

BEST EVIDENCE TOPIC REPORTS

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

Edited by K Mackway-Jones

Emerg Med J 2002;19:550-557

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 Eight BETs are included in this issue of the journal.

- ▶ Swimmers view or supine oblique views to visualise the cervicothoracic junction
- ▶ Computed tomography and the exclusion of upper cervical spine injury in trauma patients with altered mental state
- ▶ Antibiotics in compound depressed skull fractures
- ▶ Antibiotics in patients with isolated chest trauma requiring chest drains
- ▶ Lignocaine (lidocaine) premedication before rapid sequence induction in head injuries
- ▶ Ultrasound or computed tomography in paediatric blunt abdominal trauma
- ▶ Routine use of antibiotic ointment and wound healing
- ▶ Factor VIIa for intractable blood loss in trauma

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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.

Swimmers view or supine oblique views to visualise the cervicothoracic junction

Report by **Nasreen Contractor**, *Specialist Registrar*

Checked by **Martin Thomas**, *Specialist Registrar*
Abstract

A short cut review was carried out to establish whether swimmer's views were better than superior oblique views at visualising the C7/T1 junction. Eleven 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 36 year old man is brought to the emergency department after a road traffic accident. He complains of neck pain. A "pulled" lateral is taken, but fails to show the C7/T1 junction. You wonder whether a pair of supine oblique views or a swimmer's view would be best to visualise this region.

Three part question

In a [trauma patient in whom standard lateral views of the cervical spine are inadequate] is a [swimmer's view better than supine oblique views] at [visualising the C7/T1 junction]?

Search strategy

Medline 1966- 07/02 using the OVID interface. [supine oblique.mp OR trauma oblique.mp OR swimmers view.mp OR twining.mp] AND [exp X-Rays OR x-ray\$.mp or radiograph.mp OR exp radiography OR radiography.mp] AND [exp cervical vertebrae OR cervical spine.mp OR exp neck injuries OR neck injur\$.mp OR cervicothoracic junction.mp.] LIMIT to human AND English.

Search outcome

Altogether 11 papers were found of which only one was relevant to the original question (see table 1).

Table 1

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Ireland AJ <i>et al</i> , 1998, UK	427 consecutive patients who attended with acute trauma requiring cervical spine radiographs. 60 patients required additional swimmers view. 62 required additional paired supine oblique views.	Two phase prospective study	Able to visualise the vertebral bodies and posterior elements of the cervicothoracic junction	37% of the swimmers group and 38% of the supine oblique group were judged satisfactory. When vertebral bodies not shown adequately, 70% of supine obliques and 37% swimmers showed posterior elements adequately	9 patients from supine oblique group lost, therefore not included in calculations

Comments

While there are numerous articles expressing personal views, there is only this one paper that attempts to answer the question. This paper showed no difference in visualising the vertebral bodies of C7/T1 junction between swimmers or supine obliques, but supine obliques did visualise the posterior elements better. But 9 of 62 of supine oblique data were lost, which could have swayed the results either way. Therefore more research is needed in this area.

► CLINICAL BOTTOM LINE

Local advice should be followed.

Ireland AJ, Britton I, Forrester AW. Do supine oblique views provide better imaging of the cervicothoracic junction than swimmer's views? *J Accid Emerg Med* 1998;15:151-4.

Computed tomography and the exclusion of upper cervical spine injury in trauma patients with altered mental state

Report by Martin Thomas, Specialist Registrar

Checked by Stewart Teece, Clinical Research Fellow

Abstract

A short cut review was carried out to establish whether CT scans of the upper cervical spine are necessary in trauma patients with altered mental status and normal plain radiographs. A total of 572 papers were found using the reported search, of which six 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 20 year old man is brought into the emergency department having been hit by a high speed vehicle while crossing the road. He has a large haematoma to the head and is confused and combative. Plain radiographs of his cervical spine are normal, as are radiographs of his chest and pelvis. You request a CT brain scan and a CT of his upper cervical spine, as you have heard that plain radiographs can miss injuries in this area. The radiologist does not agree that this is indicated as the plain radiographs of the cervical spine appear normal. You wonder if there is any evidence to support your request.

