The Skeptics' Guide to Emergency Medicine

Season One (2012-2013)

Meet 'em, greet 'em, treat 'em and street 'em

W. Ken Milne
Alia Dharamsi
Chris R. Carpenter

Table of Contents

Introduction 4

Disclaimer 5

Evidence Based Medicine 6

Best Evidence in Emergency Medicine (BEEM) 9

SGEM #1: Introduction to TheSGEM 10

SGEM #2: Evidence Based Medicine 11

SGEM #3: To X-ray or not to X-ray 13

SGEM #4: Getting Un-Stoned 15

SGEM #5: Does Johnny "kneed" an X-ray? 16

SGEM #6: Orthopedic Surgeons: Strong AND Smart! 18

SGEM #7: Every Breath You Take 19

SGEM #8: ABCD2 Not as Simple as 1, 2, 3 21

SGEM #9: Who Let the Dogs Out? 23

SGEM #10: Ten Commandments of EBM 26

SGEM #11: All Seizures Stop…Eventually 28

SGEM #12: Oh Dance-a-tron 31

SGEM #13: Better Out than In 33

SGEM #14: You Can Ring My Bell 38

SGEM #15: Choosing Wisely 41

SGEM #16: Ho, Ho, Hold the PPI 43

SGEM #17: The Best FOAM/#FOAMed of 2012 46

SGEM #18: Eye of the Tiger 48

SGEM #19: Bust-a-Move 50

SGEM #20: Hit Me with your BEST Shot 53

SGEM #21: Ice, Ice, Baby 57

SGEM #22: Papa Don't Preach 59

SGEM #23: A Bump Up Ahead 61

SGEM #24: The Strokes 63

SGEM #25: Who Are You? 65

SGEM #26: Honey, Honey 66

SGEM #27: Bad to the Bone 70

SGEM #28: Bang your Head 72

SGEM #29: Stroke Me, Stroke Me

.....74
SGEM #30: My Generation 77
SGEM #31: She's Got Legs.....79
SGEM #32: Stone Me.....81
SGEM #33: Boston 2013 82
SGEM #34: This is Spinal Tap.....84
SGEM #35: We are Young.....87
SGEM #36: Mac and CCBs 89
SGEM #37: TNT (To Not Treat) 91
SGE M #38: TheSGEM Down Under.....93
SGEM #39: Weak in the Knees.....94
SGEM #40: Great White North (CanFOAMed).....96
SGEM #41: Ultra Spinal Tap.....99
SGEM #42: Don't Panic 101
About the Authors.....104

Introduction

Welcome to the Skeptics' Guide to Emergency Medicine (TheSGEM). Meet 'em, greet 'em, treat 'em and street 'em. The SGEM is a knowledge translation (KT) and dissemination project. Its goal is to shorten the KT window from about ten years down to one year. To do this, it will turn traditional medical education on its head.

The top down/didactic method of the 19th century with an older man in a white lab coat sanding in front of a lecture hall delivering information to an audience of medical students is over. This was replaced by the small group/ problem based learning of the 20th century.

Medical education is now entering another phase that uses social media. The SGEM will use social media to deliver the most valid, reliable, and unbiased global source of current, clinically relevant, patient-centered emergency medicine information.

The SGEM consists of a weekly podcast utilizing among other sources content from Best Evidence in Emergency Medicine (BEEM) project. This content tied into a blog, Facebook page, active twitter feed and YouTube channel.

Rather than the trickle down KT method, the SGEM will use the bubble up technique. The SGEM will empower students, residents and front line emergency care providers with the latest and best evidence based medicine (EBM) information.

They can download and listen to the SGEM podcast at anytime, to turn their car into a classroom and listeners can consume the information on demand when it fits into their busy schedule.

The social media aspect can foster discussion and in the process the medium, as Marshall McLuhan said, will become the message.

To Access the SGEM:

- www.TheSGEM.com
- TheSGEM@gmail.com
- Twitter @TheSGEM
- Facebook www.facebook.com/TheSGEM
- iTunes The Skeptics' Guide to Emergency Medicine

Enjoy, give us feedback and remember

the first rule of emergency medicine…don't panic!

Disclaimer

This material produced in Canada and is intended for medical students, residents, and emergency physicians. The goal of the Skeptics' to Emergency Medicine (SGEM) program is to provide the students and physicians with best evidence so they can provide their patients with the best care.

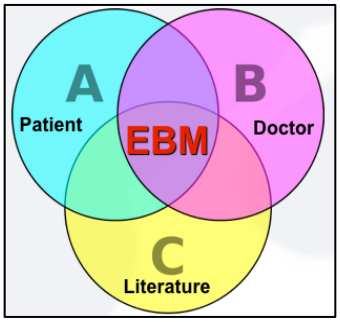
The provider of this educational material may discuss commercial products and/or devices as well as the unapproved/investigative use of commercial products/devices.

The provider of this educational material report that they do not have significant relationships that create, or may be perceived as creating, a conflict relating to this educational activity.

The Skeptics Guide to Emergency Medicine makes a reasonable effort to supply accurate information but does not assume any liability for errors or omissions. Because of the nature of the program and its format, it is not recommended that they serve as the sole basis for patient evaluation and treatment.

Remember to be skeptical of anything you learn, even if you learned it from The Skeptics' Guide to Emergency Medicine.

Evidence Based Medicine



Evidence based medicine (EBM) was coined by Dr. Gordon Guyatt and the Evidence Based Medicine Working Group in 1992. It is defined as the overlap between clinician expertise, a patient's unique situation and personal values, and research evidence. It is about increasing patients' choices, not decreasing choices.

Unfortunately, a growing body of evidence suggests that clinical experience alone is insufficient to ensure that patients receive contemporary, guideline-based medical care. In fact, half of the patients in the United States do not receive evidence- based management in primary care[1]. Since there are over 5000 biomedical publications that appear every day in PUBMED and since an emergency medicine provider needs to read 26 articles in *Annals of Emergency Medicine* to find one manuscript that changes their practice[2]. It is not surprising that busy clinicians often overlook new innovations and updated guidelines.

EBM provides a new approach to incorporating clinical research into bedside practice. The process of EBM provided a template to seek, find, appraise, and apply research findings to individual patients, as opposed to the passive dissemination of research that had been relied upon by investigators, journals, and educators in the past.

EBM offers an approach to help busy clinicians to find, evaluate, and use clinical research in their practice, but it is not a panacea[3]. Most clinicians lacked a high-quality exposure to EBM during their medical training[4],[5] and there is ample evidence that traditional CME is ineffective[6].

---

[1]McGlynn EA, Asch SM, Adams J, Keesey J, Hicks J, DeCristofaro A, Kerr EA: **The quality of health care delivered to adults in the United States**. *N Engl J Med* 2003, **348**(26):2635-2645.

[2] McKibbon KA, Wilczynski NL, Haynes RB: **What do evidence-based secondary journals tell us about the publication of clinically important articles in primary healthcare journals?** *BMC Med* 2004, **2**:33.

[3] Jenicek M: **Evidence-based medicine: fifteen years later. Golem the good, the bad, and the ugly in need of a review?** *Med Sci Monit* 2006, **12**(11):R241-R251.

[4] Kuhn GJ, Wyer PC, Cordell WH, Rowe BH: **A survey to determine the prevalence and characteristics of training in evidence-based medicine in emergency medicine residency programs**. *J Emerg Med* 2005, **28**(3):353-359.

[5] Carpenter CR, Kane BG, Carter M, Lucas R, Wilbur LG, Graffeo CS: **Incorporating evidence-based medicine into resident education: a CORD survey of faculty and resident expectations**. *Acad Emerg Med* 2010, **17**(S2):S54-S61.

[6] Forsetlund L, Bjorndal A, Rashidan A, Jamtvedt G, O'Brien MA, Wolf F, Davis D, Odgaard-Jensen J, Oxman AD: **Continuing education meetings and workshops: effects on professional practice and health care outcomes**. *Cochrane Database Syst Rev* 2009, **Issue 2. Art. No.: CD003030. DOI: 10.1002/14651858.CD003030.pub2**.

EBM critics often portray the EBM construct of finding, appraising, and using clinical evidence as an unreal expectation[7],[8].[9]. However, these same critics offer no viable alternatives[10],[11].

To misquote Winston Churchill, *"EBM is the worst form of medicine, except for all the others that have been tried."*

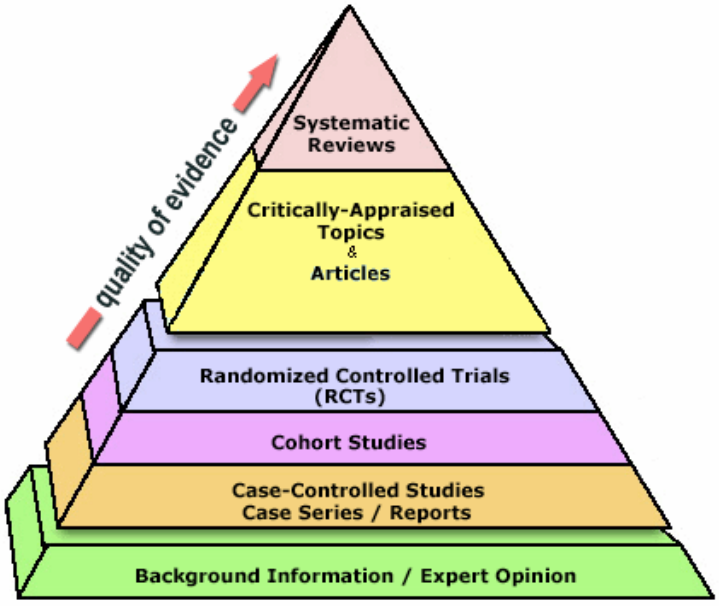
The stepwise approach to EBM involves starting with a specific clinical question you are looking to answer. You then go through a five-step process in an attempt to answer the question.

Step 1: PICO

This stands for Population, Intervention, Control and Outcome. You want to find a study population that is similar to your patient. What was the intervention and what were the controls (placebo, sham or other treatment). Finally, were the outcomes patient oriented outcomes and not disease oriented or surrogate markers.

Step 2: Devise a Search Strategy

This could be as broad as a Google or Google scholar search. While capturing many hits, it may be difficult to distinguish the signal from the noise. PubMed is a large database you are probably familiar with already. It has various filters to help refine your search to obtain an answer to your clinical questions. Another search strategy you may want to try is www.TRIPdatabase.com (Turning Research Into Practice). It can be very useful to narrow your search. Alternatively, Washington University amazing Journal Club (www.emjclub.com) may have already asked and answered the same question.



Step 3: Select the Least Biased Information

There is a hierarchy of EBM that is beautifully illustrated in this pyramid. It goes from the lowest form of evidence like an expert opinion, to the highest form of evidence such as systematic reviews. You want to find the highest form of evidence possible when trying to answer your

[7] Tobin MJ: **Counterpoint: evidence-based medicine lacks a sound scientific base**. *Chest* 2008, **133**(5):1071-1074.

[8] Hatala R: **Is evidence-based medicine a teachable skill?** *Ann Emerg Med* 1999, **34**(2):226-228.

[9] Sestini P: **Epistemology and ethics of evidence-based medicine: putting goal-setting in the right place**. *J Eval Clin Pract* 2010, **16**(2):301-305.

[10] Mayer G: **Medicine based on systematic research, eminence based medicine or common sense medicine--what would you prefer?** *EDTNA ERCA J* 2006, **32**(1):2,7.

[11] Leppäniemi A: **From eminence-based to error-based to evidence-based surgery**. *Scan J Surg* 2008, **97**(1):2-3.

clinical question.

Step 4: Critically Appraise the Study

You need to review the manuscript found in the search. For a randomized clinical trial (RCT) there are a number of questions you need to ask yourself:

i. Does the study population included apply to your patient?
ii. Were the patients adequately randomized?
iii. Was the randomization process concealed?
iv. Were the patients analyzed in the groups to which they were randomized?
v. Were the patients recruited consecutively (i.e. no selection bias)?
vi. Were patients in both groups similar with respect to prognostic factors?
vii. Were all participants (patients, clinicians, outcome assessors) unaware of group allocation?
viii. Were all groups treated equally except for the intervention?
ix. Was Follow-up complete (i.e. at least 80% for both groups)?
x. Were all patient-important (oriented) outcomes considered?
xi. Was the treatment effect large enough and precise enough to be clinically significant?

Step 5: Consider the Limitations

Think about what the limitations were based on your critical appraisal and summarize these thoughts. Consider these broad issues:

i. External validity
ii. Biases
iii. Randomization
iv. Blinding
v. Patient Oriented Outcomes (POO)
vi. Clinically Significant

In the end after looking at the evidence, critically appraising it and considering the limitations you will have to decide is the information practice changing?

Best Evidence in Emergency Medicine (BEEM)

Best Evidence in Emergency Medicine (BEEM) is a knowledge translation and dissemination project. Dr. Andrew Worster of McMaster University started it in 2005. It provides up to 12hrs of continuing medical education per course. BEEM does not have any financial or other affiliation with any commercial organization.

BEEM Mission: To provide Emergency Medicine practitioners with the best clinical evidence to optimize patient care.

BEEM Vision: To be the most valid, reliable, and unbiased global source of current clinically relevant patient-centered medical knowledge for practitioners.

There are close to 3,000 articles published every day. BEEM via Health Information Research Unit at McMaster University screens the electronic databases of about 200 journals each month. While most articles do not make it past this point, 10-20 articles are emergency medicine related. These articles are then organized in Survey Monkey.

The survey includes the title of the paper and author's conclusions. Articles are sent to over 100 BEEM raters. These are front line emergency doctors just like you. Raters are asked to assume that the results of this article are valid. They are then asked to rate clinically how important the paper is to their own practice on a seven point Likert scale.

Only BEEM faculty appraises those highly rated papers. Standardized EBM tools are used to create a critical appraisal and BEEM bottom line. These critical reviews are then provided to you so you can provide your patients with the BEST care. www.BEEMsite.com

BEEM | BEST EVIDENCE IN EMERGENCY MEDICINE

Evidence Based Medicine Worth Spreading

SGEM #1: Introduction to TheSGEM

Date: 20 August 2012

Welcome to the first SGEM podcast. Its goal is to shorten the knowledge translation (KT) window from 10 years down to 1 year. This is an extension of the Best Evidence in Emergency Medicine (BEEM) project. Enjoy this introductory podcast. Like us on Facebook and follow us on Twitter.

Some of the excellent other resources:

- Washington University Journal Club
- The Number Needed to Treat (www.TheNNT.com)
- Quack Cast

Give us your feedback on the site and the first podcast. Be skeptical of anything you are taught…including stuff you hear on TheSGEM. This information should not be the sole basis for your patient evaluation and treatment. Remember, the first rule of Emergency Medicine…Don't Panic. All bleeding stops…eventually.

SGEM #2: Evidence Based Medicine

Date: 20 August 2012

Welcome back to TheSGEM. Our goal remains to shorten the knowledge translation (KT) window from 10 years down to 1 year. TheSGEM uses the Best Evidence in Emergency Medicine (BEEM) content as the basis for its podcasts.

