BEST EVIDENCE TOPIC REPORTS

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

Edited by S D Carley

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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 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. Each BET is based on a clinical scenario and ends with a clinical bottom line which indicates, in the light of the evidence found, what the reporting clinician would do if faced with the same scenario again. The BETs published below were first reported at the Critical Appraisal Journal Club at the Manchester Royal Infirmary¹ or placed on the BestBETs website. 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 Four BETs are included in this issue of the journal.

- ▶ Transthoracic ultrasonography to diagnose pneumothorax in trauma
- ▶ Early mobilisation for volar plate avulsion fractures
- ▶ Do we need to give steroids in children with Bell's palsy?
- ▶ Topical anaesthetic versus lidocaine infiltration to allow closure of skin wounds in children

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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.

Transthoracic ultrasonography to diagnose pneumothorax in trauma

Report by Usman Jaffer, Senior House Officer
Search checked by Duncan McAuley, Special Registrar

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Abstract

A short cut review was carried out to establish whether transthoracic ultrasound can be used to diagnose pneumothoraces in trauma patients. A total of 46 papers were found using the reported search, of which four represented 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 35 year old male is brought into the emergency department after falling from a height. He is tachypnoeic and tachycardic and has tenderness in the left anterior chest and left upper abdomen. Your department has an ultrasound scanner and this is used to assess the patient's abdomen. You wonder whether it could also be used to diagnose a pneumothorax.

Three part question

In a [patient with chest trauma] can [transthoracic ultrasonography] accurately diagnose [a traumatic pneumothorax].

Search strategy

Medline 1951 to December 2004 using the Dialog Datastar interface. [(pneumothorax#.W.DE OR pneumothorax) AND (ultrason\$12) AND (wounds.and.injuries#.DE. OR trauma)]

Editor's note: In OVID Medline an equivalent search strategy would be: [exp pneumothorax/OR pneumothorax.mp] AND [ultras\$12.mp] AND [exp wounds and injuries/OR trauma.mp]

Search outcome

Altogether 46 papers were found of which four were relevant to the three part question (table 1).

Comments

These studies were relatively small and only two were obviously blinded. Sensitivity for pneumothorax reported varied between 58.9% and 100% and specificity varied between 94% and 100%. It is interesting to note that the study with the lowest sensitivity used CT as part of the gold standard. In such cases CT may be able to find small pneumothoraces not visible on CXR. The clinical relevance of such small pneumothoraces in the resuscitation room is debatable (unless intermittent positive pressure ventilator (IPPV) is being considered). All ultrasound examinations are known to be operator dependent. There is some variation in the ultrasonographic signs used to confirm pneumothorax.

▶ CLINICAL BOTTOM LINE

Rapid and accurate bedside ultrasound performed by emergency physicians can be used to diagnose pneumothorax after chest trauma. The clinical role of this in the resuscitation of trauma patients is not clear.

Dulchavsky SA, Schwarz KL, Kirkpatrick AW, *et al*. Prospective evaluation of thoracic ultrasound in the detection of pneumothorax. *J Trauma* 2001;50:201–5.
Knudson JL, Dort JM, Helmer SD, *et al*. Surgeon-performed ultrasound for pneumothorax in the trauma suite. *J Trauma* 2004;56:527–30.

Table 1

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Dulchavsky SA <i>et al</i> , 2001, USA	382 stable surgical patients (95% post-traumatic)	Prospective diagnostic study	USS v CXR diagnosis	Sensitivity 95% (89–95) Specificity 100% (99–100)	Only stable patients recruited. CXR used as gold standard
Rowan KR <i>et al</i> , 2002, Canada	27 patients sustaining blunt chest trauma who had CT scans	Prospective blinded diagnostic study	USS v CT diagnosis	Sensitivity 100% (82.6–100) Specificity 94% (82–94)	May have selection bias for large pneumothoraces Small numbers
Knudston JL <i>et al</i> , 2004, USA	328 consecutive trauma patients	Prospective diagnostic study	USS v CXR diagnosis	Sensitivity 92.3% (74.4–97.9) Specificity 99.7% (98.9–99.9)	CXR used as gold standard. Not clearly blinded
Kirkpatrick AW <i>et al</i> , 2004, USA	225 trauma patients	Prospective diagnostic study	USS v CT diagnosis or escape of air on thoracostomy	Sensitivity 58.9% (45.0–71.9) Specificity 99.1% (97.6–99.8)	Unclear if CT radiologists blinded to USS