Three part question

In [trauma patients with altered mental status] is [plain radiography as good as CT] at [diagnosing significant upper cervical spine injuries]?

Table 2

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Kirshenbaum KJ, et al 1990, USA	50 consecutive patients with significant head trauma CT v radiography.	Prospective case series.	Number of patients with significant upper cervical spine fractures	4 v 0	Sensitivity of CT not assessed
Woodring JH and Lee C, 1993, USA	216 consecutive patients with acute traumatic fractures, subluxations or dislocations of cervical vertebrae. CT of entire cervical spine and plain films performed on all patients	Retrospective case series.	Fractures seen at time on plain film trauma series Fractures seen on plain films in retrospect Subluxations and dislocations seen at time on plain films Subluxations and dislocations seen on plain films in retrospect	39% 58% 64% 93%	Retrospective nature of study CT sensitivity not assessed
Link TM et al, 1995, Germany	202 patients with head injuries and GCS<7 37 (18.3% of patients) had fractures of occipital condyles, C1 or C2	Prospective consecutive series.	Number of fractures of C1 or C2 identified by CT or radiography Number of fractures of C1 or C2 identified by plain radiographs alone Mean time to perform (conventional) CT of upper cervical spine	28 (13.9% of patients) 17 (60.7% of those identified by CT) 8 minutes	Wide age range (3-86)
Ajani AE et al, 1998, Australia	91 major trauma patients with injuries to head or neck, or multiple injuries. 12 with abnormal or equivocal radiographs had CT scans. 48 unconscious or uncooperative with normal radiographs had passive flexion-extension views	Prospective consecutive case series.	Total patients identified with unstable cervical injury Patients identified as having unstable cervical injury with normal initial radiographs by flexion-extension views	6 (6.6%) 1 (1.1%)	CT not uniformly performed - possible that significant number of false negative radiographs missed.
Berne JD et al, 1999, USA	58 high risk blunt trauma patients, with inability to evaluate cervical spine clinically. ICU. All patients underwent plain lateral and AP +/- odontoid view when possible in non-intubated patients, and subsequent complete cervical helical CT (C0 to T1) CT v radiography	Prospective consecutive case series	Number of patients with stable injuries Number of patients with unstable injuries Sensitivity Specificity	12 (20.7%) 8 (13.8%) 18/20 (90%) v 12/20 (60%) 38/38 (100%) v 38/38 (100%)	Radiographic protocol violations in 9 patients of original 67 meeting criteria
Schenarts PJ et al, 2001, USA	1356 blunt trauma patients, aged over 14, with altered mental status (mean GCS 11) requiring CT evaluation of 2 or more body systems CT of C0-C3, in addition to five view plain film series. CT v radiography	Prospective consecutive case series	Number of patients in whom cervical spine injuries identified overall Number of patients in whom cervical spine injuries identified	70 (5.2% of all eligible patients) 67 v 38	Unblinded radiological review Haemodynamically unstable patients, those dying before plain films, those requiring immediate surgery excluded

Search strategy

Medline 1966–07/02 using the OVID interface. [Exp spinal injuries OR exp spinal fractures OR {(exp odontoid process OR exp axis OR exp atlas OR exp atlanto-axial joint OR exp cervical vertebrae OR odontoid.mp OR cervical.mp OR dens.mp OR cervical spine.mp)} AND (exp “wounds and injuries” OR trauma.mp OR exp fractures OR exp fractures, closed OR exp dislocations OR fracture\$.mp OR dislocation\$.mp)}] AND [exp confusion OR exp coma OR exp coma, post-head injury OR exp craniocerebral trauma OR head trauma.mp OR exp brain injuries OR head inj.mp OR exp intubation, intratracheal OR exp intubation OR exp delirium, dementia, amnesic, cognitive disorders OR altered mental status.mp OR unconscious.mp OR intubated.mp OR rapid sequence induction.mp OR coma.mp OR confusion.mp OR unevaluable.mp] AND [(exp “sensitivity-and-specificity” OR sensitivity.mp OR exp diagnosis OR exp pathology OR specificity.mp) OR exp tomography, x-ray computed OR computed tomography.mp OR exp x-rays OR x-ray\$.mp] LIMIT to human AND English.