This episode of TheSGEM looks at the history of EBM, different levels of EBM, and then discusses the Leaky Pipe model of EBM. We hope by understanding some of the background of EBM it will help you to be skeptical of the medical literature and develop critical thinking skills. The next podcast in TheSGEM series will start using BEEM reviews of specific articles relevant to emergency medicine.

Brief History of EBM:

Dr. Franz Mesmer

- First blinded trial
- Where the term 'mesmerized' comes from
- People are still being mesmerized today

Dr. Hamilton

- Trial from 1816 demonstrating the need to control allocation bias
- 80.9% alive if blood letting performed vs. 96.7% alive with no blood letting
- 19.1% died if blood letting vs. 3.3% alive with no blood letting

Dr. Archie Cochrane

- The Cochrane Collaboration is named in honor of Dr. Archie Cochrane, a medical researcher who contributed greatly to the science called epidemiology
- Drs. David Sackett, Gordon Guyatt and Brian Haynes
- The guys from McMaster University
- Dr. Gord Guyatt coined the term Evidence Based Medicine in 1992

THE COCHRANE COLLABORATION®

British Medical Journal

- EBM one of the top medical milestones in the last 166 years

Dr. Andrew Worster

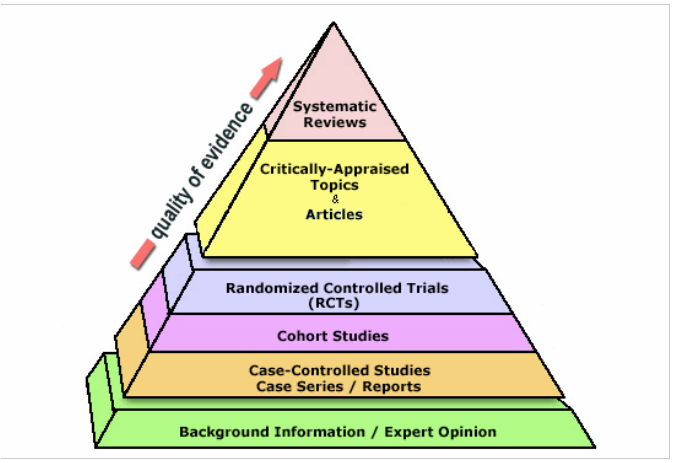
- Started the Best Evidence in Emergency Medicine (BEEM)

Dr. Chris Carpenter

- Started the BEST emergency medicine at Washington University

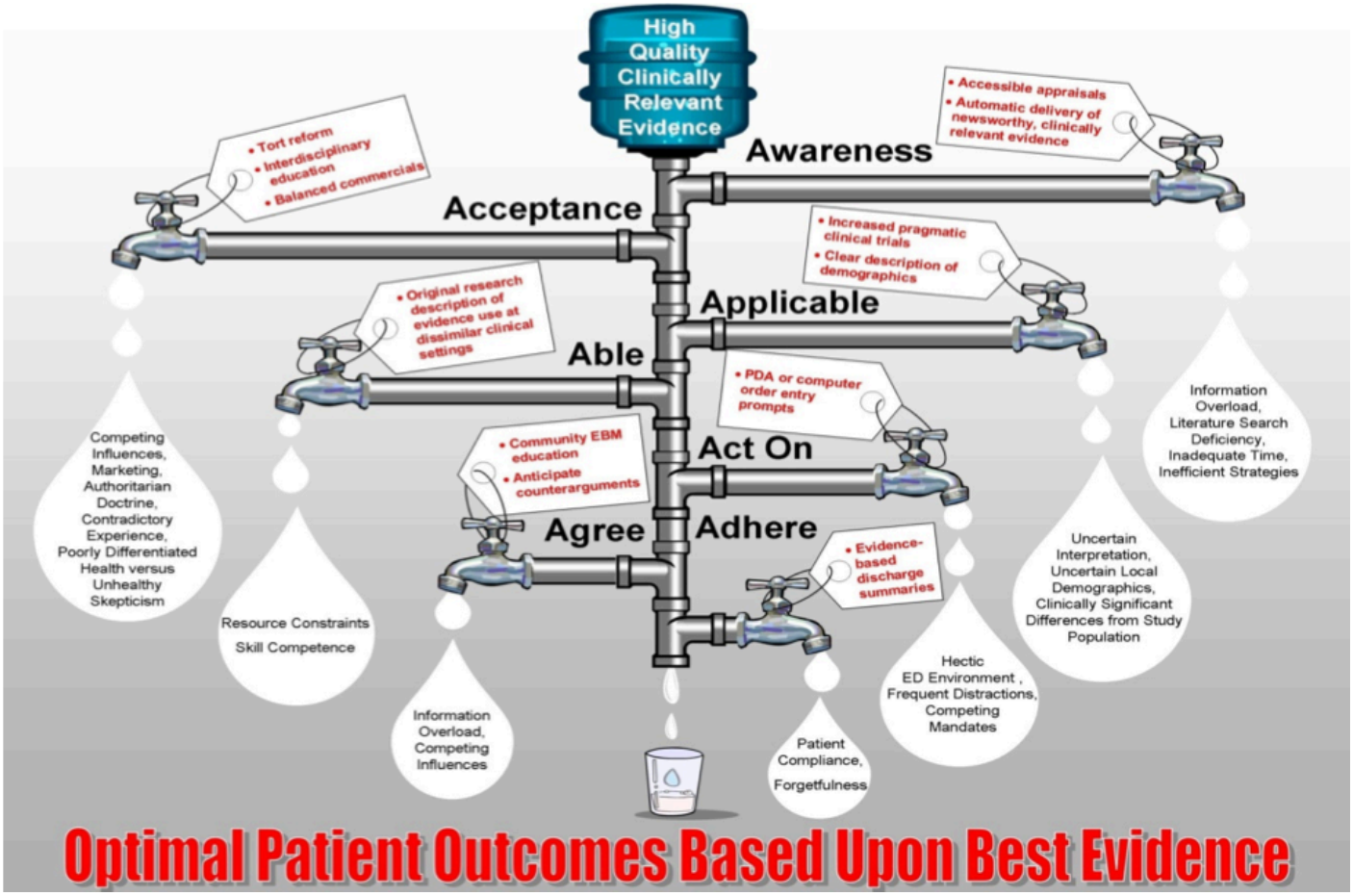
Introduction to the Levels of Evidence:

- Evidence based medicine pyramid
- Illustrates seven levels of EBM
- Lowest form being expert opinion and the highest form of evidence being systematic reviews
- Centre for Evidence Based Medicine (a more complex table showing the levels of evidence)



Leaky Pipe Model of Knowledge Translation:

- Dr. Pathman first put forward a model of describing the 4 stages of putting evidence into action
- Pathman DE, Konrad TR, Freed GL, Freeman VA, Koch GG. The awareness-to-adherence model of the steps to clinical guideline compliance: the case of pediatric vaccine recommendations. Med Care. 1996; 34:873–89.
- This was further described by Dr. Brian Haynes editorial in the ACP journal identifying seven "A"s (awareness, acceptance, applicable, able, act on, agree and adhere)
- Diner, Carpenter et al modified the Pathman pipeline and Haynes editorial into the Leaky Pipe model of knowledge translation



So after this you should have some knowledge concerning the history of EBM, the various levels of evidence and an understanding of the Leaky Pipe model.

The next podcast will start the series of BEEM content. We will be providing a case, reviewing an article on the topic raised and providing a BEEM summary and bottom line.

Don't forget to like us on Facebook and follow us on Twitter. We welcome your comments, suggestions and constructive criticisms.

Consider all the information available not just what you hear on TheSGEM to provide your patient with the best possible emergency care.

First rule of Emergency Medicine…Don't Panic. No one stays in ventricular fibrillation forever.

SGEM #3: To X-ray or not to X-ray

Date: 3 September 2012

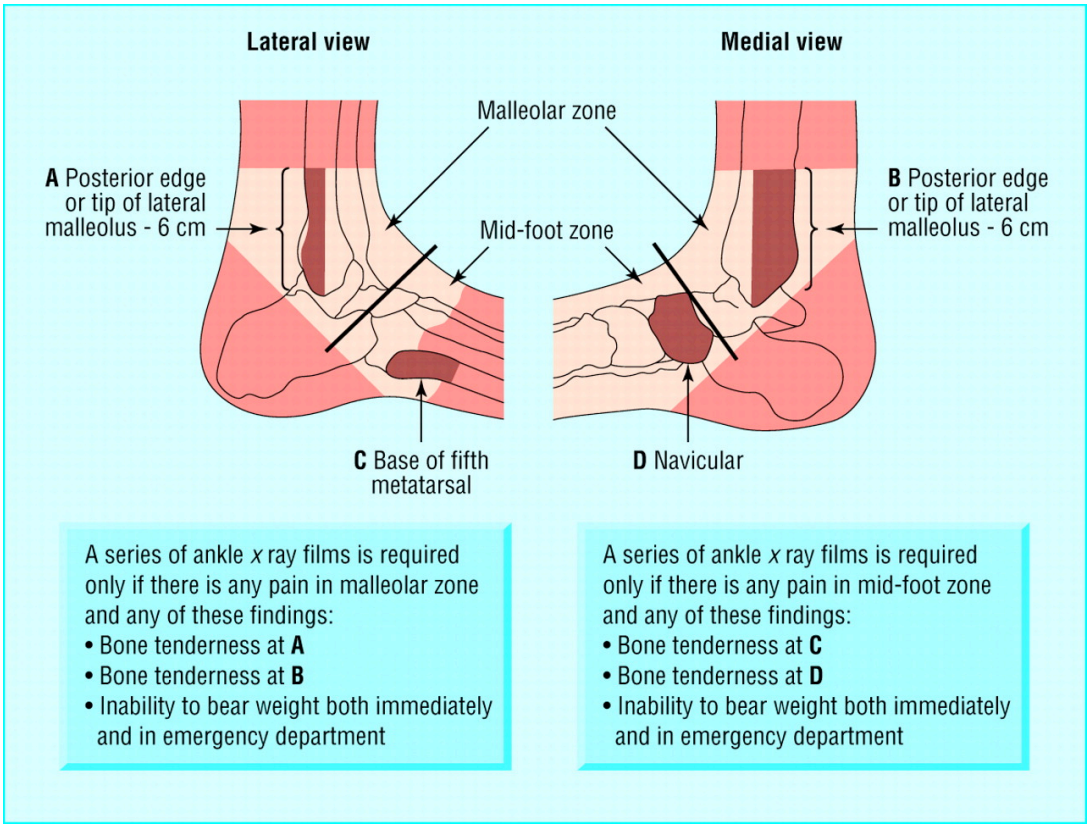
Case Scenario: 8-year-old girl was brought into the ED by her mother after twisting her ankle on a trampoline. She was able to walk on it but it became very swollen. The mother wants to know if she should get an x-ray to see if her daughter has broken the ankle.

The Ottawa Ankle Rules (OAR): These rules were developed by Dr. Ian Stiell. He is one of the most famous Canadian emergency physicians.

The OAR represents one of the best-known clinical decision instruments. The rule says x-rays are only required if the patient is tender:

- Distal 6 cm posterior edge of the tibia to the tip of the medial malleolus
- Distal 6 cm posterior edge of the fibula to the tip of the lateral malleolus
- Base of the 5th metatarsal
- Navicular bone of the mid foot or
- Patient unable to weight bear immediately in the ED for 4 steps

(Does not apply to pregnant, drunk or head injured patients)



Dr. Stiell's article on the OAR was published in the Ann Emerg Med 1992. There were 150 patients in the pilot stage and 750 in the main study. It showed the OAR was 100% sensitive and 40% specific. So it picked up all of the true positives or fractures. Applying the OAR would have decreased x-rays by over one-third.

The Question: Can the Ottawa ankle rules safely exclude ankle and foot fractures in children?

Reference: Dowling et al. Accuracy of Ottawa Ankle Rules to Exclude Fractures of the Ankle and Midfoot in Children: A Meta-analysis Acad Emerg Med. 2009 Apr;16(4):277-87. Epub 2009 Feb 2. PMID: 19187397

- **Population:** 3,130 Children ≤18 years old presenting to the ED with blunt ankle and/or midfoot injury. The prevalence of fracture in this group was 21.4%.
- **Intervention:** Application of the Ottawa Ankle Rule.
- **Control:** None.
- **Outcome:** Any fracture of the ankle or midfoot using an x-ray or a proxy measure (phone follow up) as the criterion standard.

Authors Conclusions: *"The OAR appear to be a reliable tool to exclude fractures in children greater than 5 years of age presenting with ankle and/or midfoot injuries. Employing the OAR would significantly decrease x-ray use with a low likelihood of missing a fracture."*

Commentary: The OAR has been well validated in the adult population but its use in children has remained unclear. Special challenges arise in the application of this clinical decision instrument to children due to various age related issues (ability to ambulate, difficulty in assessing pain, presence of growth plates). The authors of the SR rigorously test this decision instrument in children and appropriately conclude that it can be safely applied in children aged five and older. Only 10 fractures were missed in the pooled analysis of 3,130 children. Four of these 10 were described of which 2 were deemed insignificant (SH-I or avulsion fracture <3 mm). If these were excluded, the decision instrument would have even better performance characteristics than the authors' conservative measures.

Bottom Line: Application of the OAR in children 5 and older can be safely used to guide x-ray utilization.

SGEM #4: Getting Un-Stoned

Date: 6 September 2012

Case Scenario: 49-year-old man presents to the ED with his typical problem of renal colic.

Guest Skeptic: Dr. Tony Seupaul

The Question: Is an alpha-blocker safe and effective for the treatment of kidney stones?

Reference: Vincendeau et al. Tamsulosin Hydrochloride vs. Placebo for Management of Distal Ureteral Stones. Arch Intern Med. 2010; 170(22): 20212027 PMID: 21149761

- **Population:** 129 adult patients with acute renal colic presenting to ED with stone size of 27mm.
- **Intervention:** Tamsulosin 0.4mg OD
- **Control:** Placebo
- **Outcome:** Time to stone expulsion from inclusion in study up to 42 days.
- **Exclusion criteria:** Pregnant or breastfeeding women, patients receiving alpha or beta-blockers, those with transient hypotension, those with liver impairment, and those requiring a surgical procedure because of infection or continuation of pain after medical treatment were excluded. Patients with spontaneous passage before randomization were also excluded.

Authors Conclusions: *"Although well tolerated, a daily administration of 0.4 mg of tamsulosin did not accelerate the expulsion of distal ureteral stones in patients with ureteral colic"*

Commentary: Renal colic is a very common presentation to the ED. Several studies have demonstrated the use of alpha-blockers to help pass stones faster and with less pain. These trials had some limitations due to publication bias and non-masking of small cohorts of patients.

