swischuk *et al* in their survey of 432 paediatric radiologists report that they have identified 46 fractures, seen on the odontoid peg view that could not be seen on the lateral view. The American Association have set the current best evidence guidelines in this area but it should be

remembered that they warn that these do not represent diagnostic standards and caution should be used in their application.

► CLINICAL BOTTOM LINE

Guidelines on cessation of the odontoid peg views in the under 9 age group should be viewed with great caution.

Swischuk LE, John SD, Hendrick EP. Is the open-mouth odontoid view necessary in children under 5 years? *Pediatr Radiol* 2000;**30**:186–9.

Buhs C, Cullen M, Klein M, *et al*. The pediatric trauma c-spine: is the "odontoid" view necessary? *J Pediatr Surg* 2000;**35**:994–7.

American Association of Neurological Surgeons and the Congress of Neurological Surgeons. Management of pediatric cervical spine and spinal cord injuries. *Neurosurgery* 2002;**50** (suppl 3):S85–99.

Conservative management of asymptomatic cocaine body packers

Report by **Debasis Das**, House Officer in Surgery

Checked by **Baha Ali**, Senior Clinical Fellow in Emergency Medicine

Abstract

A short cut review was carried out to establish whether asymptomatic cocaine body packers can be managed conservatively. Altogether 171 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

Table 4

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Swischuck L <i>et al</i> , 2000, USA	984 questionnaires submitted to paediatric radiologists (432 respondents) to determine whether odontoid views were included in the imaging protocols and how often odontoid fractures were missed on lateral views and detected on odontoid views in children under 5 years	Survey	Concept that the odontoid view might not be necessary in children under 5	Of the 432 respondents, 161 (37%) indicated that an open mouth odontoid view was not routinely included in their imaging protocol Of the 271 respondents who routinely use the open mouth odontoid view, 122 (45%) would request a CT if this view was too difficult to obtain 28 of the 432 respondents (7%) reported missing a total of 46 fractures on the lateral view that were detected on the odontoid view	Only 44% of radiologists responded Recollection of a missed fracture is not a reliable method of data collection Emergency physicians, not radiologists are the cohort of doctors who are actually most likely to recollect missed fractures such as these
Buhs C <i>et al</i> , 2000, USA	Multi-institutional review of all paediatric patients in the 0–16 age group with a documented cervical spine injury during a 10 year period from 1987–1997 at 4 hospitals. 51 children with cervical spine injury were identified from the medical records	Retrospective cohort study	Identification of a cervical fracture on odontoid peg view alone.	In no child in the 0–8 year old group was the odontoid peg view useful to make a diagnosis of fracture. Also in 63% of these children, the film was of such poor quality that the dens could not be evaluated In the 9–16 year-old group only 1 of 36 children (3%) was the open mouth view the diagnostic view (a Type III odontoid injury)	Total number of children with cervical injury was only 51 This study looks retrospectively at positive fractures only, no cohort of odontoid views was analysed, thus limiting greatly the utility of this study
American Association of Neurological Surgeons and the Congress of Neurological Surgeons, 2002, USA	Search of Medline (1966–2001) in the following subject headings: “spinal injuries” and “child” were reviewed with “cervical vertebrae”, “spinal injuries” and “child”. Altogether, 58 relevant articles were identified	Systematic review	Guidelines for the management of acute cervical spine and spinal cord injuries	Insufficient evidence to support diagnostic standards however the following are recommended: In children <9 years of age who have experienced trauma and are non-conversant, or have neurological deficit, an altered mental status, neck pain, or a painful distracting injury, are intoxicated, or have unexplained hypotension it is recommended that anteroposterior and lateral cervical spine radiographs be obtained.	Search strategy is not fully described in this paper Note authors came to their recommendations largely on the two other studies summarised above

outcomes, results and study weaknesses of these best papers are tabulated. A clinical bottom line is stated.

Clinical scenario

You are called to see a young adult male who is accompanied by two members of Her Majesty's Customs and Excise. They tell you that he is under suspicion of trying to smuggle drugs into the country and that he may have done this by ingesting packets of cocaine. Physical examination is unremarkable, but abdominal radiography does reveal multiple, oval foreign bodies in the bowel. You know that such “body packers” might well develop intestinal obstruction and/or get potentially fatal cocaine toxicity from leakage of the contents of these packages in their bowels. You wonder whether to simply leave the patient as he is and observe him for signs of obstruction and/or pending cocaine toxicity, intervene conservatively and do the latter as well, or do something more aggressive to remove the packages from the patient's intestines.

Three part question

In [asymptomatic patients who have swallowed packets of cocaine in order to smuggle them across borders] is [conservative management] effective at [preventing the morbidity and mortality associated with body packing]?

Search strategy

Medline 1966–12/02 using the OVID interface. [exp cocaine OR exp cocaine-related disorders OR exp crack cocaine OR

“cocaine”.mp] AND [exp foreign bodies OR exp gastrointestinal system OR “packet”.mp OR “INGESTED”.mp] LIMIT to human AND English Language.