Search outcome

Altogether 572 papers were found of which 566 were irrelevant or of insufficient quality for inclusion. The remaining six papers are shown in table 2.

Comment(s)

The results of most of the studies outlined above indicate that in high risk patients with reduced level of consciousness there is an incidence of upper cervical spine injury between 5.2% and 13.9% (with the patients in the study by Berne *et al* having an incidence of 35%). The sensitivity of plain radiograph has usually been found to be between 39% and 61%. If the incidence of cervical spine injury is estimated as 8%, and the sensitivity of plain films taken to be 50%, this means that 4%, or 1 in 25, of polytrauma patients with a reduced level of consciousness will have an upper cervical spine injury not evident on plain radiographs. The missed spinal injuries included unstable fractures in all studies where stability was considered. It should be noted that not all studies limited themselves to the upper cervical spine, though the majority of missed injuries occurred either here or in the C7/T1 region, where this could not be adequately visualised on plain radiographs. Further studies involving helical CT scanning of the entire cervical spine are planned.

Possible drawbacks of routine CT imaging of the upper cervical spine include adverse events occurring as a result of spending longer periods in the CT scanner. Such events were not specifically sought in any of the studies described. Spiral CT scanners, with faster scanning times, should minimise this risk. In addition, CT scans cannot be used to reliably exclude ligamentous injuries—other imaging modalities are required for this.

► CLINICAL BOTTOM LINE

The upper cervical spine should be scanned during CT scanning of the head in the polytraumatised patient with reduced level of consciousness.

Kirshenbaum, KJ, Nadimpalli SR, Fantus R, *et al*. Unsuspected cervical spine fractures associated with significant head trauma: role of CT. *J Emerg Med* 1990;**8**:183–98.

Woodring JH, Lee C. Limitations of cervical radiography in the evaluation of acute cervical trauma. *J Trauma Injury Infect Crit Care* 1993;**34**:32–9.

Link TM, Schuierer G, Hufendiek A, *et al*. Substantial head trauma: value of routine CT examination of the cervicocranium. *Radiology* 1995;**196**:741–5.

Ajani AE, Cooper DJ, Scheinkestel CD, *et al*. Optimal assessment of cervical spine trauma in critically ill patients: a prospective evaluation. *Anaesth Intensive Care* 1998;**26**:498–1.

Berne JD, Velmahos GC, El-Tawil Q, *et al*. Value of complete cervical helical computed tomographic scanning in identifying cervical spine injury in the unevaluable blunt trauma patient with multiple injuries: a prospective study. *J Trauma Injury Infect Crit Care* 1999;**47**:896–903.

Schenarts PJ, Diaz J, Kaiser C, *et al*. Prospective comparison of admission computed tomographic scan and plain films of the upper cervical spine in trauma patients with altered mental status. *J Trauma Injury Infect Crit Care* 2001;**51**:663–9.

Antibiotics in compound depressed skull fractures

Report by Baha Ali, Senior Clinical Fellow

Checked by Angaj Ghosh, Senior Clinical Fellow

Abstract

A short cut review was carried out to establish whether antibiotics reduce the incidence of meningitis in patients with compound depressed skull fracture. Altogether 198 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 23 year old man attends the emergency department having been assaulted outside a nightclub with a hammer. He has sustained an isolated head injury with no loss of consciousness and is fully alert and oriented. He has a compound depressed left parietal skull fracture (confirm and defined by CT scan). No surgical intervention is considered. You wonder whether the administration of antibiotics will reduce the chance of meningitis developing.

Three part question

In [an adult with compound depressed skull fracture] does [the administration of antibiotics] reduce [the incidence of meningitis]?

