BEST EVIDENCE TOPIC REPORTS

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

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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 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 Three BETs are included in this issue of the journal.

- ▶ Serum Lactate as a marker for mortality in patients presenting to the ED with infection.
- ▶ Negative D-dimer may allow safe early cardioversion of atrial fibrillation.
- ▶ Does Clopidogrel Increase Morbidity and Mortality After Minor Head Injury.

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**:220–222.
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**:222–226.
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.

Serum Lactate as a marker for mortality in patients presenting to the emergency department with infection

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A short cut review was carried out to establish whether serum lactate might be a marker for mortality in patients presenting to

the emergency department with an infection. Only one paper was found addressing the clinical question. The author, date and country of publication, patient group studied, study type, relevant outcomes, results and study weaknesses of this paper are tabulated. The clinical bottom line is that serum lactate may be a marker for mortality in patient admitted with an infection-related diagnosis.

Three part question

In [a patient presenting to the emergency department with infection] is [serum lactate] a [predictor of mortality]?

Clinical scenario

A 40-year-old male presents to the emergency department with a 4 day history of cellulitis of the lower extremity, fever and chills. How useful is an initial serum lactate concentration drawn in the emergency department as a predictor of mortality?

Search strategy

Medline 1950–2007 April Week 1 using the OVID interface. Cochrane Database of Systematic Reviews and Cochrane Central register of Controlled Trials, April 2007 [(lactic acid.mp. or exp Lactic Acid/) OR (lactate.mp.) OR (exp Acidosis, Lactic/)] AND [(exp Infection/or infection.mp.) OR (sepsis.mp. or exp Sepsis/) OR (septic shock.mp. or exp Shock, Septic/OR severe sepsis.mp.)] AND [(emergency medical services.mp. or exp Emergency Medical Services/) OR (exp Emergency Service, Hospital/or emergency department.mp.)]

Search outcome

A total of 18 papers were found on Medline, of which only one directly addressed the question (table 1). No additional papers were found in the Cochrane Library.

Comment

An initial serum lactate may be useful in risk stratification in patients presenting to the emergency department with infections. Conversely, it may be a covariate of another clinical marker. There appears to be an increasing trend of mortality with elevated initial lactate levels. 22.4% patients with an initial lactate level >4.0 mmol/L died within 3 days.

▶ CLINICAL BOTTOM LINE

Initial serum lactate levels drawn in the emergency department may serve as an overall marker of mortality in patients admitted to the hospital with an infection-related diagnosis.

Shapiro NI, Howell MD, Talmor D, *et al.* Serum Lactate as a Predictor of Mortality in Emergency Department Patients With Infection. *Ann Emerg Med* 2005;**45**:524–8.

Table 1

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Shapiro <i>et al</i> , 2005, USA	1278 patients in an urban academic medical center: 18 years or older, admitted to the hospital with a suspected infection-related diagnosis, having had serum lactate level drawn at initial presentation in the ED. Patients stratified according to lactate. Low (L) <2.5 mmol/L, medium (M) 2.5–3.99 mmol/L, high (H) ≥4 mmol/L.	Prospective cohort study. Level IIb evidence.	Death at 28 days	L = 43/877 (4.9%) (95% CI 3.5%–6.3%), M = 24/267 (9.0%) (95% CI 5.6%–12.4%), H = 38/134 (28.4%) (95% CI 21%–36%) Lactate ≥2.5 Sn = 59% (95% CI 50%–68%), Sp = 71% (95% CI 69%–74%), lactate ≥4, Sn = 36% (95% CI 27%–45%), Sp = 92% (95% CI 90%–93%)	Patients without lactate drawn at presentation were not included. Only patients admitted to the hospital were included. No patient demographics or measures of illness severity provided.
			Sensitivity (Sn) and specificity (Sp) for death at 28 days		
			Death within 3 days	L = 13/877 (1.5%) (95% CI 0.7%–2.3%), M = 12/267 (4.5%) (95% CI 2.0%–7.0%), H = 30/134 (22.4%) (95% CI 15%–29%) Lactate ≥2.5 Sn = 76% (95% CI 65%–88%), Sp = 71% (95% CI 68%–73%), lactate ≥4, Sn = 55% (95% CI 41%–68%), Sp = 91% (95% CI 90%–93%)	
			Sensitivity (Sn) and specificity (Sp) for death within 3 days		

ED, emergency department

Negative D-dimer may allow safe early cardioversion of atrial fibrillation

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A short cut review was carried out to establish whether a negative D-dimer will accurately rule out an atrial thrombus in a patient presenting with atrial fibrillation. Ten papers seemed relevant to the clinical question. The author, date and country of publication, patient group studied, study type, relevant outcomes, results and study weaknesses of these papers are tabulated. The clinical bottom line is that a negative D-dimer suggests that it is safe to cardiovert a patient with recent onset of atrial fibrillation.

Three part question

In [patients with atrial fibrillation being considered for electrical or pharmacologic cardioversion] does [measurement of D-dimer] allow [exclusion of atrial thrombus]?

Clinical scenario

A 45-year-old man presents to the emergency department with a 48 hour history of palpitations, postural light-headedness and exertional dyspnoea. ECG demonstrates atrial fibrillation (AF) at a rate of 130 beats/minute. There are no apparent reversible causes following history, examination, chest radiography, urinalysis and haematological and biochemical screening. You feel that pharmacologic or electrical cardioversion to sinus rhythm rather than rate control would be most beneficial to the patient, but as you are aware of the possibility of atrial thrombus and systemic embolism you opt for rate control and refer for anticoagulation. You wonder if measuring D-dimer, a product of clot breakdown, would have allowed accurate

exclusion of atrial thrombus, thus enabling the safe acute administration of flecainide.

Search strategy

All via the Ovid interface: Medline 1950–2007 February Week 4 CINAHL 1982 – 2007 March Week 1 Embase 1980 – 2007 Week 9 Cochrane Central Register of Controlled Trials (CCRCT) <1st Quarter 2007> ACP Journal Club 1991 to January/February 2007 Cochrane Database of Systematic Reviews (CDSR) <1st Quarter 2007> Database of Abstracts of Reviews of Effects (DARE) <1st Quarter 2007> [exp Atrial Fibrillation/OR exp Atrial Flutter/OR (atrial fibrillation OR AF OR atrial flutter OR (cardiac adj thromb\$) OR (intracardiac adj thromb\$) OR ((atrial OR atrium) adj3 thromb\$)).mp. OR] AND [exp Fibrin Fibrinogen Degradation Products/OR D-dimer\$.mp.].

Search outcome

Altogether 110 papers were identified using Medline, 2 using CINAHL, 141 using Embase, 12 in CCRCT, 4 in ACP Journal Club, 1 in CDSR and 0 in DARE. Ten were relevant to the three-part question (table 2).

Comments

Cardioversion of AF to sinus rhythm carries a small but definite risk of systemic thromboembolism from atrial thrombus, typically within the left atrial appendage. Although the risk is greatest when the arrhythmia has lasted for over 48 hours, atrial thrombi may occur earlier (Stoddard *et al*, 1995; Manning *et al*, 1995). As the left atrial appendage is not easily visualised on transthoracic echocardiography (TTE), transoesophageal echocardiography (TOE) is necessary to exclude thrombus. However, this test is invasive, carries a small but definite risk of complications, is unpleasant for the patient and not readily available in most centres.

Current European Society of Cardiology guidelines state that patients must either have TOE or anticoagulation for 3–4 weeks prior to attempted cardioversion unless there is an immediate indication (Fuster *et al*, 2001). A quick, non-invasive test such as D-dimer, that is easily applied in the emergency department