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. 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 Infirmary[1] 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.

- Beta-agonists with or without anti-cholinergics in the treatment of acute childhood asthma
- Delivery of bronchodilators in acute asthma in children
- Lorazepam or diazepam in paediatric status epilepticus
- Tibial fractures in very young children and child abuse

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Beta-agonists with or without anti-cholinergics in the treatment of acute childhood asthma?

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Abstract
A short cut review was carried out to establish whether adding inhaled anti-cholinergics to beta-agonists improves outcome in the treatment of acute childhood asthma. 148 papers were found using the reported searches, 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 is tabulated. It is concluded that anti-cholinergics reduce time to recovery and discharge and may reduce admissions for moderate to severe groups.

Clinical scenario

A seven year old boy with moderately well controlled asthma since his last admission 10 months ago presents to the emergency department with an acute exacerbation. You ask the nurse to administer salbutamol and ipratropium 5 mg and 0.25 mg as a nebuliser. She questions the value of adding an anti-cholinergic, despite your theoretical knowledge that the mechanism of action of both drugs should be additive you are left wondering about the clinical evidence to support this.

Three-part question

In [children with acute asthma who present to the Emergency Department] is [salbutamol and ipratropium better than salbutamol alone] at [producing a clinical improvement and reducing hospital stay]?

Search strategy

OVID Medline 1966 to March Week 4 2006 [(exp asthma/OR asthma mp) AND (exp albutarol/OR salbutamol.mp.) AND (exp atropine derivatives/OR exp ipratropium/).OR [*''Adrenergic beta-Agonists''/AND *''Cholinergic Antagonists''/AND ''Drug Therapy, Combination''/] LIMIT to Humans and English Language and BestBETs paediatric filter. OVID Embase 1980 to 2006 Week 12 [(exp asthma/OR asthma mp) AND (exp Salbutamol/or albutarol.mp.) AND (exp atropine derivative/OR exp ipratropium bromide/) OR [exp Beta Adrenergic Receptor Stimulating Agent/AND exp Cholinergic Receptor Blocking Agent/AND exp Drug Combination/] AND (exp Emergency Ward/). LIMIT to Human and English Language AND (infant <to one year> or child <unspecified age> or preschool child <1 to 6 years> or school child <7 to 12 years> or adolescent <13 to 17 years>). The Cochrane Library 2006 Issue 1 [Ipratropium [MeSH] AND Albutarol [MeSH] AND [Child [MeSH] 40 articles.

Search outcome

Altogether148 articles were found on all three databases of which one presented the best evidence. This is shown in table 1.

Comment(s)

Other outcomes including pulse, blood pressure, and oxygen saturation showed no significant differences. Reduced admission rates can only be considered a gross measure of combined drug efficacy. Reproducible results may be more likely given the following: 1. An agreed method of assessing the severity of asthma; 2. An increased use of peak flow meters among the background population of known asthmatics; 3. Delineation of clinical pathways for treatment,

Table 1

Author, date and country	Patient group	Study type	Outcomes	Key results	Study weaknesses
Rodrigo GJ and Castro-Rodriuez JA, 2005, Uruguay and Chile	16 RCTs	Meta-analysis	NNT to prevent one admission (1786 children in 10 trials) SMD of Improvement in pooled spirometric parameters	13 −0.54 (−0.28–−0.81) p<0.0001	Significant heterogeneity in spirometric analysis

including admission criteria. Three well designed papers and a Cochrane review showed variably modest benefits in adding inhaled anti-cholinergics to â2-agonist in the standard treatment of moderate to severe asthma in children. There is little to suggest that the side effects of adding ipratropium that would preclude its use.

► CLINICAL BOTTOM LINE

Adding inhaled anti-cholinergics to beta 2-agonists in the treatment of acute asthma in children presenting to the Emergency Department reduces time to recovery and discharge and may reduce admissions for moderate to severe groups.

Rodrigo GJ, Castro-Rodriguez JA. Anticholinergics in the treatment of children and adults with acute asthma: a systematic review. *Thorax* 2005;**60**:740–6.