Search strategy

Medline 1996–07/02 using the OVID interface. [{exp skull fractures OR skull fracture\$.mp} OR {(exp fractures, open OR compound fracture\$.mp OR depressed fracture\$.mp)} AND (exp skull OR skull\$.mp OR cranium\$.mp OR calvarium\$.mp)}] AND {exp antibiotics OR antibiotic\$.mp OR exp

Table 3

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Mendelow AD <i>et al</i> , 1983, Edinburgh	223 patients were admitted to the Edinburgh Royal Infirmary (head and spinal injury unit) with depressed fracture of the skull over the 8-year period 1971–1978. 176 patients with compound depressed skull fracture.	Retrospective study	107 patient had ampicillin and sulphonamide, one patient developed meningitis and ventriculitis. 45 patients had other prophylactic antibiotics. four developed meningitis and brain abscess. 19 patient had no antibiotics, one developed meningitis	Early treatment with ampicillin and sulphonamide, in addition to adequate surgical debridement, is recommended in patient with compound depressed skull fractures.	The group designated (other combinations) was made up of patient on a variety of antibiotics, the number on each antibiotic being too small for individual analysis. They accepted that, there are other factors related to the occurrence of the infection.

penicillin OR penicillin\$.mp OR benzylpenicillin.mp OR exp metronidazole OR metronidazole.mp OR flagyl.mp}] LIMIT to human AND English language.

Search outcome

Altogether 198 papers were found, 197 of which were irrelevant or of insufficient quality. The remaining paper is shown in table 3.

Comment(s)

The incidence of infectious complications other than meningitis in the non-antibiotic group was higher than in the group given antibiotics.

► CLINICAL BOTTOM LINE

The results of this study do not provide a definitive answer regarding the role of antibiotics in preventing meningitis. There is very little evidence about giving antibiotic in depressed compound skull fracture. Local advice should be followed.

Mendelow AD, Campbell D, Tsementzis SA, *et al*. Prophylactic antimicrobial management of compound depressed skull fracture. *J R Coll Surg Edinb* 1983;**28**:80-3.

Antibiotics in patients with isolated chest trauma requiring chest drains

Report by John Butler, *Specialist Registrar*

Checked by Ian Sammy, *Consultant*, and Joel Desmond, *Research Fellow*

Abstract

A short cut review was carried out to establish whether the administration of antibiotics reduces the incidence of intrathoracic infection in patients who have had a chest drain inserted after trauma. Altogether 321 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 25 year old man is stabbed in the chest during a pub brawl. He sustains an isolated chest injury that requires a tube thoracostomy. You wonder whether the administration of prophylactic antibiotics will reduce the incidence of intrathoracic infection in this patient.

Three part question

In [patients suffering isolated penetrating chest injuries which require tube thoracostomy] does [the administration of prophylactic antibiotics] reduce [the incidence of intrathoracic infection]?

Search strategy

Medline 1966 to 8/02 using the OVID interface. ({exp thoracic injuries OR chest injury.mp OR exp Chest tubes OR exp Thoracostomy OR chest drain.mp OR chest tube\$.mp or thoracostomy.mp } AND {exp antibiotic prophylaxis OR antibiotic prophylaxis.mp OR exp antibiotics OR antibiotics.mp OR prophylactic antibiotics.mp}) LIMIT to human AND English.

Search outcome

Altogether 321 papers were found, of which 308 were irrelevant. One paper was a systematic review of 11 other relevant papers up to 1997 that were also found on our search. Only one other relevant paper was found after this date. Therefore the systematic review and the remaining paper are included in table 4.

Comment(s)

The EAST Practice Management Group have recently performed an excellent quality systematic review on this subject that included all other studies except Gonzalez *et al*. They give figures that show that the number needed to treat with antibiotics to prevent an intrathoracic infection is six. They caution that the available studies are small and these studies look at chest drains inserted under differing clinical situations and by differing grades of clinicians.

