# Emergency Medicine Research Review™

Making Education Easy

Issue 2 - 2013


## In this issue:



## Welcome to the second issue of Emergency Medicine Research Review.

One of the studies in this issue highlights the over-use of blood cultures in uncomplicated paediatric pneumonia, suggesting that it may be time for a change to our current practice. In the face of ongoing concern about the use of propofol in the ED we have included a new study reviewing its use in the UK, and we also look at a new co-management model of care designed to reduce the length of ED stays for psychiatric patients.

If you have colleagues or friends within Australia who would like to receive our publication, send us their contact email and we will include them in the next issue. We hope you find the selections for this issue interesting, and we look forward to receiving your comments and feedback.

Kind Regards,


**Professor Anne-Maree Kelly**

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## Prevalence of concurrent deep vein thrombosis in patients with lower limb cellulitis: a prospective cohort study

**Authors**: Maze M, et al


**Summary**: This prospective trial investigated the effectiveness of the Wells algorithm in detecting deep vein thrombosis (DVT) in patients with lower limb cellulitis. Of the 200 patients who underwent assessment, 20% were categorised as high risk under the Wells criteria. During ongoing investigation 74% were found to have an elevated D-dimer, and 79% underwent insonation of the affected leg. Rates of DVT were low (ipsilateral, 0.5%; and non-ipsilateral VTE, 1%).


**Comment**: The question of whether there is an associated DVT in patients with lower limb cellulitis is a common one. In some centres, ultrasound studies to 'rule out DVT' are almost routine. This study from New Zealand goes some way to answering this question. It found that it is very uncommon for DVT to occur concurrently with lower limb cellulitis (ipsilateral DVT 0.5%), although 95% confidence intervals were as high as 2.7%. The Wells score substantially over-estimated the likelihood of DVT, largely due to overlapping signs. That said, no patient identified as low risk by Wells criteria had a DVT identified. Of concern was that 74% of patients had an elevated d-dimer, suggesting limited utility as a discriminatory test in these patients.

***Reference: BMC Infect Dis. 2013 Mar 19;13:141***
http://www.biomedcentral.com/1471-2334/13/141

**Abbreviations used in this issue:**

**CI** = confidence interval; **C-spine** = cervical spine; **CT** = computed tomography; **DVT** = deep vein thrombosis; **ED** = emergency department; **GLF** = ground level falls; **MACE** = major adverse cardiac event; **TIMI** = Thrombolysis In Myocardial Infarction

## Utility of blood culture in uncomplicated pneumonia in children

**Authors:** Mendoza-Paredes A, et al

**Summary:** This was a retrospective review of the prevalence of bacteremia in children with uncomplicated pneumonia, conducted in a single institution from July 2003 until July 2008. The setting was the paediatric emergency department (ED) of an urban teaching hospital. All children who were admitted to the teaching hospital ED with uncomplicated pneumonia, who were under the age of 36 months, and who had been fully immunised, were included. Exclusion criteria included current antibiotic use and any immunodeficiency status. A total of 535 children with radiographic pneumonia were recruited, with bacteremia found in 2.2%. The authors noted that all twelve positive cultures were considered to have been caused by outside contaminants.

**Comment:** Despite evidence that the rate of bacteraemia in fully immunised, immunocompetent children with uncomplicated pneumonia is low, blood cultures are commonly obtained. This retrospective chart review from the US seriously challenges this practice. It found a very low rate of bacteraemia (2.2%), all of which were considered to be contaminants. It also found no variables that predicted bacteraemia. While studies of this type need to be interpreted with caution for methodological reasons, this evidence combined with other data suggests that a revision of current practice is in order.