This study appears to be a well designed, multicenter; randomized, double blind trial that shows tamsulosin was well tolerated but did not speed up the passage of distal ureteral stones. However, the fact that the investigators only recruited 129 patients from 6 French hospitals over five years and then took another four years to get it published suggest the quality of the study might not be what it appears.

As with some similar studies, these results suggest tamsulosin does not work. A systematic review is currently underway by the Cochrane Collaboration to help resolve this controversy. Zhu Y et al. Alpha-blockers as medical expulsive therapy for ureteral stones. Cochrane Database of Systematic Reviews 2010, Issue 5. Art. No.: CD008509. DOI:10.1002/14651858.CD008509.

EBM Commentary: They "p" all over this paper (it was a urology paper after all). A better statistical test would have been to do a relative risk reduction or number needed to treat (NNT) analysis.

Bottom Line: Tamsulosin 0.4 mg OD does not seem to work for renal colic beyond the placebo effect.

SGEM #5: Does Johnny “kneed” an X-ray?

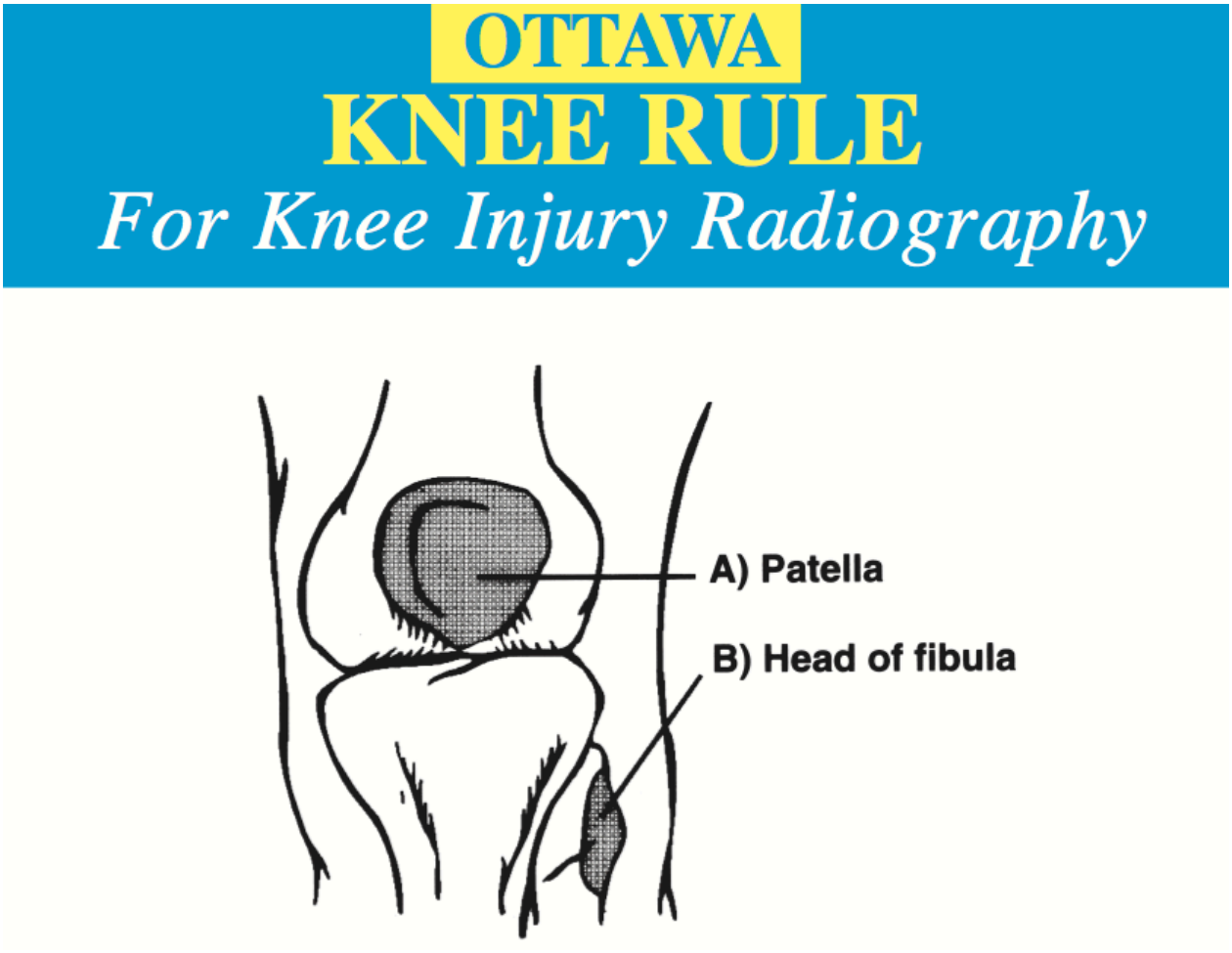
Date: 4 September 2012

Case Scenario: 10-year-old Johnny was playing hockey last night where he twisted his knee and could not finish the game. Mom brings him in after asking for an x-ray.

The Ottawa Knee Rules (OKR): These were also developed by Dr. Ian Stiell .

The rule says x-rays are only required if the patient has one or more of the following:

- Age 55 years or older
- Tenderness at head of fibula
- Isolated tenderness of patella
- Inability to flex to 90°
- Inability to bear weight both immediately and in the ED (4 steps)



(Does not apply to pregnant, drunk or head injured patients)

Dr. Stiell's article on the OKR was published in the Ann Emerg Med 1995. There were 127 patients in this prospective study. It showed application of the OKR was 100% sensitive and 54% specific. So it picked up all of the true positives or fractures. Applying the OKR would have decreased x-rays by 28%.

The Question: Can the Ottawa knee rules safely exclude knee fractures in children?

Reference: Vijayasankar D et al. Can the Ottawa knee rule be applied to children? A systematic review and meta-analysis of observational studies. Emerg Med J 2009; 26: 250-253. PMID: 19307383

- **Population:** 1130 children presenting to the ED with knee injuries. The prevalence of fracture in this group was 8.4%.
- **Intervention:** Application of the Ottawa knee rule.
- **Control:** None.
- **Outcome:** Any fracture of the knee.

Authors Conclusions: *"The available evidence suggests that the OKR can safely be applied to children over the age of 5 years. There is insufficient evidence to justify the use of the OKR in children less than 5 years."*

Commentary: The Ottawa Knee rule has been well validated in adult patients and when used can safely reduce the number of radiographs required by these patients presenting with knee injuries. Although there have been some studies on the use of the Ottawa Knee rule in children, these studies have had relatively smaller numbers. This paper, for the first time, provides a meta-analysis of the available data. The systematic review did not include non-English papers, and thus may have excluded certain data-sets. The data presented is convincing that the Ottawa Knee rules can safely be used in children over the age of 5 years. There was insufficient data to make conclusions about children less than 5 years.

Bottom Line: The Ottawa Knee Rule can be safely used in children over the age of 5 years.

SGEM #6: Orthopedic Surgeons: Strong AND Smart!

Date: 4 September 2012

Case Scenario: A new anesthetist meets a new orthopedic colleague who jokes that his hand shake is very firm but that he can't finish the cross word puzzle.

Question: Are orthopedic surgeons dumber and stronger than anesthetists?

Reference: Subramanian et al. Orthopedic surgeons: as strong as an ox and almost twice as clever? Multi-centre, prospective, comparative study. BMJ 2011

- **Population:** Male UK orthopedic surgeons
- **Intervention:** Orthopedic surgery training
- **Control:** Male UK anesthetist training
- **Outcome:** Dominant grip strength and intelligent scores.

Results: Orthopedic surgeons significantly greater grip strength and intelligence. (47.25 (SD6.95) kg) vs. 42.83 (7.57) kg) and 105.19 (10.85) vs. 98.38 (14.45).

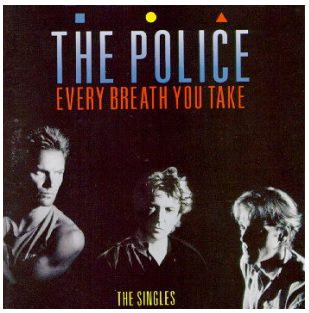
Authors Conclusions: *"Male orthopedic surgeons have greater intelligence and grip strength than their male anesthetic colleagues, who should find new ways to make fun of their orthopedic friends."*

Commentary:

- **What was good:**
  - Well designed, prospective, comparative study
  - Addresses important issue
  - Good humorous article
- **What was not so good (limits):**
  - Was it clinically relevant?
  - Representative of all ortho and anesthesia (women excluded)
  - No oxen included in the study (clinical relevance)

Bottom Line: The stereotypical image of male orthopedic surgeons as strong but stupid is unjustified in comparison with their male anesthetist counterparts. The comedic repertoire of the average anesthetist needs to be revised in the light of these data. However, we would recommend caution in making fun of orthopedic surgeons, as unwary anesthetists may find themselves on the receiving end of a sharp and quick witted retort from their intellectually sharper friends or may be greeted with a crushing hand shake at their next encounter.

SGEM #7: Every Breath You Take



Date: 8 October 2012

Case Scenario: 55 year old man arrives via EMS very SOB, diaphoretic and speaking only one-two word sentences. If you don't do something soon it will result in "badness".

Guest Skeptic: Dr. Tony Seupaul

Question: Is noninvasive ventilation beneficial for patients with acute cardiogenic pulmonary edema?

Reference: Weng CL, Zhao YT, Liu QH, Fu CJ, Sun F, Ma YL, Chen YW, He QY. Meta-Analysis: Noninvasive Ventilation In Acute Cardiogenic Pulmonary Edema. Ann Intern Med. 2010 May 4; 152 (9):590-600.

- **Population:** 2887 patients with Acute Cardiogenic Pulmonary Edema (ACPE) from 31 RCTs.
- **Intervention:** Continuous positive airway pressure and bilevel ventilation.
- **Control:** Standard therapy or each other.
- **Outcome:** Mortality, need for intubation, new MI.

Results:

In Hospital Mortality	N	RR (CI)
CPAP vs Standard Rx	697	0.64 (.44-.92)
BiPAP v Standard Rx	548	0.82 (.58-1.15)
BiPAP v CPAP	728	1.06 (.72-1.57)

Intubation	N	RR (CI)
CPAP vs Standard Rx	764	0.44 (.32-.60)
BiPAP v Standard Rx	579	0.54 (.33-.86)
BiPAP v CPAP	747	1.23 (.72-2.10)

Authors Conclusions: *"…the evidence in aggregate still supports the use of NIV for patients with ACPE. Continuous positive airway pressure reduces mortality more in patients with ACPE secondary to acute myocardial ischemia or infarction."*

Commentary: The 3CPO RCT found no difference in mortality and intubation rates between patients with ACPE treated with NIPPV versus standard therapy alone despite recent meta-analyses on the topic. This more recent meta-analysis sought to update these results to verify the clinical implications of the 3CPO trial. In contrast to the C3PO trial, their findings were consistent with prior investigations of reduced mortality and need to intubate without an increase in AMI.

Bottom Line: NIPPV decreased mortality and the need for intubation in patients that presented to the ED with ACPE.

SGEM #8: ABCD2 Not as Simple as 1, 2, 3

Date: October 2012

Case Scenario: A 68-year-old woman presents with unilateral weakness lasting 20 minutes. Blood pressure 165/95.

Guest Skeptic: Dr. Chris Carpenter, Washington University, St. Louis

Question: Does the ABCD2 score predict who will go on to have a stroke in the next 7 or 90 days?

Reference: Perry JJ et al. Prospective validation of the ABCD2 score for patients in the emergency department with transient ischemic attack. CMAJ. 2011 Jul 12; 183(10):1137-45. Epub 2011 Jun 6.

- **Population:** Prospective cohort trial done in eight Canadian emergency departments. n=2056. Mean age 68 years old with 50.9% women.
- **Intervention:** Application of the ABCD2 scored by treating ED physician
- **Control:** None
- **Outcome:** Stroke at 7 days or 90 days as determined by treating neurologist or adjudicating committee.

Results:

Table 4: Performance of stratified, standardized, ABCD2 scores as a predictor of stroke at 7 and 90 days among 2032 patients with transient ischemic attack

ABCD2 threshold for high risk	Stroke at 7 d *n = 38*		Stroke at 90 d *n = 65*	
	Sensitivity, % (95%CI)	Specificity, % (95%CI)	Sensitivity, % (95%CI)	Specificity, % (95%CI)
> 0	100.0 (90.8–100)	0.7 (0.4–1.1)	100.0 (94.4–100)	0.7 (0.4–1.1)
> 1	100.0 (90.8–100)	4.0 (3.2–4.9)	100.0 (94.4–100)	4.0 (3.1–5.0)
> 2*	94.7 (82.7–98.5)	12.5 (11.2–14.1)	96.9 (89.3–99.1)	12.7 (11.3–14.3)
> 3	92.1 (79.2–97.3)	32.7 (30.6–34.7)	92.3 (83.2–96.8)	33.0 (30.9–35.1)
> 4	65.8 (49.9–78.8)	57.2 (55.0–59.3)	63.1 (50.9–73.8)	57.4 (55.2–59.6)
> 5†	31.6 (19.1–47.5)	86.9 (85.3–88.3)	29.2 (19.6–41.2)	79.7 (77.9–81.4)
> 6	10.5 (4.2–24.1)	97.3 (96.5–97.9)	10.8 (53.2–20.6)	97.4 (96.6–98.0)

Note: CI = confidence interval.
*Threshold for defining high risk as recommended by the American Heart Association.
†Threshold for defining high risk as recommended in the original publication of the ABCD2 score.

Table 6: Classification performance of ABCD2 score using likelihood ratios by total score for the outcome of stroke at 7 and 90 days and the outcome of recurrent TIA at 7 and 90 days

ABCD2 score	Outcome, likelihood ratio (95% CI)			
	Stroke at 7 d	Stroke at 90 d	TIA at 7 d	TIA at 90 d
0	0	0	0	1.09 (0.14–8.34)
1	0	0	0.55 (0.08–3.91)	1.56 (0.72–3.34)
2	0.61 (0.16–2.38)	0.36 (0.09–1.42)	0.63 (0.21–1.92)	0.64 (0.32–1.27)
3	0.13 (0.02–0.91)	0.23 (0.08–0.70)	1.11 (0.67–1.84)	0.76 (0.51–1.13)
4	1.07 (0.63–1.84)	1.22 (0.83–1.79)	1.11 (0.72–1.73)	1.08 (0.81–1.44)
5	1.53 (0.97–2.39)	1.47 (1.03–2.11)	0.96 (0.58–1.60)	1.21 (0.92–1.61)
6	1.19 (0.64–2.22)	1.06 (0.63–1.77)	1.13 (0.66–1.93)	1.06 (0.74–1.51)
7	3.89 (1.48–10.19)	4.22 (1.99–8.92)	0.63 (0.09–4.47)	0.47 (0.12–1.90)

Note: CI = confidence interval, TIA = transient ischemic attack.