Search outcome

Altogether 171 papers found of which 111 were irrelevant and a further 57 papers were unsuitable for inclusion due to either having insufficient patient numbers to be useful (usually single/double case reports—range: 1–7 patients, n=36 papers, including five letters/editorials), or for being irrelevant to the other core issue of how to actually manage cocaine packet ingestion (n=19 papers—usually on only investigating body packing). In addition one more relevant paper, not yet indexed on Medline was found The four papers are shown in table 5.

Comment(s)

It has generally become accepted that cocaine body packers who show signs of cocaine toxicity or gastrointestinal obstruction need emergency surgery. Additionally, when packets show signs of in vivo degradation (passing pieces of sloughed packet wrappings or actual packets with deteriorated packaging) emergency surgery may also be warranted.

The general management plan in asymptomatic cocaine body packers would seem to be conservative management consisting of mild laxatives and light solid or clear liquid diet with close monitoring and intravenous access maintenance throughout. Treatment usually ceases with the passage of at

Table 5

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
McCarron MM and Wood JD, 1983, USA	48 suspected smugglers with ingested intra-corporeal cocaine packets (number of packets per patient: 15–175)	Prospective cohort	Complete passage of packets per rectum Emergency surgery Complications of conservative management	47 patients 1 patient with obstruction 2 patients developed cocaine toxicity due to packet	
Caruana DS <i>et al</i> , 1984, USA	50 patients with ingested intra-corporeal cocaine packets. (number of packets passed per patient: 54–182)	Retrospective cohort	Complete passage of packets per rectum using conservative management. Elective surgery Complications of conservative management	44 patients 6 patients (their own choice) 3 patients required emergency surgery for obstruction	Treatment environment unknown Time from admission to onset of symptoms in the three patients who developed complications unknown
Aldrighetti L <i>et al</i> , 1996, Italy	61 asymptomatic suspected smugglers with ingested intra-corporeal packets of cocaine (number of packets ingested per patient: 52–117)	Retrospective cohort	Complete passage of packets per rectum using conservative management. Complications of conservative management	61 patients 2 patients required emergency surgery: 1 obstruction, 1 cocaine toxicity (on day 3 of admission)	Treatment environment unknown Time from admission to onset of symptoms in the obstructed patient unknown
Bulstrode N <i>et al</i> , 2002, UK	180 suspected smugglers with ingested intra-corporeal packets of contraband. (number of packets per patient: 2–217)	Retrospective cohort	Complete passage of packets per rectum using conservative management	144 asymptomatic body packers	Several key details unknown, for example, exact management of the 144 packers who were not admitted and discharge criteria

least two packet free stools, with or without supporting radiographic data (abdominal radiograph/ KUB), and only McCarron and Wood suggest using suppositories to obtain non-obstructing, intra-rectal packets.

That said, details such as management environment (intensive care/high dependency unit, emergency department, or general ward?) still remain unclear, and because none of the series mentioned above are prospective, randomised control trials, the validity of their results can also be called into question.

► CLINICAL BOTTOM LINE

The best evidence available suggests that asymptomatic cocaine body packers can be managed conservatively until they have completely passed their packets. Close clinical observation in the meantime allows for the early detection of patients developing complications that may require emergency surgery.

McCarron MM, Wood JD. The cocaine body packer syndrome. Diagnosis and treatment. *JAMA* 1983;250:1417–20.

Caruana DS, Weinbach B, Goerg D, *et al*. Cocaine-packet ingestion. Diagnosis, management, and natural history. *Ann Intern Med* 1984;100:73–4.

Aldrighetti L, Paganelli M, Giacomelli M, *et al*. Conservative management of cocaine-packet ingestion: experience in Milan, the main Italian smuggling center of South American cocaine. *Panminerva Med* 1996;38:111–16.

Bulstrode N, Banks F, Shrotria S. The outcome of drug smuggling by 'body packers'—the British experience. *Ann R Coll Surg Engl* 2002;84:35–8.

Acute myocardial infarction in cocaine induced chest pain presenting as an emergency

Report by Simon Carley, *Specialist Registrar*
Checked by Baha Ali, *Senior Clinical Fellow*

Abstract

A short cut review was carried out to establish the incidence of acute myocardial infarction in patients presenting as emergen-

cies with post-cocaine chest pain. Altogether 198 papers were found using the reported search, of which eight 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 32 year old man presents to the emergency department with central chest pain suggestive of cardiac ischaemia. He has had pain for 50 minutes after nasal cocaine. He is an occasional cocaine user who has not had chest pain previously. He is previously well. His 12 lead ECG is normal and he is now pain free. You see him in the resuscitation room and prescribe oral aspirin 300 mg. He is cardiovascularly stable. You admit him and do a 12 hour troponin T, which is normal. The next day a colleague suggests that there was no need to admit as he was well, had a normal ECG, had few risk factors, and that as cocaine causes spasm rather than clots he could have gone home. You wonder whether this is good advice.