Table 4

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Gonzalez RP and Holevar MR, 1998, USA	139 patients with isolated chest injuries either blunt (34) or penetrating (105) with ISS scores of 9 or 10 requiring tube thoracostomy	Double blind PRCT	Empyema/pneumonia	Antibiotic group - No infection v placebo group - 2 empyemas, 2 pneumonias. Fisher's exact test p=0.05	Sample size not justified Small number of positive cases in the placebo group.
Luchette FA <i>et al</i> for EAST practise management guidelines work group, 2000, USA	4 double blinded PRCTs, 5 PRCTs and 2 meta-analyses Search methodology :Medline search 1977-1997) using chest tubes, human, drainage, tube thoracostomy, infection, empyema, bacterial infection prevention and control. (this identified 44 references of relevance) bibliographies of identified references were searched. Articles reviewed by 5 trauma surgeons, 2 pharmacists and a health care economist.	Meta-analysis	Pneumonia Empyema Total thoracic infection rate	Antibiotic group 4.1% (14/338) Placebo group 1.4% (49/332) p=0.001 Antibiotic group 0.6% (2/338) Placebo group 8.7% (29/332) p<0.0001 Antibiotic group 5.0% (17/338) Placebo group 23.2% (77/332) p<0.0001 (note ?small adding up error in total figures published by journal)	This well conducted systematic review pointed out that of the 9 primary studies found, Demitriates <i>et al</i> gave a single dose of antibiotics to all pts. before randomisation thus they excluded it from further pooled results. Of the 8 other studies, only 4 were double blinded and only 3 had applied Center for Disease Control criteria for pneumonia and Empyema. Despite the weaknesses in the evidence the EAST group recommends that there is sufficient class 1 and 2 evidence to recommend 24 hours of a first generation cephalosporin.

► CLINICAL BOTTOM LINE

Administration of prophylactic antibiotics to patients requiring chest tube thoracostomy for isolated chest injuries reduces the incidence of intrathoracic infection especially empyema with an number needed to treat of six. The ideal regimen is 24 hours of a first generation cephalosporin.

Gonzalez RP, Holeyar MR. Role of prophylactic antibiotics for tube thoracostomy in chest trauma. *Am Surg* 1998;**64**:617–20.

Luquette FA, Barrie PS, Owanski MF, et al. Practice management guidelines for prophylactic antibiotic use in tube thoracostomy for traumatic hemopneumothorax: the EAST Practice Management Guidelines Work Group. Eastern Association for Trauma. *J Trauma* 2000;**48**:753–9.

Lignocaine premedication before rapid sequence induction in head injuries

Report by John Butler, *Specialist Registrar*

Checked by Rupert Jackson, *Specialist Registrar*

Abstract

A short cut review was carried out to establish whether pretreatment with lignocaine (lidocaine) reduces the rise in intracranial pressure associated with intubation of head injured patients. Altogether 85 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 patient attends the emergency department having sustained a blunt head injury. On examination they have clinical signs of raised intracranial pressure and a Glasgow Coma Score of 5. You decide that the patient needs a rapid sequence intubation and continuous mandatory ventilation to protect the airway and reduce intracranial pressure. You wonder whether the pretreatment with lignocaine will attenuate the rise in intracranial pressure from the rapid sequence intubation.

Three part question

In [head injured patients with signs of raised intracranial pressure who need RSI and ventilation] is [pretreatment with lignocaine better than placebo] at [attenuating the rise in intracranial pressure associated with RSI]?

Search strategy

Medline and Embase 1966–07/02 using the OVID interface. [exp Lidocaine OR lidocaine\$.mp OR lignocaine\$.mp] AND

[exp Intracranial pressure OR intracranial pressure.mp OR ICP.mp] LIMIT to human AND English AND remove duplicates.

Search outcome

Altogether 85 papers were found of which three were relevant to the question. These are shown in table 5.

Comment(s)

Some 40%–60% of patients with coma producing brain injuries will have intracranial hypertension. The National Emergency Airway Course recommends a pretreatment dose of lignocaine (1.5 mg/kg) given three minutes before induction when intubating head injured patients. Analysing the results of the above search there seems to be little high quality evidence available to show that intravenous lignocaine suppresses the rises in intracranial pressure associated with rapid sequence intubation in head injured patients.

► CLINICAL BOTTOM LINE

There is no high quality evidence to support the use of a pretreatment dose of lignocaine in addition to neuromuscular block in patients with head injuries requiring a rapid sequence intubation in the emergency department. Its use remains controversial.

Donegan MF, Bedford RF. Intravenously administered lidocaine prevents intracranial hypertension during endotracheal suctioning. *Anesthesiology* 1980;**52**:516–18.

White PF, Schlobohm RM, Pitts LH, et al. A randomized study of drugs for preventing increases in intracranial pressure during endotracheal suctioning. *Anesthesiology* 1982;**57**:242–4.

Yano M, Nishiyama H, Yokota H, et al. Effect of lidocaine on ICP response to endotracheal suctioning. *Anesthesiology* 1986;**64**:651–3.