***Reference: Clin Med Insights Pediatr. 2013 Jan 24;7:1-5***
http://tinyurl.com/m23gspg

## Geriatric trauma patients with cervical spine fractures due to ground level fall: five years experience in a level one trauma center

**Authors:** Wang H, et al

**Summary:** Ground level falls (GLF) in elderly patients are a significant risk of cervical spine (C-spine) injuries, and this retrospective review looked at the injury patterns and clinical risk factors in these patients. Data from a single institution from 2006-2010 was included in the review, a total of 12,805 trauma patients. C-spine injury (n=726, 5.67%) was common in geriatric patients (136/726, 19.15%). C1 and C2 fractures were more common in geriatric patients (27.34% and 53.96%, respectively) than in younger patients (13.63% and 21.98%, respectively; p<0.001) with C6 and C7 fractures more common in younger patients (32.03% and 41.40%, respectively) than in the elderly (13.67% and 18.71%, respectively; p<0.001). The presence of blood alcohol varied greatly between the two groups, with 52.9% of younger patients testing positive, compared to only 3.2% of elderly patients.

**Comment:** This US trauma registry study compared C-spine fractures sustained in the elderly (>65 years) to those in younger patients. Older patients had a different mechanism of injury (50% falls) and different injury pattern (more likely to have C1 or C2 fractures and less likely to have C6 or C7 fractures). One in five older patients with injuries from a ground level fall had an associated intracranial haemorrhage. This is a timely reminder that we need to have a high index of suspicion for cervical fractures in the elderly, even with apparent minor trauma.

***Reference: J Clin Med Res. 2013 Apr;5(2):75-83***
http://www.jocmr.org/index.php/JOCMR/article/view/1227

## Propofol for adult procedural sedation in a UK emergency department: safety profile in 1008 cases

**Authors**: Newstead B et al.

**Summary**: The World SIVA International Sedation Task Force has recently created an adverse event tool, in an effort to standardise reporting regarding the safe use of propofol. This safety analysis examined a single-institution departmental sedation database between December 2006 and March 2012, cross-examining the original sedation chart for each case recorded. Of the 1008 consecutive cases there were 73 adverse events identified: 11 sentinel (5 cases of hypoxia, 6 of hypotension), 34 moderate, 25 minor, and 3 minimal risk events. There were no adverse outcomes. The authors concluded that this large series of propofol sedations performed by emergency physicians supported the safety of this practice.

**Comment**: We are more and more using propofol for sedation for procedures in ED. Some (mostly outside the emergency medicine community) have questioned the safety of this approach. This paper from the UK analysed 1008 propofol sedation episodes using the World SIVA adverse sedation event reporting tool. Overall, the authors conclude that propofol sedation in ED is safe with a sentinel adverse event rate of about 1%, including a hypoxia rate of 0.5%. Improvements suggested by the case analysis were adherence to lower dosing regimens in the elderly and slower titration to avoid hypotension. They also highlight the importance of clinical governance, training and credentialing. A really useful affirmation of the safety of this approach!

***Reference: Br J Anaesth. 2013 May 9 (online ahead of print)***
http://bja.oxfordjournals.org/content/early/2013/05/08/bja.aet168.abstract

## A survey of emergency department resources and strategies employed in the treatment of pediatric gastroenteritis

**Authors:** Kinlin L, et al

**Summary:** The aim of this multi-institutional review was to assess the use of clinical tools in the management of paediatric gastroenteritis in the ED. The hypothesis tested was that academic, high-volume institutions with a larger percentage of emergency medicine (EM)-trained physicians would use a greater number of clinical tools in decision making. Data were collected via an optional Internet-based survey or eligible departments in Ontario (N=160) of which 133 (83%) were completed and returned. Of these, 38 (29%) used practice guidelines, 69 (52%) used clinical pathways or order sets, and 105 (79%) used printed discharge instructions. High-volume institutions were more likely to have these decision-making tools that lower-volume institutions (p=0.001).

**Comment:** This Canadian survey explored the presence and quality of clinical pathways/guidelines for the management of paediatric gastroenteritis in Ontario EDs. It found that only 29% reported having pathways in place of which about half met pre-specified quality criteria. Paediatric 'gastro' is an area where there is good evidence to support evidence-based practice pathways with the cornerstones of appropriate pathways being formal hydration assessment (including weight) and oral rehydration (except in very severe cases), supported by ondansetron if needed, and commenced as early as possible—even in the waiting room.