Three part question

In [patients presenting with cocaine associated chest pain] what [is the incidence] of [acute myocardial infarction]?

Search strategy

Cochrane database and Medline 1966–12/02 using the OVID interface. [exp cocaine OR exp cocaine-related disorders OR exp crack cocaine OR cocaine.mp] AND [exp Myocardial Infarction OR myocardial infarction.mp OR exp Chest Pain OR chest pain.mp] LIMIT to human, English AND abstracts.

Search outcome

No relevant papers found on Cochrane library. Altogether 198 papers were found on Medline of which eight were relevant to the three part question (see table 6).

Comment(s)

The incidence of acute myocardial infarction in cocaine associated chest pain is small but significant. The ECG seems to have

Table 6

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Kossowsky WA <i>et al</i> , 1989, USA	19 patients presenting with chest pain shortly after intranasal, iv or smoking of cocaine	Prospective cohort study	Incidence of AMI Coronary angiogram	17 (89%) that demonstrate non-Q wave infarction 2 with Q wave infarction 5 patients: 4 normal coronary arteries 1 proximal stenosis of right coronary artery	Small study Hospitalised patients only
Amin M <i>et al</i> , 1990, USA	70 patients with cocaine associated chest pain	Retrospective cohort study	Incidence of AMI Sensitivity of ECG Specificity of ECG	22/70 (31%) 91% 60%	Small study Hospitalised patients only
Zimmerman JL <i>et al</i> , 1991, USA	48 admitted patients with cocaine associated chest pain	Retrospective case note review	Incidence of AMI Number of patients with ECG criteria for thrombolysis	3/48 (6%) 18/48 (37%)	Wide distribution of time between use and presentation Not ED patients
Gitter MJ <i>et al</i> , 1991, USA	101 admitted patients with cocaine associated chest pain	Prospective cohort study	Incidence of AMI Number of patients with ECG criteria for thrombolysis	No patients had AMI confirmed 8 (8%)	Poor gold standard used. CK rises or CKMB fractions
Hollander JE <i>et al</i> , 1994, USA	246 patients presenting with cocaine associated chest pain in 6 US centres	Prospective cohort study	Incidence of AMI Sensitivity of ECG for AMI PPV of ECG for AMI Specificity of ECG for AMI PPV of ECG for AMI	14/246 (6%) 36% 18% 90% 96%	Gold standard was a twofold rise in CKMB Not consecutive enrolment of patients
Mittleman MA <i>et al</i> , 1999, USA	Interviewed 3946 patients with AMI (an average of 4 days after infarction onset)	Case cross over study	38 (1%) reported cocaine use in the previous year. 9 reported cocaine use within the 60 minutes preceding the onset of infarction	The users of cocaine sustained a transient 24-fold increase in risk of MI in the hour immediately after cocaine use and that the increased risk rapidly decreased thereafter	Data based on patient self report Small number of exposed cases The absolute risk of MI onset cannot be directly estimated from the data
Weber JE <i>et al</i> , 2000, USA	250 patients presenting with cocaine associated chest pain in 29 US centres AMI diagnosed on WHO criteria	Prospective cohort study	Incidence of AMI Number with ECG changes compatible with ischaemia Number with ECG changes compatible with infarction Number without ECG changes who had confirmed infarction	15/250 (6%) 39/250 of which 4 had confirmed AMI 9/250 of which all had confirmed AMI 2/67 had confirmed AMI	Wide distribution of time between use and presentation (up to 7 days) 6% had no urinary metabolites Gold standard was a twofold rise in CKMB Most (91%) patients used crack cocaine
Feldman JA <i>et al</i> , 2000, USA	293 patients with cocaine associated chest pain. Sub-study of the Aci-TIPI trial	Prospective cohort study	Incidence of AMI Incidence of ACS	(0.7%) CI 0.08% to 2.4% with cocaine 1.4% CI 0.37% to 3.5%	Sub study of another trial. WHO criteria for AMI Wide variation of AMI incidence between hospitals

a higher false positive rate in these patients. A normal ECG reduces but does not exclude myocardial damage. Most acute myocardial infarction patients will present with ST elevation or an abnormal ECG. Many of the above papers exhibit selection bias as only admitted patients are used, this may account for some of the higher incidences recorded. They also enrol patients who have taken cocaine hours before symptomatology, this contradicts the known pharmacology of cocaine. Early presentation after cocaine use would normally be expected. It must be remembered that some of the reported incidence will be coincidental. Those patients presenting with normal findings, and a normal ECG have a low but not absent acute myocardial infarction risk. They should have myocardial damage excluded.

► CLINICAL BOTTOM LINE

Acute myocardial infarction should be excluded using cardiac markers in patients presenting to the emergency department with cocaine related chest pain.

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