Ultrasound or computed tomography in paediatric blunt abdominal trauma

Report by Ross Murphy, *Senior Clinical Fellow*

Checked by Angaj Ghosh, *Senior Clinical Fellow*

Abstract

A short cut review was carried out to establish whether computed tomography is superior to ultrasonography at identifying intra-abdominal injury in children. Altogether 123 papers were found using the reported search, of which six 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.

Table 5

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key Results	Study weaknesses
Donegan MF <i>et al</i> , 1980, USA	10 ventilated comatosed patients on ICU. IV lignocaine 1.5 mg/kg v N/Saline	Double blind PRCT	Change in ICP on suctioning	Lignocaine attenuated rise in ICP	Small numbers Patients not paralysed
White PF <i>et al</i> , 1982, USA	15 comatosed patients with diffuse axonal injury on ICU. Compared response to suction with:	RCT	Change in baseline ICP Change in ICP on suctioning	Reduced with lidocaine and thiopentone No effect	Small numbers Unblinded Questionable randomisation
Yano M <i>et al</i> , 1986, USA	9 patients with severe head injury (GCS<8). All patients had mild cranial high BP. All ventilated	RCT compared response on suctioning. IV lignocaine v intratracheal lignocaine. Readings at 1, 3, 5, 10, 15 min	Change in baseline ICP Change in ICP on suctioning Comparison of routes	No change in baseline ICP Both methods reduced ICP Intratracheal route more effective	Unblinded Small numbers Patients not paralysed

Table 6

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Kaufman RA <i>et al</i> , 1984, USA	95 children with suspected intra-abdominal injury Abdominal CT with contrast v abdominal ultrasound	Diagnostic test study	Intra-abdominal fluid or organ injury identified on initial CT or ultrasound Intra-abdominal injury identified at any stage by any means	2 false negative and 6 false positive CT scans 18 false negative and 3 false positive ultrasound scans	No real gold standard
Rossi D <i>et al</i> , 1993, Belgium	38 children with intra-abdominal injuries Abdominal CT with contrast v abdominal ultrasound	Diagnostic test study	Intra-abdominal fluid or organ injury identified on initial CT or ultrasound Intra-abdominal injury identified at any stage by any means	CT identified 30 out of 31 cases with intra-abdominal fluid. Ultrasound identified 37 out of 38 cases with intra-abdominal fluid CT identified organ injury in 33 out of 38 cases. Ultrasound identified organ injury in 14 out of 31 cases	Retrospective Not all patients had both tests No real gold standard
Akgur FM <i>et al</i> , 1997, Turkey	60 children with blunt abdominal trauma who had abnormal findings on abdominal ultrasound Abdominal CT v abdominal ultrasound	Diagnostic test study	Intra-abdominal fluid or organ injury	CT identified the source of intra-abdominal fluid in 3 patients in whom ultrasound could not identify a source	Sample group selective No real gold standard
Richardson MC <i>et al</i> , 1997, UK	26 children with blunt abdominal trauma Abdominal CT with contrast v abdominal ultrasound	Diagnostic test study	Intra-abdominal fluid or organ injury identified on initial CT or ultrasound Intra-abdominal injury identified at any stage by any means	CT missed 1 injury. Ultrasound missed 3 injuries CT diagnosed organ specific injury in 22 out of 24 patients. Ultrasound diagnosed organ specific injury in 12 out of 24 patients. Both correctly identified 2 cases of no injury	Retrospective No real gold standard
Partrick DA <i>et al</i> , 1998, USA	100 children who had abdominal CT and ultrasound performed as investigations for blunt abdominal trauma Abdominal CT v abdominal ultrasound performed by an emergency physician	Diagnostic test study	Intra-abdominal fluid. Organ injury	CT identified 7 intra-abdominal injuries not identified on ultrasound	Retrospective Sample group selective No real gold standard
Richards JR <i>et al</i> , 2002, USA	744 consecutive children undergoing ultrasonography for trauma	Prospective diagnostic cohort	Detection of haemoperitoneum	US 56% sensitivity, 97% specificity	

Clinical scenario

A 6 year old boy presents to the emergency department after falling out of a fast moving car. He is extremely distressed and appears to have sustained multiple injuries including a large laceration to his head, bruising and deformity to both forearms and his left lower leg. After initial assessment and stabilisation you decide to paralyse, intubate, and ventilate him before performing a head CT. However you are also concerned about the possibility of an intra-abdominal injury. You wonder whether an ultrasound or CT would be better at identifying this.