***Reference: Acad Emerg Med. 2013 Apr;20(4):361-6.***
http://tinyurl.com/ntct3wx

## Prediction value of the Canadian CT head rule and the New Orleans criteria for positive head CT scan and acute neurosurgical procedures in minor head trauma: A multicenter external validation study

**Authors:** Bouida W et al

**Summary:** This observational cohort study compared the performance of two sets of criteria for use in indemnifying patients with intracranial traumatic lesions, and those requiring surgical invention; the New Orleans Criteria and the Canadian CT Head Rule. Patients (N=1,582) who were ≥10 years of age and who had a mild head injury were included. Of these, 13.8% displayed positive findings on CT and 2.1% required neurosurgical intervention. Sensitivity for intervention requirement was 100% and 82% for the Canadian CT Head Rule and the New Orleans Criteria, respectively. Specificity was 60% and 26%, respectively. Sensitivity for significant CT findings was 95% and 86% for the Canadian CT Head Rule and the New Orleans Criteria, respectively. Specificity was 65% and 28%, respectively.

**Comment**: A very low proportion (<1%) of patients with minor head trauma require acute neurosurgical intervention. Performing a head CT on them all is not cost-effective, contributes to ED crowding and exposes patients to unnecessary radiation. A number of clinical decision rules have been developed to assist with selecting patients who need a CT. This study from Tunisia showed that the Canadian CT head rule was more sensitive for both positive CT findings and acute neurosurgical intervention than the New Orleans criteria with both having excellent negative predictive value (>99%). This is a timely reminder that regional context is a powerful influence on generalisability of research findings.

***Reference: Ann Emerg Med. 2013 May;61(5):521-7.***
http://tinyurl.com/nrkhbux

## Challenges in diagnosing mesenteric ischemia

**Authors:** Van den Heijkant T, et al

**Summary:** The early identification of acute mesenteric ischaemia (AMI) remains challenging and the mortality rate remains high. This comprehensive review of the diagnosis and treatment of this condition provides many helpful pointers. The authors point to arterial embolus and superior mesenteric artery thrombosis as common causes, and note that non occlusive causes are less frequent, although vasculitis should not be discounted, particularly in young people. Diagnostic delay in these patients can be dangerous (progression of ischaemia to transmural bowel infarction with peritonitis and septicaemia). It is agreed that multi-detector row CTA remains the current gold standard for diagnosis modality, but the authors make a strong push for the development of a non-invasive biochemical test.

**Comment:** AMI is often difficult to diagnose and diagnostic delay contributes to its high morbidity and mortality. This concise and informative article from the Netherlands reviews the epidemiology, clinical features and laboratory and imaging diagnosis of acute mesenteric ischaemia. It also gives an insight into research underway into new approaches to early diagnosis, in particular use of biomarkers.

***Reference: World J Gastroenterol. 2013 Mar 7;19(9):1338-41***
http://tinyurl.com/mb2tgyv

## Validation of high-sensitivity troponin I in a 2-h diagnostic strategy to assess 30-day outcomes in emergency-department patients with possible acute coronary syndrome

**Authors:** Cullen L et al

**Summary:** This prospective, two-cohort trial evaluated the sensitivity, specificity and negative predictor values for a new, high sensitivity troponin 1 (hs-TnI) assay, in ED patients presenting with chest pain. Patients were placed in an accelerated diagnostic pathway which included 0- and 2-hour troponin assays and electrocardiographs (ECGs) and were stratified into either Thrombolysis In Myocardial Infarction (TIMI) risk scores =0, or ≤1. In the primary cohort (n=1635), 247 (15.1%) experienced a Major Adverse Cardiac Event (MACE). TIMI=0 patients with a non-ischaemic ECG and troponin ≤26.2ng/L (320,19.6%) were classified as low risk, and none had a MACE. The TIMI≤1 patients with a non-ischaemic ECG and troponin ≤26.2ng/L (678,41.5%) were also classified as low risk, with 2 patients (0.8%) having a MACE. The results were similar in the second cohort.

**Comment:** Chest pain is one of the most common ED presentations. Currently guidelines recommend a process requiring serial biomarkers 3-4 hours apart, with the latter at least 6 hours from pain onset. Cullen and colleagues have done a number of studies to identify a low risk cohort suitable for a shorter evaluation process. This paper from Australia provides further evidence that a rapid rule-out process is accurate and safe for selected patients. Depending on the biomarker used, as many as 40% of patients may be suitable for such a process. This body of evidence is now strong enough to support a push for practice change.