Authors Conclusions: *"This multicentre prospective study involving patients in emergency departments with transient ischemic attack found the ABCD2 score to be inaccurate, at any cut- point, as a predictor of imminent stroke. Furthermore, the ABCD2 score of more than 2 that is recommended by the American Heart Association is nonspecific."*

Commentary (Dr. Chris Carpenter): This prospective, ED-based multicentre Canadian trial represents the highest quality evidence to assess the ABCD2 thus far. Although an ABCD2 score of 0 or 1 is 100% sensitive for 30-day stroke risk, very few ED patients with a suspected TIA fall within this low-risk category. Therefore, the ABCD2 is not an accurate post-TIA stroke risk prognostic instrument and should NOT be used to risk-stratify ED patients. Instead, clinical gestalt and local resource availability should be used to determine the disposition and timing for the diagnostic work-up of post-TIA ED patients.

EBM Commentary:

- Sensitivity and Specificity
- Likelihood Ratio
- Evidence-Based Emergency Care: Diagnostic Testing and Clinical Decision Rules
- TIA Risk Stratification
- Further TIA Risk Stratification

Bottom Line: ABCD2 score is not a reliable way to risk stratify patients presenting to the ED with TIAs on who will go on to have a stroke.

SGEM #9: Who Let the Dogs Out?

Date: 28 October 2012

Case Presentation: 45-year-old man presents to the ED with a laceration to his finger. He was washing the dishes when a glass broke. There is a 1 cm full thickness laceration on the pad of his index finger. The bleeding has stopped, skin edges look good, tetanus is up-to-date and he wants to know does he need stitches?

Dogma Taught in Medical School: There are over 7 million lacerations a year in the USA. Close to 5 million animal bites/year and 1.5 million skin tears in the elderly. Open wounds and lacerations are the third most common presenting problems in the ED (Singer and Dagum NEJM 2008). Most of what we know has been based on observations from animal studies and practices in the OR. However, most of our ED patients are not animals and do not end up in the OR. So it is time to challenge some of the dogma of wound care.

Dogma #1: Top priority for patients is infection

Interestingly when you ask patients about their priorities infection is not their top concern. Singer et al published a study called Patient Priorities with Traumatic Lacerations. It surveyed 724 adult ED patients in 2000 attempt to find the *"clinically relevant outcome"* for future wound research. Function was #1 concern for non-facial lacerations and cosmetic appearance was #1 priority for facial lacerations. This is something we should keep in mind when addressing these injuries.

The risk for infection in adults with traumatic lacerations is 3.5% according Hollander. He did a cross sectional study looking at 5,521 patients over 4 years. Two things really increased the Odds Ratio (EBM Teaching Point!) of developing an infection and that was diabetes (OR=6.7 95%CI 1.7-26.4) and a foreign body (OR=2.6 95%CI 1.3-5.2).

Bottom Line: Infection is very important to us but patients have priorities too. They are more concerned about function for non-facial lacerations and cosmetic outcome on the face. We should make sure we acknowledge and address both sets of priorities.

Dogma #2: All wounds need to be cleaned with fancy solutions

What is the best solution to prevent wound infection? Luckily there is a Cochrane SR on the subject. Fernandez and Griffith searched the various databases for randomized controlled trials.

- tap water vs. no cleansing
- tap water vs. sterile normal saline (NS)
- water (distilled or cooled, boiled water) vs. sterile NS
- tap water vs. cooled, boiled water
- tap water vs. any other solution

Bottom Line: There was not a difference between all these solutions, so clean tap water is fine and less costly than using all the fancy solutions to prevent infection.

Dogma #3: Sterile gloves must be used for simple laceration treatment

Believe it or not, there was a study done on gloves vs. no gloves! Maitra and Adams did a single blinded, non-RCT of 242 sutured hand wounds. There was an increase in late purulent infections in those treated without gloves. The conclusion was *"we recommend wearing of sterile gloves to suture all wounds".*

This brings up the issue of whether sterile gloves are necessary or will clean non-sterile gloves be fine?

Perelman et al published a multicenter RCT in 2004 with 816 patients. They compared infection rates using sterile gloves vs. clean non-sterile gloves.

- Sterile gloves group: 6.1% (95% CI: 3.8% – 8.4%)
- Non-Sterile group: 4.4% (95% CI: 2.4% – 6.4%)

The relative risk (RR) was 1.37 **(**95% CI: 0.75 – 2.52) with the confidence interval crossing 1.0 indicating no difference.

Bottom Line: This study demonstrated that there is no clinically important difference in infection rates between using clean non-sterile gloves and sterile gloves during the repair of uncomplicated traumatic lacerations.

Dogma #4: No epinephrine in the tips of things or they will fall off

Epinephrine activates alpha-adrenergic receptors in the vascular endothelium. It causes peripheral vascular endothelial vasoconstriction. Several of the prominent emergency medical textbooks still say don't use local anesthetic containing epinephrine in fingers, toes, nose or other appendages.

Katis P addressed this issue with a systematic review published in the CJEM 2003. The article was called Epinephrine in digital blocks: refuting dogma.

Dr. Katis searched 120 years of the literature and only found four papers met inclusion criteria. There were historical cases in context of epinephrine using older anesthetics (cocaine). Other studies used un-standardized epinephrine concentrations or other conditions including infection or tourniquet use. There were no modern-day reports to suggest epinephrine in commercial lidocaine preparations cause finger gangrene. In addition, there are ample case studies of post-amputation digit re-implantation after up to 42 hours of warm ischemia suggesting significant digital resistance to ischemic insult

Bottom Line: This means that epinephrine is safe to use with local anesthetic in the tips of things without the fear of those tips falling off.

Dogma#5: All lacerations must be sutured

The dogma here is that sutures lead to better wound approximation and thus better wound outcome. Quinn et al (BMJ 2002) investigated that question in their paper suturing vs. conservative management of lacerations of the hand: randomized controlled trial.

They looked at whether or not simple lacerations needed sutures. Single center RCT with 95 full thickness lacerations to the hand, which would normally require sutures. These were uncomplicated (no tendon, joint, fracture, nail bed or nerve complications) lacerations of <2 cm.

Outcome:

- Cosmetic appearance after 3 months – NO DIFFERENCE
- Time for patients to resume normal activities (function) – NO DIFFERENCE
- Pain during treatment – SIGNIFINCATLY BETTER favoring conservative management

Bottom Line: You can achieve similar cosmetic and functional outcomes with either conservative management or suture repair of small-uncomplicated hand lacerations. But conservative management is less painful, quicker and likely less costly. No sutures required.

Busted Dogma of Simple Laceration in the ED:

- Patients have priorities and infection is not #1
- The solution is dilution and tap water is just fine
- Non-sterile gloves are fine; save the sterile gloves for sterile procedures
- Epinephrine can go in the tips of everything without fear of the appendage falling off
- Simple hand lacerations <2 cm don't need sutures

SGEM #10: Ten Commandments of EBM

Date: 4 November 2012

And now for something a little different. We are always trying out new things on TheSGEM to improve knowledge translation and dissemination. Today I want to look at evidence based medicine again. There are some critics of EBM. I appreciate the system is not perfect. There are a number of limitations to EBM.

Sir Winston Churchill said, ***"Democracy is the worst form of government except all the others that have been tried."*** This is how I feel about EBM. It is the worst form of medicine except for all the others that have been tried.

Or I could quote JFK's speech at the Berlin Wall ***"Freedom has many difficulties, and democracy is not perfect"***. EBM has many difficulties, and is not perfect. It can be hard coming up with a focus question and then using the appropriate methods. Interpreting the results can also be a challenge. But don't panic! The EBM answer as my mentor, Dr. Andrew Worster, taught me is always…*"it all depends".*

Do we really want to go back to non-randomized, non-blinded trials?

We would still be using magnets to mesmerize patients and blood letting to treat sepsis.

This leads me to today's podcast on the **Ten Commandments of EBM.** I have said in previous podcasts that most things in medicine are made of five things. Look at the Ottawa Ankle and Knee Rules (guidelines) – five things. If there are only four we tend to make up a fifth and if there are six we combine two to make a total of five. It sort of reminds me of Mel Brooks in the movie History of the World Part I when he acts as Moses with Ten Commandments.

The Ten Commandments of Evidence Based Medicine:

Adapted from Dr. John S. Yudkin, Emeritus Professor of Medicine, University College London and published in a blog by Dr. Richard Lehman

1. Thou shalt endeavor to provide patient care based on the BEST evidence. (BEEM)
2. Thou shalt consider benefits of drugs as proven only by hard endpoint studies and not bow down to surrogate endpoints, composite endpoints or secondary endpoints for these are but graven images.
3. Thou shalt not worship Guidelines, for these are but the creations of Committees, which even their own members do not strongly believe in the recommendations.
4. Thou shalt apply a pinch of salt to Relative Risk Reductions, regardless of P values, for the population of their provenance may bear little relationship to thy daily clientele.
5. Thou shalt honor the Numbers Needed to Treat (NNT), for therein rest the clues to patient-relevant information and to treatment costs.
6. Thou shalt also honor the Number Needed to Harm (NNH) such that primum non-nocere (first do no harm).
7. Honor the elderly patient, for although this is where the greatest level of risk resides, so do the greatest hazards to many treatments.
8. Thou shalt neither see drug representatives, nor covet an educational symposium in a luxury setting like Hawaii.
9. Thou shalt share decisions on treatment options with the patient in the light of estimates of the individual's likely risks and benefits.
10. Thou shalt be skeptical and critical of all that you are taught.

SGEM #11: All Seizures Stop…Eventually

Date: 11 November 2012

Case Scenario: A healthy 23-year-old woman presents at 37 weeks pregnant and seizing. She has no history of seizures, drugs, trauma, illness, etc. You are addressing the A, B, Cs and the nurse asks… *"what med do you want to stop the seizure"*?

- Ativan 2 mg IV, Diazepam 10 mg IV, Phenytoin 20 mg/kg IV, MgSO4 4 g IV or Hide in Bathroom

Pre-Eclampsia: High blood pressure in pregnancy is a leading cause of maternal and perinatal mortality and morbidity. Hypertension (HTN) represents a spectrum of possible disorders (pre-existing HTN, pregnancy induced HTN, pre-eclampsia and eclampsia).

Pre-eclampsia is defined as HTN and proteinuria. Between 2-8% or pregnancies develop pre-eclampsia. Woman who have HTN before they become pregnant have a 20% risk of developing pre-eclampsia.

Hypertension in pregnancy is a diastolic BP >90mmHg measured twice. Systolic BP of >140mmHg should be followed closely for the development of diastolic HTN. Severe HTN is a diastolic BP >110mmHg or systolic BP >160mmHg.

Protein in the urine is the other component to make the diagnosis of pre-eclampsia. You should strongly suspect proteinuria when the urinary dipstick is >2+. Proteinuria is defined as >0.3 g/day in a 24 urine collection of >30 mg/mmol urinary creatinine in a random urine sample.

There are other clinical manifestations of pre-eclampsia of which none are specific:

- Visual scintillations and scotomata (occipital cortical ischemia)
- Persistent headaches (cerebral ischemia or edema)
- Right upper quadrant pain (capsular irritation secondary to hepatic necrosis and/or hematoma)
- Shortness of breath or chest pain (secondary to non-cardiogenic pulmonary edema)

While pre-eclampsia is fairly common, eclampsia is a fairly rare complication. Interestingly, only 20% of women with eclampsia have documented HTN in the week before the seizure, 10% will only have proteinuria and 10% will have neither. Eclampsia typically occurs in the second half of pregnancy or during labor. However, it can still occur after the birth.
The prevention and treatment of pregnancy induced HTN and pre-eclampsia are beyond the scope of this podcast. For more information please visit the Society of Obstetricians and Gynecologists of Canada (SOGC) Guidelines on the topic: Diagnosis, Evaluation and Management of the Hypertension Disorders of Pregnancy.

Question: What is the better treatment for eclampsia: magnesium sulphate or diazepam?

Reference: Duley L, Henderson-Smart DJ, Walker GJA, Chou D. Magnesium sulphate versus diazepam for eclampsia. Cochrane Database of Systematic Reviews 2010, Issue 12. Art. No.: CD000127. DOI: 10.1002/14651858.CD000127.pub2.

- **Population**: Seven trials in low-to middle-income countries with 1386 women with eclampsia
- **Intervention**: MgSO4 4 g IV loading dose followed by 1 g/hr infusion vs. diazepam 40 mg IV loading dose followed by an infusion of 20 mg/500 ml titrating to effect
- **Analyses:** Death, recurrence of seizures, stroke or any serious morbidity

Results:

- 41% relative risk reduction in death with MgSO4
- 57% relative risk reduction in recurrence of seizures MgSO4

Analysis 1.1. Comparison 1 Magnesium sulphate versus diazepam, Outcome 1 Maternal death.

Review: Magnesium sulphate versus diazepam for eclampsia

Comparison: 1 Magnesium sulphate versus diazepam

Outcome: 1 Maternal death

Study or subgroup	Magnesium sulphate n/N	Diazepam n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Bangladesh 1998	3/100	7/100		0.43 [0.11, 1.61]
Collab Trial 1995	17/453	23/452		0.74 [0.40, 1.36]
India 2001	5/60	6/40		0.56 [0.18, 1.70]
Malaysia 1994	0/5	0/6		0.0 [0.0, 0.0]
Nigeria 2004	3/30	5/30		0.60 [0.16, 2.29]
Zimbabwe 1990	1/24	0/27		3.36 [0.14, 78.79]
Zimbabwe 1998	0/35	6/34		0.07 [0.00, 1.28]
Total (95% CI)	**707**	**689**		**0.59 [0.38, 0.92]**

Total events: 29 (Magnesium sulphate), 47 (Diazepam)

Heterogeneity: $Chi^2 = 3.95$, df = 5 (P = 0.56); $I^2 = 0.0\%$

Test for overall effect: Z = 2.34 (P = 0.019)

Analysis 1.2. Comparison 1 Magnesium sulphate versus diazepam, Outcome 2 Recurrence of seizures.

Review: Magnesium sulphate versus diazepam for eclampsia

Comparison: 1 Magnesium sulphate versus diazepam

Outcome: 2 Recurrence of seizures

Study or subgroup	Magnesium sulphate n/N	Diazepam n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Bangladesh 1998	5/100	26/100		0.19 [0.08, 0.48]
Collab Trial 1995	60/453	126/452		0.48 [0.36, 0.63]
India 2001	0/60	2/40		0.13 [0.01, 2.73]
Malaysia 1994	0/6	0/5		0.0 [0.0, 0.0]
Nigeria 2004	3/28	13/26		0.21 [0.07, 0.67]
Zimbabwe 1990	5/24	7/27		0.80 [0.29, 2.20]
Zimbabwe 1998	1/35	2/34		0.49 [0.05, 5.11]
Total (95% CI)	**706**	**684**		**0.42 [0.33, 0.54]**

Total events: 74 (Magnesium sulphate), 176 (Diazepam)

Heterogeneity: $Chi^2 = 7.05$, df = 5 (P = 0.22); $I^2 = 29\%$

Test for overall effect: Z = 6.89 (P < 0.00001)

EBM Commentary:

Forest Plots: "*A graphical display designed to illustrate the relative strength of treatment effects in multiple quantitative scientific studies addressing the same question. It was developed for use in medical research as a means of graphically representing a meta-analysis of the results of randomized controlled trials."*

Heterogeneity: *"Statistical heterogeneity manifests itself in the observed intervention effects being more different from each other than one would expect due to random error (chance) alone."* Cochrane

The mechanism of action for magnesium sulphate to treat eclampsia is not clearly understood. Infusion of magnesium can cause serious reactions such as cardiovascular collapse and respiratory paralysis.