CT, computed tomography; CXR, chest radiograph; USS, ultrasound

Rowan KR, Kirkpatrick AW, Liu D, *et al*. Traumatic pneumothorax detection with thoracic US: correlation with chest radiography and CT—initial experience. *Radiology* 2002;**225**:210–14.

Kirkpatrick AW, Sirois M, Laupland KB, *et al*. Hand-held sonography for detecting post-traumatic pneumothoraces: the extended focussed assessment with sonography for trauma (FAST). *J Trauma* 2004;**57**:288–95.

Early mobilisation for volar plate avulsion fractures

Report by Richard Body, *Clinical Research Fellow*
Checked by Craig J Ferguson, *Clinical Research Fellow*

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A short cut review was carried out to establish whether rest or mobilisation is best for volar plate avulsion fractures. A total of 73 papers were found using the reported search, of which two represented 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.

Three part question

In [adults with volar plate avulsion fractures] does [early mobilisation or splintage] lead to [superior functional outcome]?

Clinical scenario

A 30 year old man presents to the emergency department a few hours after a hyperextension injury to his index finger. A radiograph demonstrates an avulsion fracture at the volar plate of the proximal interphalangeal joint. You wonder whether splintage or early active mobilisation will lead to a better functional outcome.

Search strategy

OVID Medline 1966–September 2004. (volar plate.mp. OR Fingers/ OR exp Finger Joint/ OR proximal interphalangeal joint.mp. OR PIP joint.mp.) AND (exp Fractures/OR exp Fractures, Closed/) AND (exp Early Ambulation/OR mobilisation.mp. OR exp Immobilization/OR strapping.mp. OR splint\$.mp.) LIMIT to human and english language.

Search outcome

Altogether 73 papers were identified using the reported search, of which two were relevant to the three part question (table 2).

Comment(s)

There is a range of opinions about the optimal treatment for small, stable volar plate avulsion fractures. Some advocate immobilisation with aluminium splints, others advocate neighbour strapping and yet others advocate early active mobilisation. Unfortunately there are no randomised controlled trials to compare the efficacy of these interventions. The two trials that were identified suggest that early mobilisation leads to acceptable functional outcomes, which may be at least as good as following immobilisation.

There is no evidence of harm following early mobilisation. However, the available evidence is insufficient to make an evidence based recommendation for early active mobilisation instead of splintage.

► CLINICAL BOTTOM LINE

There is insufficient evidence to give firm recommendations whether mobilisation or splintage is best. Local guidelines should be followed.

Phair IC, Quinton DN, Allen MJ. The conservative management of volar avulsion fractures of the PIP joint. *J Hand Surg* 1989;**14B**:168–70.

Gaine WJ, Beardsmore J, Fahmy N. Early active mobilisation of volar plate avulsion fractures. *Injury* 1998;**29**:589–91.

Do we need to give steroids in children with Bell's palsy ?