Three part question

In [a paediatric patient with blunt abdominal trauma] is [an ultrasound scan better at identifying intra-abdominal injury] than [a CT scan]?

Search strategy

Medline 1966–07/02 using the OVID interface. [exp abdominal injuries OR “abdominal injur\$.mp OR “abdominal trauma\$.mp] AND [exp tomography, x-ray computed OR “computed tomograph\$.mp OR “computerised tomograph\$.mp OR CT.mp] AND [exp ultrasonography OR ultrasonography.mp OR exp ultrasonics OR ultrasonics.mp OR ultrasound.mp] 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 123 papers were found, of which 117 were irrelevant or of insufficient quality. The remaining six papers are shown in table 6.

Comment(s)

The studies do seem to indicate that CT is better than ultrasound at identifying intra-abdominal injury in children. However, as it is impossible to confirm most of the injuries identified on imaging, it is also difficult to compare the two imaging techniques with a definite gold standard.

This also needs to be considered in the light of the clinical scenarios encountered by emergency physicians. Because of the need for transport and the time it takes to perform CT, children with blunt abdominal trauma need to be stable and have no other injuries requiring urgent treatment. Most will also require sedation. Ultrasound can be performed in the resuscitation room, is much quicker, and is much less distressing to a terrified child.

► CLINICAL BOTTOM LINE

CT is better than ultrasound at identifying intra-abdominal injury in children.

Kaufmann RA, Towbin R, Babcock DS, *et al*. Upper abdominal trauma in children: imaging evaluation. *AJR Am J Roentgenol* 1984;142:449–60.

Rossi D, de Ville de Goyet J, Clement de Cleyt S, *et al*. Management of intra-abdominal organ injury following blunt abdominal trauma in children. *Intensive Care Med* 1993;19:415–19.

Akgur FM, Aktug T, Olguner M, *et al*. Prospective study investigating routine usage of ultrasonography as the initial diagnostic modality for the evaluation of children sustaining blunt abdominal trauma. *J Trauma* 1997;42:626–8.

Richardson MC, Hollman AS, Davis CF. Comparison of computed tomography and ultrasonographic imaging in the assessment of blunt abdominal trauma in children. *Br J Surg* 1997;84:1144–6.

Patrick DA, Bensard DD, Moore EE, *et al.* Ultrasound is an effective triage tool to evaluate blunt abdominal trauma in the pediatric population. *J Trauma* 1998;45:57–63.

Richards JR, Knopf NA, Wang L, *et al.* Blunt abdominal trauma in children: evaluation with emergency US. *Radiology* 2002;222:749–54.

Routine use of antibiotic ointment and wound healing

Report by A Van Zyl, D Abbott, D Andrews, P Reaves, Senior House Officers

Checked by Hamish Simpson, Consultant

Abstract

A short cut review was carried out to establish whether topical antibiotics improved the outcome of simple wounds. Altogether 71 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 26 year old man attends the emergency department with a simple laceration requiring suturing. You wonder whether application of a topical antibiotic ointment will promote healing and reduce incidence of infection.

Three part question

In [adults with non-contaminated lacerations] does [the application of topical antibiotics] reduce [the incidence of secondary infection, the length of time dressings are required and achieve a better cosmetic result]?

Search strategy

Medline 1966–07/02 using the OVID interface. [(exp administration, topical OR topical therapy.mp) AND (exp antibiotics OR antibiotic\$.mp) OR "topical antibiotic\$.mp"] AND (exp ointments OR ointments.mp)] AND [exp Staphylococcal infections OR exp Skin OR superficial wound\$.mp OR exp Wound healing OR exp Wound infection OR exp" Wounds and Injuries"] LIMIT to human AND English.

Search outcome

Altogether 71 papers were found of which 70 were irrelevant or of insufficient quality for inclusion. The remaining paper is shown in table 7.