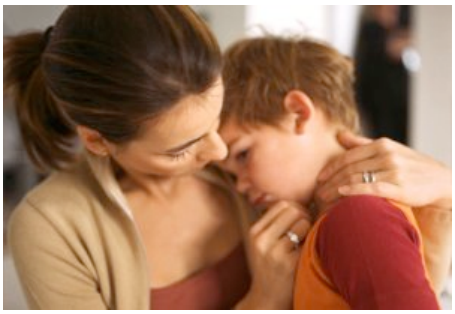
Magnesium is also recommended as prophylaxis against eclampsia in women with severe pre-eclampsia (The NNT).

Authors Conclusions*: "Magnesium sulphate for women with eclampsia reduces the risk ratio of maternal death and of recurrence of seizures, compared with diazepam."*

Commentary: Complications of pregnancy and childbirth results in about 358,000 maternal deaths world wide in 2008. However, 99% of these deaths occur in low- and middle-income countries. The risk of death in developed countries from pregnancy related issues is 1 in 1,000-4,000. In contrast, women in developing countries have a 1 in 15-20 risk of death. This is the highest disparity between high and low-income countries in the world. This systematic review involved ~ 1,400 women from seven studies. Three of the studies were of high quality representing about 1,000 patients. Magnesium sulphate compared to diazepam reduced the relative risk of death by 41% and recurrence of seizures by 57%. ***It is cheap, safe, easy to give and effective.***

Bottom Line: Delivery of the baby is the only definitive treatment for pre-eclampsia or eclampsia. However, giving magnesium sulphate 4 g IV loading dose followed by 1 g/hr infusion for 24 hours saves lives and prevents further seizures in women with eclampsia.

SGEM #12: Oh Dance-a-tron



Date: 18 November 2012

Case Scenario: A 4-year-old child presents with a one-day history of vomiting. The child is otherwise healthy, immunized, no fever, no rash, no recent travel, no abdominal pain, no cough and with no sick contacts.

Background on Dehydration in Children:

Dehydration in children is a common presentation to the emergency department. A main cause of dehydration in this age group is gastroenteritis, which is characterized by acute onset diarrhea with or without nausea, vomiting, fever and abdominal pain. The scope of the problem was quantified by Glass in 1991. This study showed the following:

- 20-40 million episodes of diarrhea in children each year in the USA
- Resulting in 2-4 million physician visits per year
- 10% of all hospital admissions of children < 5 years old

Degree of dehydration	Mild (5-7% body weight)	Moderate (7-9% body weight)	Severe (>10% body weight)
Fontanelle	Slightly sunken	Very sunken	Very sunken
Mucous membranes	Slightly sticky	Dry	Very dry
Skin turgor	Normal	Slightly decreased	Markedly decreased
Capillary refill time	Normal (<3 seconds)	Normal (<3 seconds)	Delayed (≥3 seconds)
Urine output	Normal	Slightly decreased	Decreased or absent
Mental status	Normal	Slightly fussy	Irritable or lethargic

Goldman et al Pediatrics in 2008 published a helpful table describing the degree of dehydration in children ranging from mild, moderate to severe.
Most cases of gastroenteritis are mild, self-limiting and can be treated effectively with oral rehydration. Check out the Canadian Pediatric Society algorithm for oral rehydration.

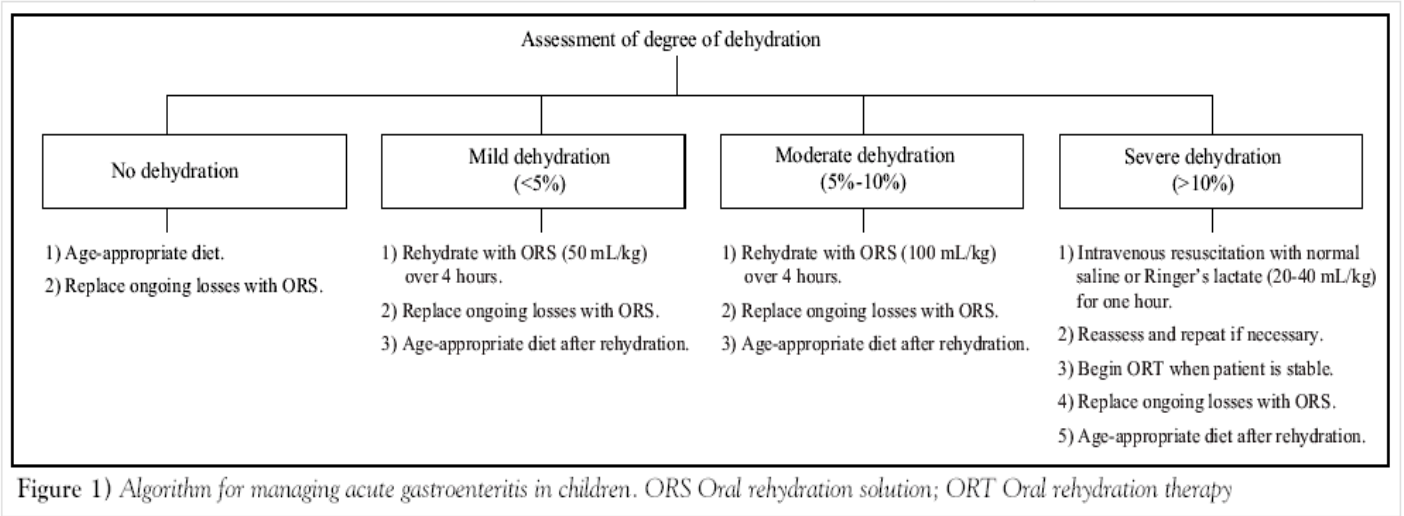


Figure 1) *Algorithm for managing acute gastroenteritis in children. ORS Oral rehydration solution; ORT Oral rehydration therapy*

Question: What can we use to prevent vomiting and avoid the use of IV fluids and admissions in children with gastroenteritis?

Reference: DeCamp LR et al. Use of antiemetic agents in acute gastroenteritis: A systematic review and meta-analysis. Arch Pediatr Adolesc Med. 2008 Sep; 162(9): 858-65

- **Population:** Children with vomiting from gastroenteritis
- **Intervention:** Antiemetic medications
- **Control:** Placebo
- **Outcome:** Further vomiting, requirement of intravenous fluids (IVF), admission to hospital, return to ED, episodes of diarrhea

Results: There were 11 articles that met the inclusion criteria: ondansetron (n = 6), domperidone (n = 2), trimethobenzamide (n = 2), pyrilamine-pentobarbital (n = 2), metoclopramide (n = 2), dexamethasone (n = 1), and promethazine (n = 1). A meta-analysis of 6 randomized, double-masked, placebo-controlled trials of ondansetron was performed.

- Prevent admission **NNT=14** (95% CI 9-44)
- Prevent IVF **NNT=5** (95% CI 4-8)
- Prevent further emesis **NNT=5** (95%CI 4-7)

Authors Conclusions: *"Ondansetron is the only antiemetic agent with consistent, proven efficacy in reducing vomiting from gastroenteritis. Other antiemetic drugs have not demonstrated consistent effectiveness and, therefore, should not be used. In addition, moderately ill children presenting to the ED who were treated with ondansetron have a decreased risk of receiving IVF and a decreased need for immediate hospital admission."*

Commentary: Ondansetron, given orally, is an effective anti-emetic in children experiencing vomiting secondary to gastroenteritis. Doses should be given as needed for vomiting and regular dosing (i.e. every eight hours) of ondansetron should be avoided to prevent worsening diarrhea and return to ER visits.

EBM Commentary: Search strategies are always important in systematic reviews. You want researchers to cast a wide net and be exhaustive in their efforts. This study did do an extensive search but there was a significant weakness. They limited the strategy to identify only English language studies. Whether or not this had an impact on the results and conclusions are unknown.

Cochrane traditionally does an excellent job in searching for articles to include. These researchers usually check everything including hand searches of medical meetings and phone calls to experts who have published in the area.

While the English language restriction is a limitation to this 2008 publication, there have been other systematic reviews that agree with the conclusions of this study. These include a Cochrane review from 2011 and a BMJ update from the same authors in 2012.

Bottom Line: Ondansetron is an effective anti-emetic preventing further vomiting, IVF and admissions for children with gastroenteritis.

Case Resolution: The 4-year-old was given 0.1mg/kg of ondansetron orally. They were observed for one hour with a trial of oral rehydration therapy. There was no further vomiting.

For more information about dosing, which is typically between 0.1-0.15mg/kg, check out the **Ondansetron dosing in pediatric gastroenteritis: a prospective cohort, dose-response study** by Freedman et al 2010 in the Journal of Paediatric Drugs.

SGEM #13: Better Out than In

Date: 2 December 2012

Case Presentation: Healthy 45-year-old man presents with a 3 cm abscess under his left arm. There is no surrounding cellulitis. He is not an IV drug user and has never had an abscess before. You make the diagnosis of an uncomplicated superficial cutaneous abscess. You know that antibiotics are *probably* not necessary after I&D. However, the patient gets nervous after you describe the I&D process. He wants to know if you can do anything to make this procedure less painful and if packing is really necessary?

Your Inside Voice Says:

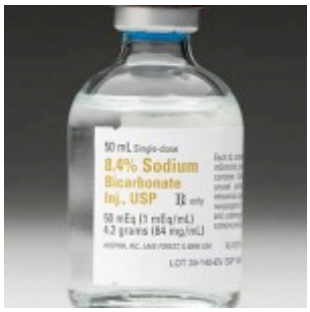
- Why to men have such low pain tolerances?
- Mmmm, pus…time for lunch
- Suck it up butter cup
- Of course there is something we can do regarding oligoanalgesia
- To pack or not to pack, that is the question

Background: Simple **c**utaneous abscesses (SCA) are a very common presentation to the emergency department (ED). In 2005, there were 3.3 million ED visits for SCA and the numbers are increasing faster than the total number of ED visits.

1) Buffering Lidocaine:

Question: Does buffering lidocaine make it less painful to inject?

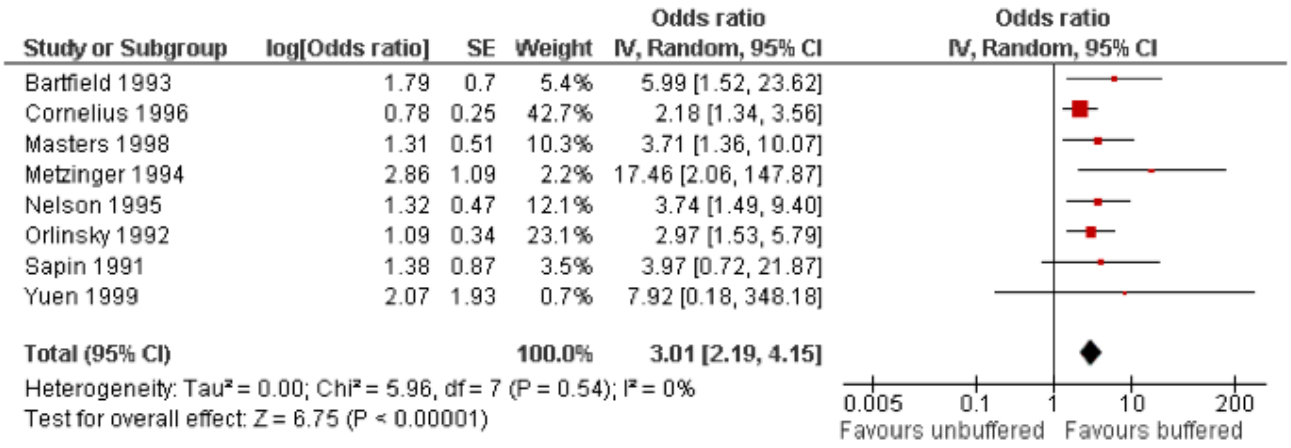
Reference: Cepeda MS et al. Adjusting the pH of lidocaine for reducing pain on injection. Cochrane Database of Systematic Reviews 2010



- **Population:** Adults and children in need of local anesthesia for epidural catheter insertion, IV cannulation or a small surgical procedure. Total of 23 trials with 1,067 patients.
- **Intervention:** Buffering lidocaine with 1 ml of 8.4% sodium bicarbonate in 9 ml of 1% or 2% lidocaine with or without epinephrine.
- **Studies Included:** 23 studies (10 parallel and 13 cross over). Eight of the 23 studies had moderate to high risk of bias.

Results:

Figure 4. Forest plot of comparison: 5 Preference, outcome: 5.1 Preference in cross over studies.



BEEM Commentary: Local injection of lidocaine is common in the ED. These injections can be a painful experience for patients and it is thought that the acidic pH of the commercially available solutions (pH 3.5-7.0) is the cause of the pain. This review included 23 studies. However, eight of the 23 lacked allocation concealment making the results more prone to bias. However, buffering lidocaine is a quick and inexpensive step with no reported adverse effects or toxicity and can reduce the burning sensation experienced by some patients.

BEEM Bottom Line: Patients might appreciate the extra effort of buffering the lidocaine.

2) Antibiotics for I&D:

Question: Do you have to use antibiotics when treating simple cutaneous abscesses especially in the age of MRSA?

Reference: Hankin A and Everett WW. Are Antibiotics Necessary After Incision and Drainage of a Cutaneous Abscess? Annals Emerg Med 2007 50(1), 49-51.

- **Review:** The authors reviewed the literature (MEDLINE, EMBASE) for English-language articles from 1966 to current, using human subjects. The initial search found 1396 articles, which were limited to five original randomized trials and one abstract dealing specifically with this question.
- **Intervention:** I&D with and without antibiotics

Results: The results of three randomized trials, two prospective cohorts and one retrospective cohort study all suggest that antibiotics were not necessary after an appropriate I&D and packing. More importantly, significant proportions of the more recent studies had MRSA in the patient populations, and even these patients did not need antibiotics. No adverse events were noted in either treatment or placebo arms.

Limitations: There is very little high quality evidence surrounding this field, which is mildly surprising given the prevalence of this condition in North America ED's. The six studies with <1000 total enrolled patients do not constitute the total body of evidence for this clinical question. BEEM's independent search identified at least three additional randomized controlled trials of an additional 752 subjects also refuting the need for antibiotics in abscess management. No study clearly defined "abscess". There are no comments about treatment choices when there is an overlying cellulitis.