Report by Chetan Sandeep Ashtekar, *Specialist Registrar*

Checked by Manohara Joishy, *Specialist Registrar*,
and Rohit Joshi, *Clinical Observer*

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Abstract

A short cut review was carried out to establish whether steroids are indicated in children presenting with Bell's palsy. A total of 60 papers were found using the reported search, of which three represented the best evidence to answer the clinical question. The author, date and country of publication,

Table 2

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Phair IC <i>et al</i> , 1989, UK	74 consecutive patients who had sustained a volar avulsion fracture at the PIP joints (size not greater than 2×2 mm) and attended for review between 6 and 24 months after injury. Patients with radiological subluxation were excluded	Retrospective comparative study	Time to regain normal range of movement (weeks)	Mean 5.7 in neighbour strapping group (range 1–16); mean 8.9 in splintage group (range 2–24)	Retrospective
	42 were treated by immobilisation in 30° flexion with an aluminium splint for 1–7 weeks (average 3.1 weeks) and 32 were permitted to mobilise by neighbour strapping for 1–6 weeks (average 2.8 weeks)		Time to regain normal use (weeks)	Mean 6.8 in neighbour strapping group (range 2–24); mean 10.9 in splintage group (range 3–52)	Not planned interventions; patients seemingly assigned to different treatment groups at the initial treating surgeon's discretion, no randomisation
			Functional outcome (excellent, good, or poor)	31 (96.6%) "excellent" in neighbour strapping group v 39 (93%) in splintage group	No statistical analysis
					6 patients included following reduction of dorsal dislocation and may have had unstable joints
					Mobilisation only permitted within the restraints of neighbour strapping
					Assessments of functional outcome were subjective. Functional outcome was assessed by the authors, which may have introduced bias
					No standardisation of interventions (large range in duration of strapping or immobilisation)
					No standardisation of review period (large range in time of review)
Gaine WJ <i>et al</i> , 1998, UK	192 consecutive patients seen in the hand clinic with volar plate avulsion fractures. Joint dislocations and unstable joints were excluded. 162 patients (with 166 fractures) were followed up for at least 1 year and were included in the analysis	Prospective interventional trial	Functional outcome (excellent, good, poor, or fair, assessed by an independent examiner)	142 patients (88%) reported excellent outcome (full range of pain free movements); 17 patients (10%) reported good outcome (average 10 degrees PIP joint deformity), 3 patients fair result (intermittent pain and swelling)	Not a controlled trial
					Discrepancy with numbers: 162 patients with 166 fractures, but only 3 patients had 2 fractures
					Some patients also received ultrasound therapy but this was not standardised
					Only small fractures analysed but no mention of large fractures being excluded or acceptable objective size of fracture for inclusion
					Patients recruited having been referred to the hand clinic, which may have introduced bias
					Patients may have been treated with splintage for variable periods before inclusion in the study (two thirds of patients were seen within 1 week and a further fifth within 2 weeks)

PIP, proximal interphalangeal.

patient group studied, study type, relevant outcomes, results, and study weaknesses of these best papers are tabulated. A clinical bottom line is stated.

Three part question

In [children with Bell's palsy] does [giving oral steroids] [hasten recovery]?

Clinical scenario

You have been called to the emergency department to see a 6 year old boy with acute onset of weakness on the left side of the face. You diagnose it to be Bell's palsy. You wonder if there is any evidence to use steroids in this situation.

Search strategy

Cochrane Edition 4 2004: Bell's palsy. PubMed February 2005: Bell's palsy OR facial palsy AND steroids AND children. Limits: RCT, English, human and child <18 years.

Search outcome

Cochrane: three systematic reviews, one relevant (included only one RCT in children). PubMed: one RCT and one systematic review (included only one RCT in children). Limits excluding RCT: 60 hits, of which only one was directly relevant (table 3).

Comment(s)

Bell's palsy (acute idiopathic facial nerve palsy) is a non-life-threatening disorder with important functional and psychosocial effects.^{1–3} The aetiology of Bell's palsy remains unclear, but many consider it to be a reactivation to viral inflammation rather than ischaemia.⁴ Diagnosis depends on exclusion of known causes of facial palsy such as hypertension, trauma, tumour, acute otitis media, chronic ear disease, and chronic systemic neurological and metabolic disorders.^{5–7} The natural history of Bell's palsy in children is thought to be benign with a tendency towards complete resolution in many cases within two months of the onset of the facial paralysis and by six months in most cases.^{1 2 8} However corticosteroids have been widely used in the treatment of Bell's palsy, as it is believed to decrease the inflammation and oedema of the nerve sheath.