Comment(s)

Although this study suggests that antibiotic ointment reduces incidence of infection there are a number of reasons at the

moment why we would be reluctant to change current clinical practice. The intensive wound care used in the study may not mirror our own practice. Long term results and patients own assessment of outcome may be better indicators of the benefit of topical antibiotics, than the short-term effects measured in this trial.

► CLINICAL BOTTOM LINE

There is not enough evidence here to change current practice. A large multicentre study is indicated to provide more relevant answers.

Dire DJ, Coppola M, Dwyer DA, *et al.* Prospective evaluation of topical antibiotics for preventing infections in uncomplicated soft-tissue wounds repaired in the ED. *Acad Emerg Med* 1995;2:4–10.

Factor VIIa for intractable blood loss in trauma

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Abstract

A short cut review was carried out to establish whether factor VIIa is indicated in patients suffering intractable blood loss after trauma. Altogether 59 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 29 year old man is brought into the resuscitation area having jumped out of a fourth floor window. He has abdominal and pelvic injuries but no chest, head, or limb injuries. He is bleeding intractably and the orthopaedic team and surgical team cannot agree on a plan of management. You suggest that operative management is required, but they would like to perform a CT scan before theatre to determine who will lead the surgery. Exasperated you wonder whether factor VIIa would help to stabilise the patient and reduce his requirement for transfusion.

Three part question

In [trauma patients with major blood loss and intractable bleeding requiring massive transfusion] does [recombinant factor VIIa] reduce [morbidity and mortality]?

Search strategy

Medline 1966–07/02 using the OVID interface. [exp Factor VII OR exp Factor VIIa OR (factor adj5 VII).af OR (factor

Table 7

Author, date and country	Patient group	Study type (level of evidence)	Key results	Outcomes	Study weaknesses
Dire DJ <i>et al</i> , 1995, USA	465 patients with minor uncomplicated soft tissue wounds necessitating suturing attending an emergency department. Puncture wounds, wounds over 12 hours old, underlying fracture or neurovascular complication, allergies to agents used, antibiotics within previous 7 days and pregnant or immunocompromised patients were excluded	Double blind randomised controlled trial	Evidence of infection	Antibiotic ointment is better at reducing infection than petrolatum alone	No mention of methods of randomisation Wounds treated differently initially Subjective measurements Patients responsible for own wound care Dubious recruitment strategy

Table 8

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Kenet <i>et al</i> , 1999, Israel	One 19 year old male soldier with life threatening bleeding from IVC	Case report	Mortality	Slowing of blood loss and surgical control of bleeding was achieved with two doses of recombinant factor VIIa	Only one case example
Martinowitz <i>et al</i> , 2001, Israel	Seven massively bleeding, multitransfused, coagulopathic trauma patients were treated with recombinant factor VIIa after failure of conventional methods to achieve haemostasis	Case series	Reduction in transfusion requirements Shortening of PTR and APTT Increase in factor VII levels Mortality	From 25 - 49 units, to 1-2 units Reduction from 20 - 31.8 seconds, to 8 - 12 seconds and 46 - 110 seconds to 28 - 46 seconds respectively From 0.7 - 0.92 IU/ml, to 18 - 44 IU/ml 3 of 7 patients died of reasons other than bleeding or thromboembolism	Small study No controls

adj5 VIIa).af OR rFVIIa.af] AND [exp hemorrhage OR hemorrhage.af OR exp haemorrhage.af OR bleeding.af. OR (blood adj5 loss).af] AND [exp "Wounds and Injuries" OR trauma.af OR injur\$.af OR wound\$.af] LIMIT to human AND English.

Search outcome

Altogether 59 papers were found of which two were relevant. The details are shown in table 8.

Comment(s)

More studies are needed.

► CLINICAL BOTTOM LINE

Factor VIIa may have a role as a temporising adjunct to surgical haemostasis. Further research is needed.

Kenet G, Walden, Eldad A, *et al*. Treatment of traumatic bleeding with recombinant factor VIIa. *Lancet* 1999;**354**:1879.

Martinowitz U, Kenet G, Segal E, *et al*. Recombinant activated factor VII for adjunctive haemorrhage control in trauma. *J Trauma Injury Infect Crit Care* 2001;**51**:431-8, 438-439.