BEEM Commentary: A limited body of evidence suggests that antibiotics are not needed after I&D and packing of cutaneous abscesses, even in an era of increasingly prevalent MRSA. The current review offers no guidance on treating in the presence of overlying cellulitis. The choice to treat/not treat with antibiotics may need to be balanced between guidelines from IDSA and CDC suggesting treatment when increased MRSA risk (don't treat otherwise), versus concerns about antibiotic misuse, increasing resistance and MRSA proliferation. If choosing to treat suspected MRSA patients, the key issue to remember is to avoid cephalexin (which doesn't treat MRSA effectively); instead use clindamycin, doxycycline or trimethoprim-sulfamethoxazole.

BEEM Bottom Line: As usual with EBM the answer is *"it all depends"*. The evidence does not suggest using antibiotics routinely in simple cutaneous abscesses even in the era of MRSA. Individual clinicians may want to factor in specific patient co-morbidities and history among other things in their decision whether or not to prescribe antibiotics. For more information about antibiotic use with I&Ds check out our 2008 publication done by a BEEM faculty member in EP Monthly. Also, Dr. Richard Bukata made a similar conclusion four years later in his 2012 EP Monthly article on the same topic.

3) Packing Abscesses:

Question: Is routine packing of simple cutaneous abscesses necessary after an I&D?

Reference: O'Malley GF et al. Routine Packing of Simple Cutaneous Abscesses Is Painful and Probably Unnecessary. Acad Emerg Med. 2009; 16:470-473.

- **Population:** Adult (≥ 18 years old) ED patients presenting with cutaneous abscesses requiring I&D
- **Intervention:** I&D without standard packing of the abscess cavity.
- **Control:** I&D with standard packing of the abscess cavity.
- **Outcome:** Primary: Need for intervention at 48 hours; Secondary: Pain and wound evaluation.
- **Exclusion criteria:** Abscesses larger than 5 cm in any dimension; pregnancy; co-morbid medical conditions including diabetes, HIV, or any malignancy; chronic steroid use; immunosuppressive states including but not limited to sickle cell disease and sarcoidosis; abscesses located on the face, neck, scalp, hands, feet, perianal, rectal, or genital areas; hidradenitis or pilonidal abscesses; allergy to sulfa or hypersensitivity to trimethoprim-sulfamethoxazole (TMP-SMX); need for procedural sedation or supplemental treatment (intravenous antibiotics or surgical consultation) based on physician's discretion; or subject inability to return for 48-hour follow-up.

Results: There were 48 patients in this study. They were randomized with 23 receiving packing and 25 with no packing. Only two-thirds of the patients were evaluated at 48-hours. Twenty-one patients were from the packing group and 13 were from the no packing group. The primary end point was the need for intervention (extension of the incision, further probing, irrigation, packing of the wound, change of initial antibiotics, need for surgical evaluation, admission to hospital or need for another follow-up visit to the ED) at 48 hours by a blinded attending physician. A total of 9 subjects needed an intervention at the follow-up visit (see below).

Intervention	Packing	No Packing
Irrigation	1	2
Extension of incision	0	1
Second follow-up	2	1
Change antibiotics	0	1
Repack abscess	1	0

Commentary: This pilot study run as a single center RCT challenges surgical dogma commonly practiced in EDs everywhere. It appears that the study was well designed and implemented but there are deficiencies. Specifically: both allocation and ascertainment bias should have been minimized; there was a lack of information about prognostic factors by group and no CONSORT Statement as required by most journals. Some of the deficiencies may have more to do with the editors than the investigators. Although, as a single RCT the evidence is not sufficient to widespread change of standard Emergency Medicine practice, it is certainly enough to make many EPs reconsider their options in treating simple cutaneous abscesses. It should also serve as a catalyst for funding further research trials.

Bottom Line: Routine packing of simple cutaneous abscesses may not be necessary. For more information on packing abscesses check out our write up in EP Monthly.

Where is all of this heading? When we looked at the literature we found many different reviews addressing I&D. Check out the variety of treatments (+/- antibiotics, +/- packing, +/- primary closure).

Author	Patients	Outcome(s)	Results
Macfie 1977	219 ED patients 77 I&D then suture + abx 44 I&D then suture 57 I&D then pack + abx 41 I&D then pack	a) Mean healing time b) Recurrence rate	a) Suture + abx: 9.3 days Suture: 8.8 days Pack + abx: 9.8 days Packed: 9.3 days b) Suture + abx: 11.7% Suture: 11.4% Packed + abx: 0% Packed: 7.3%
Simms 1982	54 I&D then sutured 60 I&D then packed	Mean healing time	Suture: 8.9 days Packed: 7.8 days
Stewart 1985	137 surgical outpatients 64 I&D then sutured 73 I&D then packed	a) Mean healing time b) Mean time of work	a) Suture: 7 days Packed: 25 days b) Suture: 4 days Packed: 14 days
Barnes 1988	1943 ED patients 891 sutured 301 packed	a) Wound healing time b) Recurrence rate	a) Suture: 6.5-21 days Packed: 7.8-35 days b) Suture: 7%-22% Packed: 14%-35%
Sorensen 1987	60 surgical outpatients 10 excluded	Mean healing time	Suture: 9 days Packed: 15 days
Abrahams 1997	60 surgical patients 32 I&D then sutured 29 I&D then packed	a) Proportion healed at 1-week b) Proportion healed at 1-month	a) Suture: 78% Packed: 3% b) Suture: 88%[1] Packed: 90%
Tonkin 2004	50 surgical outpatients with perianal abscess 20 I&D then packed 23 I&D then left open	a) Mean healing time b) Morphine required c) Recurrence rate	a) Non-packed: 21 days Packed: 24.5 days b) Non-packed: 5mg Packed: 10mg c) Non-packed: 3 Packed: 1

A recent systematic review looked at the primary closure of abscesses post I&D by Singer et al. They concluded: *"Studies from 4 countries suggest that primary closure of incised and drained abscesses results in faster healing and similar low abscess recurrence rates than after secondary closure. These studies provide a foundation for which clinical trials can be conducted in the United States."*

Summary for I&D of Simple Cutaneous Abscesses:

- Buffer your lidocaine
- I&D is the solution (better out than in) and not routine antibiotics
- No packing required

Case Resolution: You try to address the problem of oligoanalgesia in the ED by buffering your lidocaine. You have an informed discussion about antibiotics and make the mutual decision not to subject him to the harm with limited support for benefit. You explain the incomplete data doesn't support packing and he decides to forego wound packing. You discharge him with instructions to return in 2-days for a wound re-evaluation. At the same time you wonder whether someday-routine follow-up might be proven to not be necessary too.

SGEM #14: You Can Ring My Bell

Date: 9 December 2012

Guest: Dr. Tony Seupaul

Question: Steroids Y/N, Antivirals Y/N or both?
Case Scenario: 35-year-old healthy woman awakes with unilateral facial droop. The triage nurse promptly brings this case to your attention for query CVA.

Bell's Palsy: Here is the Wikipedia entry for Bell's Palsy. It is a reasonable primer to get everyone on the same page to discuss today's podcast.

"Bell's Palsy is a form of facial paralysis resulting from a dysfunction of the cranial nerve VII (the facial nerve) that results in the inability to control facial muscles on the affected side. Named after Scottish anatomist Charles Bell, who first described it, Bell's Palsy is the most common acute mononeuropathy and is the most common cause of acute facial nerve paralysis. Bell's Palsy is defined as an idiopathic unilateral facial nerve paralysis, usually self-limiting. The hallmark of this condition is a rapid onset of partial or complete paralysis that often occurs overnight. In rare cases (<1%), it can occur bilaterally resulting in total facial paralysis. It is thought that an inflammatory condition leads to swelling of the facial nerve. The nerve travels through the skull in a narrow bone canal beneath the ear. Nerve swelling and compression in the narrow bone canal are thought to lead to nerve inhibition, damage or death. No readily identifiable cause for Bell's Palsy has been found."

Washington University: They have the *BEST* EM journal club. WashU covered the issue of Bell's Palsy in September 2010. It is an excellent review of the topic.

Reference: Corticosteroids for Bell's Palsy (idiopathic facial paralysis). Salinas et al. Cochrane 2010

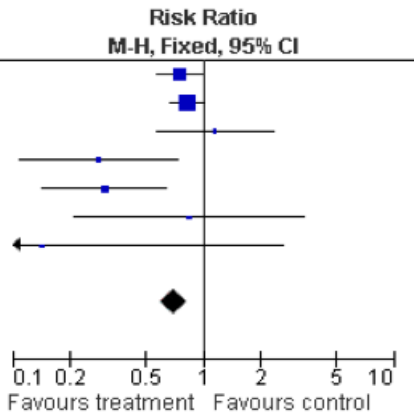
- **Population:** 1569 adults in eight trials.
- **Intervention:** Steroids
- **Control:** No steroids
- **Outcome:** Primary outcome was incomplete recovery of facial motor function six months or more after randomization. Secondary outcome was cosmetically disabling persistent sequelae six months or more after randomization.

Results: Primary outcome of incomplete recovery was 23% in patients receiving steroids vs. 33% in patients not receiving steroids. Risk ratio (RR) 0.71, 95% confidence interval (CI) 0.61 to 0.83). Therefore the NNT was 10. A significant reduction in motor synkinesis during follow-up in those receiving corticosteroids was also observed (RR 0.6, 95% CI 0.44 to 0.81).

Figure 2. 1.1 Incomplete recovery six months or more after randomisation.

	Corticosteroids		Control			Risk Ratio	Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI	M-H, Fixed, 95% CI
Engström 2008a	63	213	82	209	33.6%	0.75 [0.58, 0.98]	
Engström 2008b	86	210	103	207	42.1%	0.82 [0.67, 1.02]	
May 1976	10	25	9	26	3.6%	1.16 [0.57, 2.36]	
Sullivan 2007a	5	138	18	141	7.2%	0.28 [0.11, 0.74]	
Sullivan 2007b	8	134	27	138	10.8%	0.31 [0.14, 0.65]	
Taverner 1954	3	13	3	11	1.3%	0.85 [0.21, 3.38]	
Unuvar 1999	0	21	3	21	1.4%	0.14 [0.01, 2.61]	
Total (95% CI)		**754**		**753**	**100.0%**	**0.71 [0.61, 0.83]**	
Total events	175		245				

Heterogeneity: Chi² = 13.47, df = 6 (P = 0.04); I² = 55%
Test for overall effect: Z = 4.34 (P < 0.0001)

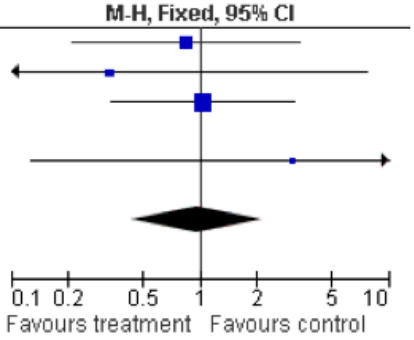


Secondary outcome in the reduction of cosmetically disabling sequelae at six months showed NO difference (RR 0.97, 95% CI 0.44 to 2.15)

Figure 3. 1.2 Cosmetically disabling persistent sequelae six months or more after randomisation.

Study or Subgroup	Corticosteroids Events	Total	Control Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Taverner 1954	3	13	3	11	32.0%	0.85 [0.21, 3.38]
Unuvar 1999	0	21	1	21	14.8%	0.33 [0.01, 7.74]
May 1976	5	25	5	26	48.3%	1.04 [0.34, 3.16]
Sullivan 2007a	0	138	0	141		Not estimable
Sullivan 2007b	1	134	0	138	4.9%	3.09 [0.13, 75.16]
Total (95% CI)		**331**		**337**	**100.0%**	**0.97 [0.44, 2.15]**
Total events	9		9			

Heterogeneity: Chi² = 1.00, df = 3 (P = 0.80); I² = 0%
Test for overall effect: Z = 0.07 (P = 0.95)



Authors Conclusions*: "The available evidence from randomized controlled trials shows significant benefit from treating Bell's Palsy with corticosteroids."*

EBM Commentary: Relative risk or risk ratio (they mean the same thing and are both abbreviated as RR) is simply the risk of the event in one group divided by the risk of the event in the other group. The most common way to go about calculating the risk ratio (and nearly all other statistics from dichotomous data) is to start by presenting your results in a 2×2 table, where each cell in the table contains the number of participants in each category. Now, if you think through what you are comparing (risk in the treated group with risk in the control group), the risk ratio is easy to calculate. If an experimental intervention has an identical effect to the control, the risk ratio will be 1. If it reduces the chance of having the event, the risk ratio will be less than 1; if it increases the chance of having the event, the risk ratio will be bigger than 1. The smallest value the risk ratio can take is zero when there are no events in the treated group.

Bottom Line: Steroids for Bell's Palsy – **YES**.

You don't need to email me about Hans and Franz from Saturday Night Live. We do realize that they were talking about anabolic steroids in the skit while we are referring to catabolic steroids in the treatment of Bell's Palsy like prednisone. The *"pump you up"* quote was just to emphasize the need for steroids in the treatment of this idiopathic facial paralysis.

David Newman has a great site, which looks at the literature. TheNNT He has covered the use of steroids for the treatment of Bell's Palsy. If you have not checked out www.TheNNT.com we highly suggest you take a look.

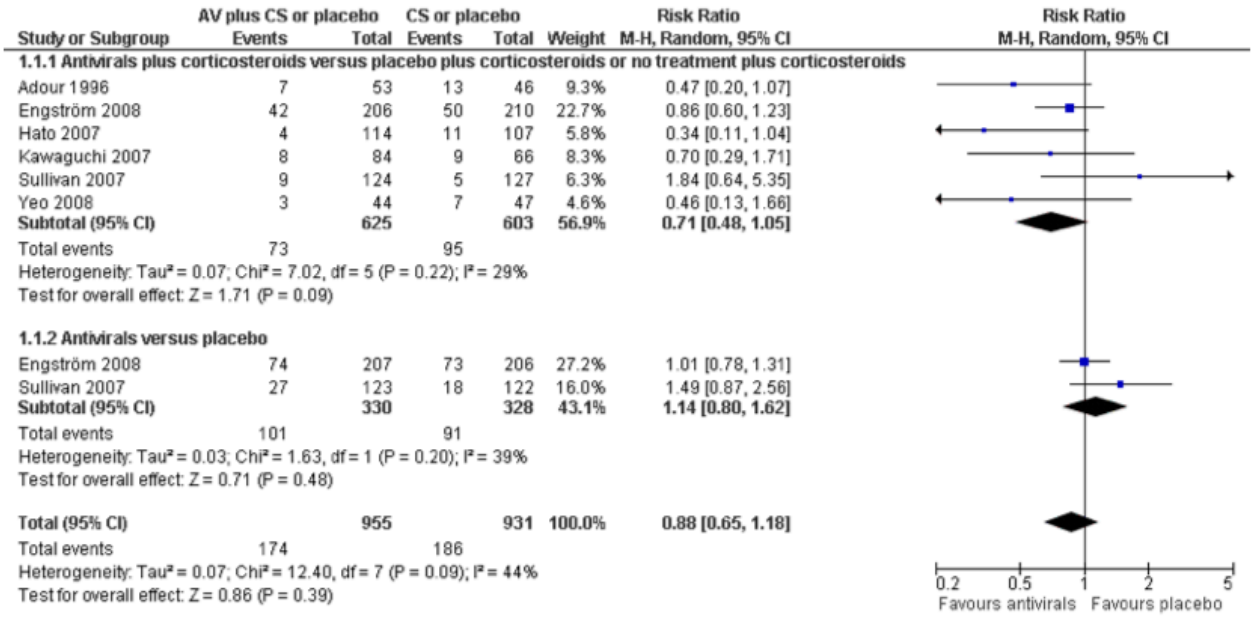
Reference: Lockhart et al. Antiviral treatment for Bell's Palsy (idiopathic facial paralysis). Cochrane

- **Population:** 1987 adults in seven trials.
- **Intervention:** Antivirals with or without corticosteroids
- **Control:** No antivirals
- **Outcome:**
  - Primary outcome was incomplete recovery of facial function at the end of study measured using a validated rating scale.
  - Secondary outcomes were motor synkinesis or crocodile tears at the end of the study,

complete facial paralysis at the end of the study and adverse events.