Although many uncontrolled paediatric studies and case series suggested that steroids are beneficial, especially in cases with complete facial paralysis,⁹ other studies showed no benefit in the final outcome.^{10 11} We found only one randomised controlled trial done exclusively in children. This study reported a recovery rate of 80–90% in the first six months of the disease, which reached 100% by 12 months irrespective of the use of steroids.¹² A recent systematic review found no positive evidence for the beneficial effects of

Table 3

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Unuvar E <i>et al</i> , 1999, Turkey	42 children with complete facial palsy Group 1 (n=21) received methyl prednisolone 1 mg/kg per day PO for 10 days; group 2 (n=21) no treatment	RCT (level 1b)	Recovery at 4, 6, and 12 months	Recovery rate: group 1, 86% and 100% at 4 and 6 months; and group 2, 72% and 86% at 4 and 6 months. All regained facial nerve function at 12 months	Small numbers Not placebo controlled or blinded
Salinas RA <i>et al</i> , 2001, Chile	3 RCTs with a total of 117 patients. One trial compared cortisone acetate with placebo; one compared prednisolone plus vitamins, with vitamins alone; and one, not placebo controlled, tested the effect of methylprednisolone	Systematic review (level 1a)	Effect of steroid therapy in the recovery of Bell's palsy	Overall 13/59 (22%) of patients allocated to steroid therapy had incomplete recovery 6 months after randomisation compared with 15/58 (26%) in control group	Only one trial was done exclusively in children (mentioned above, Unuvar <i>et al</i>) Small number of patients
Salman and MacGregor, 2001, Canada	8 RCTs in total 5 trials comparing steroids with no intervention, 1 trial each comparing steroids with either acyclovir or vitamins, or hyperbaric oxygen	Systematic review (level 1b)	Clinical and electrical recovery in 6 trials, clinical recovery with electromyography if no recovery in 1 trial, and in the last one 3 doctors assessed photos and complication rate.	3 trials found no significant difference with steroids, 4 trials showed some benefit with steroids whereas 1 trial showed hyperbaric oxygen to be more effective	Only one trial was done exclusively in children (mentioned above, Unuvar <i>et al</i>) The paediatric cases in the remaining 7 trials were not analysed separately 5 of the 8 trials were randomised The trial designs, treatment schedule and outcome measures were heterogeneous
Dhiravibulya K, 2002, Thailand	75 children with Bell's palsy, 28 excluded. 39 of the remaining 47 children in the study received oral prednisolone	Retrospective case series January 1996–July 2001 (level 4)	Recovery from Bell's palsy	Of the 39 who received prednisolone, complete recovery in 24 (61.5%), nearly complete in 15 (38.5%). All children, including those who did not receive steroid, recovered completely within 7 months	Uncontrolled, retrospective, observational study

corticosteroids in Bell's palsy.¹³ Therefore they concluded that the routine use of corticosteroids for the treatment of paediatric Bell's palsy is not recommended. Clearly there is a need for a well designed, adequately powered, multicentre randomised controlled trial to evaluate this issue.

► CLINICAL BOTTOM LINE

Currently there is no evidence to recommend the use of corticosteroids for the treatment of Bell's palsy in children.

Salman MS, MacGregor DL. Should children with Bell's palsy be treated with corticosteroids? A systematic review. *J Child Neurol* 2001;**16**:565–8.

Dhiravibulya K. Outcome of Bell's palsy in children. *J Med Assoc Thai* 2002;**85**:334–9.

Unuvar E, Oguz F, Sidal M, et al. Corticosteroid treatment of childhood Bell's palsy. *Pediatr Neurol* 1999;**21**:814–16.