Delivery of bronchodilators in acute asthma in children

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Abstract

A short cut review was carried out to establish whether delivery of bronchodilators to children was better by spacer device or nebuliser. 1456 papers were found using the reported searches, 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 outcomes, results and study weaknesses of these best papers are tabulated. It is concluded that in most cases where a child presents with moderate to severe asthma beta-2-agonists could be delivered via a spacer device in place of a nebuliser.

Clinical scenario

A seven year old child with a known history of asthma presents with a 24 hour history of exacerbation of wheeze. He has been using his salbutamol inhaler with little benefit. You prescribe a ß-agonist by nebuliser but wonder if it would have been cheaper and more effective to administer this drug via a spacer (holding chamber).

Three-part question

In [children with acute asthma] does administration of a bronchodilator [by nebuliser or spacer device] best [decrease admission rate and improve airway function].

Search strategy

Medline 1966 to March Week 4 2006 [exp asthma OR asthma.mp OR bronchodilator.mp OR exp bronchodilator agents OR exp adrenergic beta-agonists OR beta-agonist.mp OR exp receptors, adrenergic, beta] AND [exp aerosols OR exp ''nebulizers and vapourisers'' OR exp cholinergic antagonists OR nebuliser.mp OR spacer.mp OR administrat$ OR holding chamber$.mp] AND [acute.mp OR exp acute disease] AND [BestBETs paediatric filter] LIMIT to human and English language. Embase 1980–2006 week 13, CINAHL 1982 to March Week 4 2006 [asthma.mp OR exp extrinsic asthma OR exp asthma OR wheez$.mp OR bronchodilatOR.mp OR bronchodilating agent OR salbutamol OR salbutamol.mp OR exp salbutamol sulfate OR albuterol.mp OR exp terbutaline sulfate OR exp terbutaline OR terbutaline.mp OR isoproterenol.mp OR exp isoprenaline OR beta-agonist.mp. OR exp beta adrenergic receptor stimulating agent] AND [exp aerosol OR aerosol$.mp OR nebuliser$.mp OR exp nebulizer OR exp medical nebulizer OR nebulizer$.mp OR vaporizer$.mp OR exp vaporizer OR exp inhalational drug administration OR spacer.mp OR exp inhalation spacer OR exp beta adrenergic receptor stimulating agent OR exp drug delivery system OR holding chamber.mp OR exp metered dose inhaler] AND [adult children.mp OR exp adult child OR exp infant OR preschool child OR newborn OR minors.mp OR exp juvenile OR adolescent OR youth.mp OR pediatrics.mp OR exp pediatrics OR child OR paediatric$.mp OR pediatric$.mp OR perinat$.mp OR neonat$.mp OR newborn infan$.mp OR bab$.mp OR toddler$.mp OR boy$.mp OR girl$.mp OR kid$.mp OR schoolage.mp OR underage.mp OR teen$.mp OR offspring.mp OR youth$.mp OR pubescen$.mp OR adolescen$.mp] AND [exp acute drug administration OR acute.mp OR exp acute disease] LIMIT to human and English language. The Cochrane Library Issue 1 2006 [Child [MeSH] AND holding chamber [All fields]] OR [Inhalation spacers [MeSH]] 31 articles.

Search outcome

Altogether 1456 papers were found including one systematic review and one systematic review with meta-analysis. A further RCT was found that was not mentioned in either review and one RCT had been published subsequent to both reviews. These are shown in table 2.

Comment(s)

Nebulisers are commonly used in the emergency setting for the treatment of acute asthma in children despite recent research suggesting that administration by a holding chamber or spacer is at least as effective. These review articles and the two papers not included in these articles all concur with this view and tend to show a slight improvement in out-come with use of a spacer device. This research is limited to patients with moderate or severe asthma as patients with life-threatening asthma have been excluded from all of the studies. Spacer devices are faster and easier to use and may also be cheaper than nebulisers. The cost is less of a factor in patients attending hospital compared with community use due to availability of piped oxygen. They also have less maintenance involved and reduce the potential risk of cross infection.