Results: Primary outcome of incomplete recovery showed NO difference. Secondary outcome of motor synkinesis or crocodile tears at one year also showed NO difference. In addition, there was NO significant difference in rates of adverse events.

Figure 2. Forest plot of comparison: 1 Antivirals versus placebo or no treatment including comparisons in which corticosteroids were given to both groups, outcome: 1.1 Incomplete recovery at end of study.



Authors Conclusions: *"High quality evidence showed no significant benefit from anti-herpes simplex antivirals compared with placebo in producing complete recovery from Bell's Palsy. Moderate quality evidence showed that antivirals were significantly less likely than corticosteroids to produce complete recovery."*

EBM Commentary: The power of the meta-analysis was shown in these two Cochrane reviews. Some of these advantages and disadvantages of meta-analysis can be found in the paper by Nordmann et al.

Bottom Line: Antivirals for the treatment of Bell's Palsy – **NO**

But if the diagnosis is Ramsay Hunt Syndrome the treatment does include antivirals.

Case Resolution: 35-year-old woman was given a 10-day course of oral steroid. She was advised on how to protect her eye from corneal damage. Appropriate follow-up was arranged with her primary care physician or neurologist. Like most individuals she was expected to have complete recovery.

SGEM #15: Choosing Wisely

Date: December 2012

The American Board of Internal Medicine (ABIM) started the project called **Choosing Wisely.** According to the ABIM foundation website: *"Choosing Wisely is part of a multi-year effort of the ABIM Foundation to help physicians be better stewards of finite health care resources. Originally conceived and piloted by the National Physicians Alliance through a Putting the Charter into Practice grant, nine medical specialty organizations, along with Consumer Reports, have identified five tests or procedures commonly used in their field, whose necessity should be questioned and discussed. The resulting "Five Things Physicians and Patients Should Question" will spark discussion about the need—or lack thereof—for many frequently ordered tests or treatments."*

Choosing Wisely partners include:

- American Academy of Allergy, Asthma & Immunology
- American Academy of Family Physicians
- American College of Cardiology
- American College of Physicians
- American College of Radiology
- American Gastroenterological Association
- American Society of Clinical Oncology
- American Society of Nephrology
- American Society of Nuclear Cardiology
- National Physicians Alliance

ABIM challenged physicians and patients to start a conversation about what five things could be done to improve care. That included: doing things supported by the evidence, not duplicating other tests and procedures already done, choose care free from harm and only those that are truly necessary.

American College of Emergency Physicians:

ACEP decided for a variety of reasons NOT to participate in the Choose Wisely project. EP monthly did a PRO and CON debate this fall on the topic. Here are a few links for you to explore:

- ACEP News
- ABIM Blog
- Dr. Richard Bukata
- White Coat's Call Room
- EmergencyDoc Blog

Some of the reasons suggested for ACEP not to participate:

- Legal Liability
- Goal of saving money conflicts with best care
- Other specialties telling emergency physicians what to do or not do
- Insurance companies may use the list as a reason to deny payment

South Huron Hospital: It is known as ***"Little Hospital that Does"***...Choose Wisely.

The Little Hospital That Does
Choose Wisely

We are a small rural facility which has 19 in-patient beds, 5 ED beds, and ~10,000 ED visits/year. Our medical staff decided on five things we could choose wisely to improve patient care based on the evidence:

- Influenza shots for staff with privileges
- Use Ottawa ankle and knee rules (clinical decision instruments)
- No routine use of antivirals for Bell's Palsy
- No routine use of antibiotics for simple cutaneous abscesses
- No routine use of proton pump inhibitors for upper GI bleeds

SGEM #16: Ho, Ho, Hold the PPI

Date: 23 December 2012

Case Scenario: A jolly old man presents to the emergency department vomiting bright, red blood all over his fur lined winter coat. You quickly assess his A,B,Cs. The nurse places two big IVs, you bring the advanced airway cart to the bedside and the laboratory technician draws appropriate blood work. The nurse then asks if you want to give 80 mg pantoprazole IV bolus followed by an 8mg/hr drip.

Background on Upper GI Bleeds: Here is the usual blurb about and the problem…it's common, it affects millions of patients every year, it's deadly and it's expensive. The details:

- Upper GI bleeds are the most common reason for ER admit with lots of morbidity and mortality (Gilbert 1990; Longstreth 1997)
- Usually a result of peptic ulcer (Laine 1994; Silverstein 1981)
- Prevalence 170/100,00 adults each year (Blatchford 1997)
- Cost $750 million/year in USA and utilizes lots of resources (Gralnek 1998; Gralnek 1997; Lee 1999; Longstreth 1995)

There is face validity for using PPIs during upper GI bleeds. It has seemed reasonable and has been common practice to lower the gastric acid. However, there is a cost to treatment and there should be demonstrated benefit to patient (not surgeon) oriented outcome.

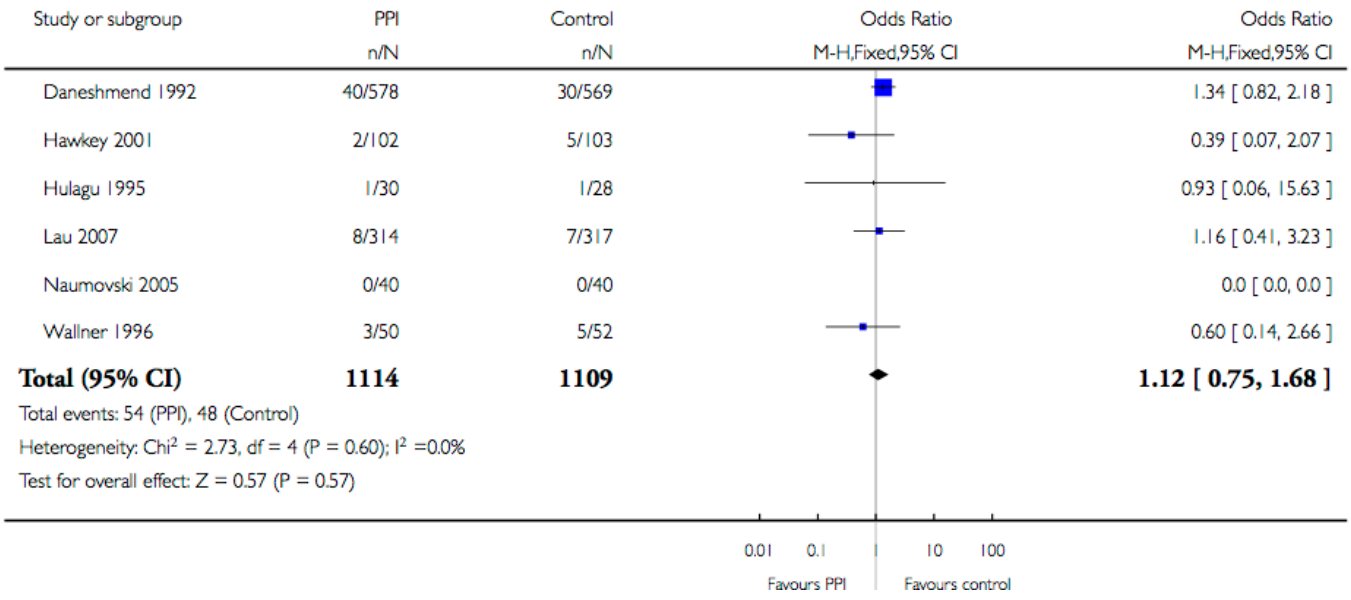
Question: Does the use of PPIs prior to endoscopy in acute upper GI bleeds change patient oriented outcomes?

Reference: Sreedharan A et al. Proton pump inhibitor treatment initiated prior to endoscopic diagnosis in upper gastrointestinal bleeding. Cochrane Database Syst Rev. 2010 Jul 7;7:CD005415. Review. PubMed PMID: 20614440.

- **Population:** 2223 participants in six RCTs
- **Intervention:** PPI (oral or IV)
- **Control:** placebo, H2 blocker or no treatment prior to endoscopy
- **Outcome:**
  - Primary outcome was all cause mortality within 30 days after the acute bleed.
  - Secondary outcomes:
    - Re-bleeding within 30 days
    - Surgery for continued or recurrent bleeding within 30 days
    - LOS in hospital
    - Transfusion requirements
    - Proportion of participants with high-risk stigmata at the time of endoscopy
    - Proportion of participants receiving endoscopic treatment at index endoscopy

Results:

1. Primary: Mortality six trials n=2223 **NO DIFFERENCE**



2. Secondary:
   - Re-bleeding five trials n=2,121 **NO DIFFERENCE**
   - Surgery five trials n=2,165 **NO DIFFERENCE**
   - LOS – could not be analyzed
   - Transfusion – could not be analyzed
   - SRH four trials n=1,332 37.2% PPI vs. 46.5% placebo (OR 0.67; 95% CI 0.54 TO 0.84) did not stand up to sensitivity analysis and fixed effect vs. random effect model
   - Active bleed at scope four trials n=1,332 8.6% PPI vs. 11.7% placebo (OR 0.68; 95% CI 0.50 to 0.93)

Authors Conclusions*: "PPI treatment initiated before endoscopy for upper gastrointestinal bleeding might reduce the proportion of participants with SRH at index endoscopy and significantly reduces requirement for endoscopic therapy during index endoscopy. However, there is no evidence that PPI treatment affects clinically important outcomes, namely mortality, re-bleeding or need for surgery."*

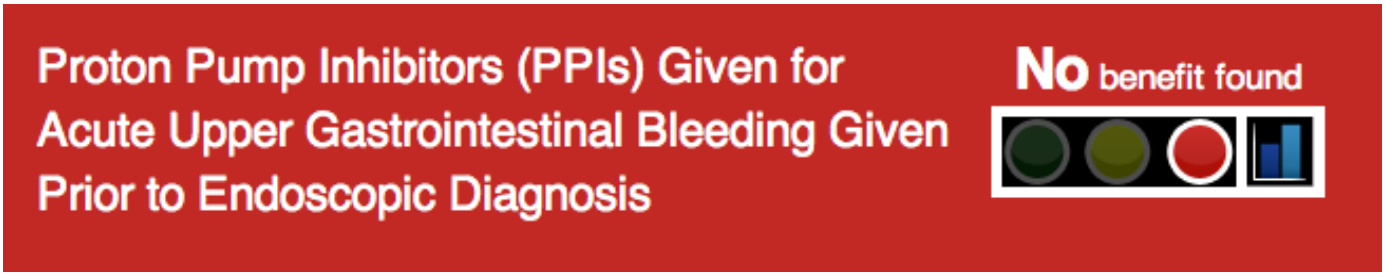
Comments: People who present to the ED with GI bleeds are usually undifferentiated. We do not know for sure the cause of the bleeding. Applying a costly treatment that does not seem to positively affect clinically important end points like mortality, need for surgery or re-bleeding does not seem wise. Proton pump inhibitors may be required but this data does not support the routine use of them before endoscopy.

Bottom Line: Routine use of proton pump inhibitors is not required in the emergency department setting for acute upper GI bleeds.

Additional Information: Daneshment et al published the oldest study in this systematic review in the BMJ in 1992. It had 1147 patients and found no difference comparing PPIs and control in mortality, re-bleeding rates or requirement for surgery. They did find a significant difference between endoscopic stigmata of hemorrhage in patients treated with PPIs.

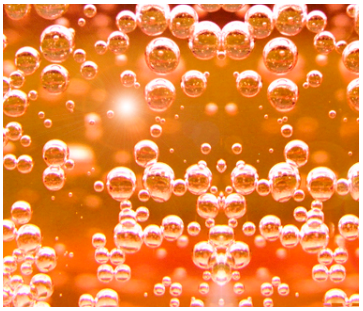
The most recent RCT of 631 patients by Lau et al 2007 in the NEJM included in the Cochrane review looked at high dose IV omeprazole vs. placebo prior to endoscopy for acute upper GI bleeds. It too found no difference in amount of blood transfused, recurrent bleeding, need for emergent surgery or death at 30 days. They did find the reduced need for endoscopic therapy 28% vs. 19% (p=<0.007).

David Newman did a great in depth review of this topic on SmartEM podcast. You can also find a good summary of this information on his website TheNNT.



Case Resolution: Jolly old St. Nick was stabilized in the emergency department. He went for endoscopy where the GI docs gave him a pre-scope dose of IV PPI anyways. He did well and was told to make some lifestyle changes.

SGEM #17: The Best FOAM/#FOAMed of 2012



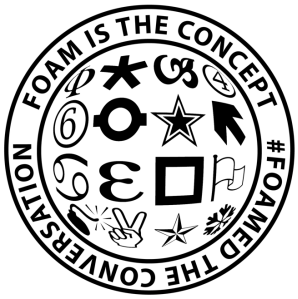
Date: 30 December 2012

Guest Skeptic: Ms. Lauren Westafer

For the last show of 2012 we decided to list the top five FOAM sites. To help compile the list we invited Lauren Westafer who is a fourth year medical student in Florida. A theme of TheSGEM is for medical information to bubble up rather than trickle down.

What is FOAM?

Free Open Access Meducation (FOAM) was dreamt up over a few pints of Guinness during the ICEM conference held in Dublin June 2012. It has been described as *"medical education for anyone, anywhere, anytime".*



FOAM or #FOAMed (with Twitter hashtag) includes all sorts of on-line resources (blogs, websites, FaceBook pages, podcasts, YouTube, Google hangouts, Twitter, etc). It is a decentralized, free, cloud sourced, movement that has exploded in the last six months since its inception. Check out our 2012 top **Five FOAM/FOAMed** to learn more.