Salinas RA, Alvarez G, Alvarez MI, et al. Corticosteroids for Bell's palsy (idiopathic facial paralysis). Most recent amendment 2001. *Cochrane Database Syst Rev* 2004;Issue 3. Art. No.: CD001942.pub2. DOI: 10.1002/14651858.CD001942.pub2.

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- Devriese PP. Bell's palsy in children. *Acta Otorhinolaryngol Belg* 1984;**38**:261–7.
- Peitersen E. The natural history of Bell's palsy. *Am J Otol* 1982;**4**:107–11.
- Devriese PP, Schumacher T, Scheide A, *et al*. Incidence, prognosis and recovery of Bell's palsy. A survey of about 1000 patients (1974–1983). *Clin Otolaryngol* 1990;**15**:15–27.
- Salman MS, MacGregor DL. Should children with Bell's palsy be treated with corticosteroids? A systematic review. *J Child Neurol* 2001;**16**:565–8.
- Adour KK, Byl FM, Hilsinger RL, *et al*. The true nature of Bell's palsy: Analysis of 1000 consecutive patients. *Laryngoscope* 1978;**88**:787–801.
- Williamson IG, Whelan TR. The clinical problem of Bell's palsy: is treatment with steroids effective? *Br J Gen Pract* 1996;**46**:743–7.

10 Inamura H, Aoyagi M, Tojima H, *et al*. Facial nerve palsy in children: Clinical aspects of diagnosis and treatment. *Acta Otolaryngol (Stockh)* 1994;(suppl 511):150–2.

11 Micheli R, Telesca C, Gitti F. Bell's palsy: Diagnostic and therapeutic trial in childhood. *Minerva Pediatr* 1996;**48**:245–50.

12 Marendia SA, Olsson JE. The evaluation of facial paralysis. *Otolaryngol Clin North Am* 1997;**30**:669–82.

13 Salinas RA, Alvarez G, Alvarez MI, *et al*. Corticosteroids for Bell's palsy (idiopathic facial paralysis). Most recent amendment 2001. *Cochrane Database Syst Rev* 2004;Issue 3. Art. No.: CD001942.pub2. DOI: 10.1002/14651858.CD001942.pub2.

Topical anaesthetic versus lidocaine infiltration to allow closure of skin wounds in children

Report by Craig Ferguson, *Clinical Research Fellow*, and Ben Loryman, *Specialist Registrar*
Checked by Richard Body, *Clinical Research Fellow*
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Abstract

A short cut review was carried out to establish whether topical anaesthetics are an acceptable alternative to lidocaine infiltration in children. A total of 54 papers were found using the reported search, of which seven represented 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.

Three part question

In [children presenting with a minor skin laceration requiring suturing] is [topical anaesthetic as effective as