***Reference: J Am Coll Cardiol. 2013 Apr 13 (online ahead of print)***
http://content.onlinejacc.org/article.aspx?articleid=1679531

**Independent commentary by Professor Anne-Maree Kelly**, MD MClinEd BS FACEM FCCP.

Professor Kelly is a senior emergency physician at Western Health in Melbourne, Director of the Joseph Epstein Centre for Emergency Medicine Research, Professorial Fellow of The University of Melbourne and Adjunct Professor, Queensland University of Technology. With over 200 publications, her research interests are broad and include health systems research, knowledge transfer and implementation science, pain management, acute cardiology, asthma, medical education and blood gas analysis. Professor Kelly is an international editor for *Annals of Emergency Medicine*, is on the editorial board of *Emergency Medicine Australasia* and *The Hong Kong Journal of Emergency Medicine* and is a reviewer for over 20 journals including *New England Journal of Medicine*, *British Journal of Sports Medicine, Medical Journal of Australia* and *BMJ*.

## A prospective comparison of three scoring systems in upper gastrointestinal bleeding

**Authors:** Wang CH et al.

**Summary:** This study prospectively compared three different scoring systems (the Glasgow-Blatchford score [GBS], the pre-endoscopic Rockall score [PRS] and the complete Rockall score [CRS]) in identifying patients at high- or low-risk of upper gastrointestinal bleeding (UGIB). High-risk was defined as requiring a blood transfusion, endoscopic therapy or surgical intervention. Results were defined as the area under the receiver operating characteristic curve (AUC) and were as follows: for prediction of high-risk or bleeding GBS, 0.808 and 0.674; PRS, 0.604 and 0.602; and CRS, 0.767 and 0.621, respectively. For mortality prediction; GBS was 0.513; PRS, 0.703; and CRS 0.620.

**Comment:** Identification of patients with evidence of UGIB who are at very low risk of adverse effects and so are suitable for early discharge, has the potential to impact on ED flow. This prospective observational study from Taiwan compares three scores (Glasgow-Blatchford score, pre-endoscopic Rockall score and complete Rockall score) for accuracy of classification of patients as high or low risk. The study is limited by low numbers of adverse events resulting in wide confidence intervals with considerable overlap. That said, the Glasgow-Blatchford score had the best negative predictive value for adverse events in regards to bleeding and 30-day mortality.

***Reference: Am J Emerg Med. 2013 May;31(5):775-8.***
http://tinyurl.com/o5t9l7y

## Marked reduction in length of stay for patients with psychiatric emergencies after implementation of a comanagement model

**Authors:** Polevoi SK et al.

**Summary:** In this paper the authors present an evaluation of their new (co-management) model of ED psychiatric assessment, which was designed to streamline the process of admission and reduce the length of patient stay in the ED (LOS). In this study the new model was measured against standard care in a before-and-after comparison. The co-management model included the use of psychiatrists to directly order pharmacotherapy and monitor its effects, and increased attending-level involvement.The total patient visits included (both phases) was 1,884. Median LOS (for patients transferred for inpatient psychiatric care) decreased 22% (p<0.0005; 95%CI, 15-28%) after the implementation of the co-management model. Additional results included an increase in ambulance diversion hours (40 hours per month; p=0.008; 95%CI, 11 to 69 hours) and a reduction in the number of patients who left the ED without being seen (-26 people per month; p=0.106; 95%CI, -60 to 5.9 visits).

**Comment:** Long stays in ED are common for psychiatric patients in Australia, particularly those thought likely to require admission to a psychiatric unit. This before-and-after study from the US describes the development and implementation of a co-management model of care for these patients. This model involved in-ED assessment and regular review of patients by psychiatrists with the aim of expedited disposition. It showed marked reductions in ED length of stay for patients transferred to a psychiatric ward and for patients placed on an involuntary hold order and later discharged. Similar models could work in Australian EDs.

***Reference: Acad Emerg Med. 2013 Apr; 20(4):338-43***
http://onlinelibrary.wiley.com/doi/10.1111/acem.12105/abstract







 