

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 14% (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.