Table 4

Author, date, and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Pryor GJ <i>et al</i> , 1980, USA	158 patients presenting to the emergency department with minor lacerations. Topical TAC versus lidocaine infiltration for anaesthesia	PRCT	Acceptability of application of anaesthetic	TAC was thought to be more acceptable in children under 17 yrs ($p<0.0001$), no significant difference in adults	Few baseline data about patient group. Some data presented in graph form or percentage values only with significance mentioned in accompanying text
			Efficacy of anaesthesia in patients over 10 yrs	In 10–17 yrs old patients TAC was effective in 82% and lidocaine in 83% ($p=1$). In patients over 17 yrs TAC was effective in 86% and lidocaine in 92% ($p=0.25$)	
			Time taken to repair wound	Significantly reduced in children under 5 yrs ($p<0.005$)	
Anderson AB <i>et al</i> , 1990, USA	151 children under 18 yrs presenting to the emergency department with skin lacerations less than 5 cm. Intradermal lidocaine versus topical TAC versus topical placebo (adrenaline plus normal saline)	PRCT	Initial anaesthesia (tested by pinprick)	TAC 89%; lidocaine 79%; placebo 17% (TAC v placebo $p<0.0001$; lidocaine v placebo $p<0.0001$)	Method of randomisation not clear from text. One error noted in results table. Some data only given in chart form
			Patients requiring additional lidocaine infiltration	TAC 18%; lidocaine 23%; placebo 60%; (TAC v placebo $p<0.0001$; lidocaine v placebo $p<0.0005$)	
			Complete patient compliance—assessed by physician	TAC 80%; lidocaine 49%; placebo 43% (TAC significantly better than either lidocaine or placebo $p<0.002$)	
Hegenbarth MA <i>et al</i> , 1990, USA	467 patients aged 18 yrs or younger presenting to an emergency department with minor lacerations requiring suturing. Wounds classified as head/scalp or trunk/extremity then randomised to either topical TAC or lidocaine infiltration	PRCT	Adequacy of anaesthesia for scalp/head wounds	TAC adequate in 80.7%; lidocaine adequate in 86.6% ($p=0.159$)	Randomised by case-note number. Error in p value for adequacy of anaesthesia for scalp/head wounds. Only 68% of patients followed up when looking at wound infection rates though dropout rate similar in each group (68% of TAC patients, 66% of lidocaine patients reviewed)
			Adequacy of anaesthesia for extremity/trunk wounds	TAC adequate in 43.2%, lidocaine adequate in 89.4% ($p<0.0001$)	
			Infection rates	2.2% for both TAC and lidocaine groups	
Smith GA, <i>et al</i> , 1996, USA	240 patients over 2 yrs old presenting to the emergency department with a skin laceration 5 cm or less that required suturing	Partially blinded PRCT	Anaesthesia by pain score by patients, parents, suture technicians and research assistant observers	No significant difference between TAC, bupivacaine with NA and lidocaine infiltration. All other agents less effective	The method of randomisation is described as block randomisation but there are 60 patients in both the lidocaine and TAC groups with 30 patients in each of the other groups. It is mentioned in the results area that some patients required supplemental lidocaine infiltration but it does not say who was or how this affected the outcome. Raw data are not provided, only the statistical methods and results of significance
	Bupivacaine with NA v etidocaine with NA v mepivacaine with NA v prilocaine with NA v TAC v lidocaine infiltration				
Kendall JM <i>et al</i> , 1996, UK	107 children between 3 and 16 yrs presenting to the emergency department with wounds less than 4 cm requiring suturing	PRCT	Pain score on application of anaesthetic	Infiltration of lidocaine significantly more painful than application of TAC ($p<0.001$)	No mention of wound site. No breakdown of different age groups of children
			Pain score on wound closure	No significant difference between lidocaine and TAC	
			Acceptability of procedure	14.5% of parents found procedure with AC gel “stressful” or “unacceptable” compared with 39% of parents when lidocaine was used	
Ernst AA <i>et al</i> , 1997, USA	66 patients aged 5 yrs or over with lacerations <10 cm	PRCT	Pain of anaesthetic application	LAT gel significantly less painful than lidocaine injection ($p<0.001$) (Mean VAS by physician for LAT = 0 and lidocaine = 1.4. Mean VAS by patient for LAT = 0, lidocaine = 1.2)	Small study. Data in figures poorly labelled
	Topical LAT gel v injectable buffered lidocaine with adrenaline		Pain of suturing	No significant difference between lidocaine and LAT gel. (Physician $p=0.83$; patient $p=0.48$)	
Smith GA <i>et al</i> , 1997, USA	71 patients 2 yrs or over presenting to the emergency department with a laceration on the face or scalp less than 5 cm that required suturing. Topical TAC v topical mepivacaine and NA v lidocaine infiltration	PRCT	Effective anaesthesia judged by VAS by suture technician and research assistant	No significant difference between effect of TAC and lidocaine infiltration. Mepivacaine less effective ($p=0.003$ and 0.0003 , respectively)	Small numbers. Results provided in graph form

AC, adrenaline-cocaine; LAT, lidocaine-adrenaline-tetracaine; NA, noradrenaline; PRCT, prospective randomised controlled trial; TAC, tetracaine-adrenaline-cocaine solution; VAS, visual analogue scale

lidocaine infiltration] in [reducing the pain and distress of wound closure].

Clinical scenario

A 7 year old boy presents with a scalp laceration that requires suturing for optimal wound closure. His mother tells you that he is scared of needles and is liable to become upset. You wonder if topical anaesthetic would be as effective as lidocaine infiltration in allowing pain free wound closure.

Search strategy

OVID interface on the World Wide Web: 1966–December 2004; Cochrane database of systematic reviews, edition 4 2004; Medline: [Anesthetics, Local/or Anesthesia, Local/or Lidocaine/or Bupivacaine/or local anaesthetic.mp] OR [Administration, Topical/or Anesthetics, Local/] AND [paediatric filter] LIMIT to human and english language and all child <0 to 18 yrs>; Cochrane: Laceration topical

Search outcome

Medline: 46 papers of which seven were relevant to this question (table 4); Cochrane: 8 papers, none relevant.

Comment(s)

Application of topical anaesthetic for minor skin lacerations is significantly less painful than infiltration of local anaesthetic. The anaesthetic effect produced appears to be similar, particularly for face or scalp wounds. In addition topical anaesthetic will not cause tissue distortion due to injection. The possibility of improved compliance plus the reduced use of needles will decrease the risk of needle-stick injury. Topical

agents that do not include cocaine are cheaper, do not involve the rigmarole of dealing with a controlled drug and may be safer to use in children. All of the studies excluded wounds involving mucous membranes or poorly vascularised areas and extremities. There were no adverse effects in any of the listed papers that could be attributed directly to cocaine use though serious consequences have been documented in published case reports. The use of a topical agent in a gel form rather than a liquid may reduce some of the associated risks.

► CLINICAL BOTTOM LINE

Topical anaesthetics should be used on selected minor lacerations in children as they have similar efficacy to lidocaine infiltration but are less painful to apply. The ideal combination and concentration of agents providing optimal levels of efficacy and safety has yet to be decided.

Pryor GJ, Kilpatrick WR, Opp DR. Local anesthesia in minor lacerations: topical TAC vs lidocaine infiltration. *Ann Emerg Med* 1980;**9**:568–71.

Anderson AB, Colechi C, Baronski R, *et al*. Local anesthesia in pediatric patients: topical TAC versus lidocaine. *Ann Emerg Med* 1980;**19**:59–62.

Hegenbarth MA, Altieri MF, Hawk WH, *et al*. Comparison of topical tetracaine, adrenaline and cocaine anesthesia with lidocaine infiltration for repair of lacerations in children. *Ann Emerg Med* 1990;**19**:63–7.

Smith GA, Strausbaugh SD, Harbeck-Weber C, *et al*. Comparison of topical anesthetics without cocaine to tetracaine-adrenaline-cocaine and lidocaine infiltration during repair of lacerations. *Paediatrics* 1996;**93**:301–7.

Kendall JM, Charters A, McCabe SE. Topical anaesthesia for children's lacerations: an acceptable approach? *J Accid Emerg Med* 1996;**13**:119–22.

Ernst AA, Marvez-Valls E, Nick TG, *et al*. Topical lidocaine adrenaline tetracaine (LAT Gel) versus injectable buffered lidocaine for local anesthesia in laceration repair. *West J Med* 1997;**167**:79–81.

Smith GA, Strausbaugh SD, Harbeck-Weber C, *et al*. Comparison of topical anesthetics with lidocaine infiltration during laceration repair in children. *Clin Pediatr* 1997;**36**:17–23.