Lauren Westafer's Top Five FOAM:

- **Life in the Fast Lane:** LITFL is a medical blog and website dedicated to providing online emergency medicine and critical care insights and education for everyone, everywhere… usually with a healthy dose of UCEM good humor, and always with endless enthusiasm.
- **Free Emergency Talks:** This page is was created by residents of the Temple University Hospital Emergency Medicine program to help distribute the vast Emergency Medicine lecture library of Dr. Joe Lex.
- **Academic Life in Emergency Medicine:** This blog aims to give you a "behind the scenes" peek into this exciting specialty of Emergency Medicine. We aim to bridge the traditional world of academia and the modern world of social media as medical educators interested in emerging technologies. www.academiclifeinem.blogspot.com/.
- **St. Emlyn's Blog:** St Emlyn's is a virtual hospital. In reality we are a team of Emergency Physicians interested in medical education, emergency medicine and critical care. We blog because education matters. Our numbers are growing every day.
- **Twitter:** Twitter is a social media app that lets people connect and communicate in 140 characters or less. Perfectly suited for the short attention span of typical emergency physicians. Here are some great FOAM twitter sites to follow: @FOAMstarter and @FOAM_Highlights.

Ken Milne's Top Five FOAM:

- **WashU Journal Club:** On the third Thursday of every month, the Washington University Emergency Medicine attending physicians, faculty, residents, fellows, nurses and medical students meet at a local restaurant for journal club. During these three-hour meetings the group, lead by the Journal Club Director, critically analyze recent literature using Evidence Based Medicine principles: patient preferences, clinician expertise, and scientific findings each weighted equally.

- **Free Emergency Talks:** Lauren and I both picked this amazing site started by Dr. Joe Lex. This site has over 2,100 lectures recorded at many national and international meetings.
- **EMCast:** This site and podcast run by Dr. Amal Mattu mission provides a user-friendly clinical resource that is designed to be the premier educational website for Emergency Physicians.
- **EMCrit:** This is a blog and podcast by Dr. Scott Weingart. It is devoted to bring the best evidence-based care from the fields of critical care, resuscitation, and trauma and translate it for bedside use in the Emergency Department (ED). Bringing Upstairs Care, Downstairs One Podcast at a Time.
- **TheNNT/SmartEM:** David Newman is an Emergency Physician and Director of Clinical Research at Mt. Sinai School of Medicine. He has the website TheNNT and the podcast series SmartEM. One gives a great quick reference on a topic while the other does a "deep dive" on the literature.

SGEM #18: Eye of the Tiger

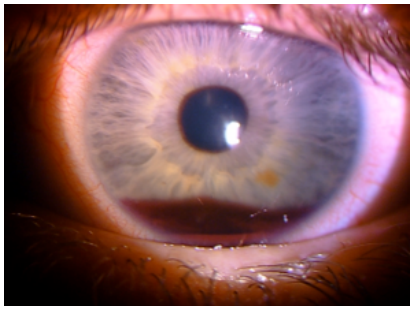
Date: 6 January 2013

Case Scenario: 18-year-old male who was *"doing nothing"* when someone jumped him and punched him in the face. He has a hyphema in his left eye. His visual acuity is 20/20 in both eyes and he has no other injuries.

Background on Traumatic Hyphema: Hyphemas are defined as blood in the anterior chamber (between the cornea and iris). It often results from a blow/direct trauma to the eye. Young men suffer from this condition in a 3:1 ratio compared with women. Sports injuries were responsible for 60% of cases. Traumatic hyphemas rarely result in permanent vision loss and resolve without any treatment. Antifibrinolytics have been tried either orally or topically applied to try and prevent vision loss.

Question: What should be done for a traumatic hyphema in the Emergency Department (ED)?

Reference: Gharaibeh A. et al. Cochrane Database of Systematic Reviews 2011, Issue 1. Art. No.: CD005431. DOI: 10.1002/14651858.CD005431.pub2.



- **Population:** 19 randomized and 7 quasi-randomized studies (n=2,560) with traumatic hyphemas.
- **Intervention:** Both Medical and Non-Medical
- **Control:** Placebo, standard care or observation
- **Outcome:**
  - Primary: VA time of resolution.
  - Secondary outcome: risk of and time to re-bleed, risk of corneal blood staining, risk of peripheral anterior synechia, risk of pathological increase in IOP and risk of optic atrophy development.

Results:

- Primary: No change in primary end point – Time to best VA or Final VA following hyphema?
- Secondary: Antifibrinolytics reduce the risk of secondary bleeding, hyphema took longer to resolve but VA in the end was not different.

Figure 2. Forest plot of comparison: 1 Oral aminocaproic acid versus placebo, outcome: 1.5 Secondary hemorrhage.

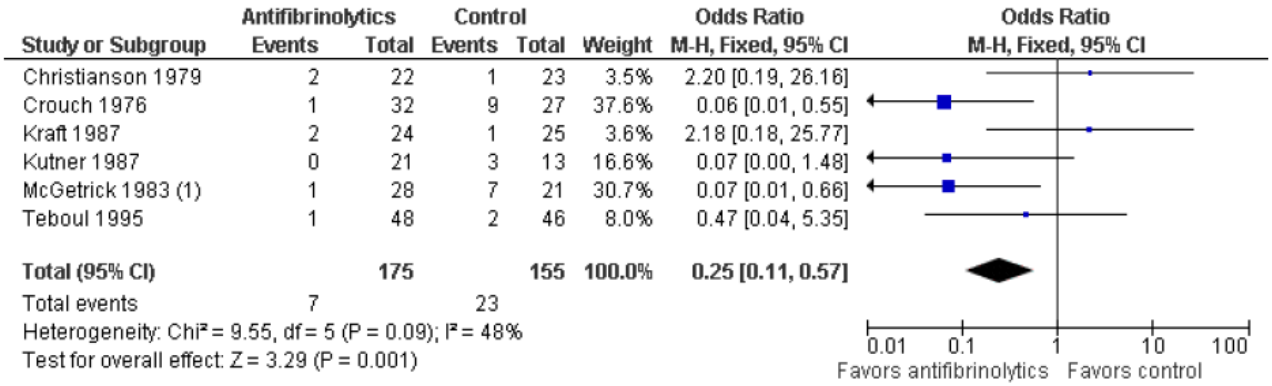
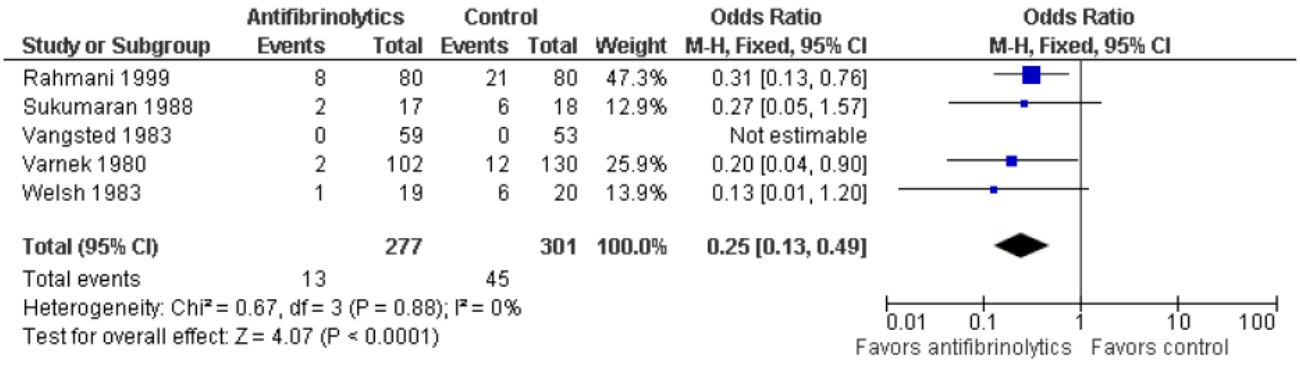


Figure 4. Forest plot of comparison: 5 Tranexamic acid versus control, outcome: 5.3 Secondary hemorrhage.



Authors Conclusions: *"Traumatic hyphema in the absence of other intraocular injuries uncommonly leads to permanent loss of vision. Complications resulting from secondary hemorrhage could lead to permanent impairment of vision, especially in patients with sickle cell trait/disease. We found no evidence to show an effect on visual acuity by any of the interventions evaluated in this review. Although evidence is limited, it appears that patients with traumatic hyphema who receive aminocaproic acid or tranexamic acid are less likely to experience secondary hemorrhaging. However, hyphema in patients on aminocaproic acid take longer to clear."*

Commentary: Trauma to the eye can lead to blood in the anterior chamber. The hyphema is typically a self-limiting condition and is rare to cause permanent vision loss. Many medical treatments have been tried to improve visual outcome and speed up resolution. The most common topical or oral medical is the antifibrinolytics (tranexamic acid or aminocaproic acid) despite being controversial. Many other modalities have also been tried with variable effect (steroids, cycloplegics and ASA). Non-medical treatment has also been tried. These included patching of the eye, bed rest, elevation of the head, and admission to hospital. This Cochrane review is typical of systematic reviews coming out of this collaborative. They searched lots and lots of papers, found few to include and the quality was limited. No intervention made a positive impact on the primary outcome. Despite the negative results they were able to produce a 145-page review that said nothing impacts the primary outcome and highlight that the secondary outcome of less re-bleeds took place on antifibrinolytics but were poorly tolerated.

Bottom Line: Most patients with isolated traumatic hyphema do well. Nothing seems to affect visual acuity. There may be a benefit with antifibrinolytic agents to prevent re-bleeds but delays resolution of primary bleed and has side effects. There is also no evidence for non-medical interventions. The ED management of traumatic hyphemas would be to prescribe nothing and call ophthalmology.

Case Resolution: This young man who was out for a night of quiet conversation and drinks and was *"doing nothing"* was referred to ophthalmology. He did not keep his outpatient appointment. You know this because he re-presented to the ED three months later with his hyphema resolved with no visual complications. However, he now has a painful swollen fifth MCP of his right dominant hand and you suspect a boxer fracture.

SGEM #19: Bust-a-Move

Date: 13 January 2013

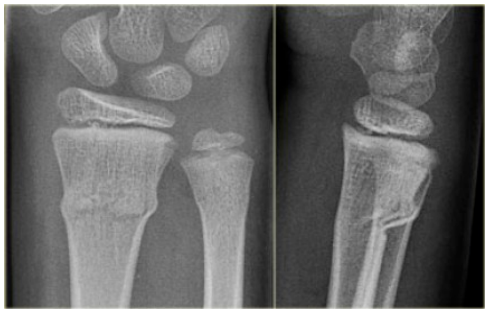
Case Scenario: A 9-year-old girl playing ringette slipped on ice and hurt her right, dominant wrist. She was seen in an "academic" pediatric emergency department one week ago. The diagnosis of a "buckle" fracture of the distal radius was made, placed in a below elbow full cast and had follow-up arranged with orthopedics. She presents to your community ("non-academic") hospital with an itchy/painful cast. Dad wants to know if she really needs a cast for just a "buckle" and can they follow-up with their primary care physician?

Distal Radius Fractures in Children:

Fractures of the distal radius are the most common fractures in childhood (Landin et al). There is a difference between buckle fracture and greenstick fractures.

Buckle fractures (also called torus) are defined as a compression of the bony cortex on one side while the opposite cortex remains intact. In contrast, in a greenstick fracture, the opposite cortex is not intact.

There seems to be a variety of approaches to the treatment of buckle fractures (cast vs. splint and length of immobilization). A survey done over a decade ago in Canada demonstrated this variability (Plint et al 2003). There is even an apparent divide between North America (favor casting) (Plint et al 2004) vs. Europe (favor splinting) (Plint et al 2006).



Question: Cast vs. Splint for Buckle Fracture and appropriate follow-up?

As with most evidence-based medicine (EBM) it can be a little messy. As my mentor, Dr. Andrew Worster from McMaster always says…the EBM answer is always *"it all depends".*

Looking back through the literature without commenting on every single article on the subject, here are some highlights. I want to mention these before the critical review of two more recent articles on the subject.

Why discuss such old data from nine years ago? As SGEM listeners know it takes an average of 10 years for high quality, clinically relevant information to reach the patients bedside. This case was an excellent opportunity to address this knowledge translation problem.

The father of the patient told me that the doctor at the peds emerg said that splinting would be OK but they were going to put a full cast on anyways. This is one of the key leaks in the Pathman Pipeway. The academic center was AWARE of the evidence but did they ACCEPT, AGREE, able to ACT upon or ADHERE to the evidence?

Plint et al (2004) mentioned earlier published a retrospective chart review of 309 children with buckle fractures of the distal radius or ulna. The average age was 9 years old. They found no benefit to casting vs. splinting.

- None needed a reduction
- None needed orthopedic intervention
- No displacement of their fracture

Potential harm:

- Orthopedic visits (time for parents and child)
- Repeat x-ray
- 12% in casted group had subsequent ED visit for cast problems

There are limitations to a retrospective study being conducted at a single site. In addition, 11% of patients were lost to follow-up. With these limitations the authors concluded *"Orthopedic follow-up visits and radiographic follow-up may have minimal utility in the treatment of pediatric wrist buckle fractures. ED casting may pose more risk than benefit for these children. Splinting in the ED with primary care follow-up appears to be a reasonable management strategy for these fractures. A prospective study comparing ED splinting and casting for pediatric wrist buckle fractures is needed".*

Plint et al rose to the challenge of a prospective trial in 2006. They published a RCT of removable splinting vs. casting for wrist buckle fractures in children. This study had n=87 with average age 9 years old. They used a self-reported outcome tool called Activities Scales for Kids performance version (ASKp). The main outcome was the ASKp score at 14d post injury, which favored splinting over casting.

Results:

- No difference in pain
- Better function with splint
- Less difficulty with daily activities (e.g. bathing/showering)
- Return to sports sooner

There were some significant limitations to this study. They could not blind researchers to parts of the ASKp tool; there was high loss to follow-up and no intention to treat analysis. The author's conclusions were *" Children treated with removable splinting have a better physical functioning and less difficulty with activities than those treated with a cast."*

Now let us jump ahead to some more recent literature. These two studies look at greenstick fractures and/ or transverse fractures of the distal radius that are minimally displaced. Buckle fractures were specifically excluded from these two studies. Therefore, these studies represent more serious fractures and risk of complications.

Reference: Kropman et al . Treatment of impacted greenstick forearm fractures in children using bandage or cast therapy a prospective randomized trial. J Trauma 2010

- **Population:** Children 4-13y presenting to ED with impacted greenstick fractures of the distal 1/3 of radius or ulna
- **Intervention:** Soft bandage wrapping treatment (BT) for 4 weeks
- **Control:** Below elbow back slab cast for 1 week followed by circumferential cast treatment (CT) for 3 weeks
- **Outcome:** 1) Pain, 2) Discomfort, 3) Function, 4) Fracture displacement

Results:

- Pain: more in first week only of BT group
- Discomfort: no difference in use of pain killers and less itching in BT group
- Function: quicker return to normal function with BT
- Fracture Displacement: No difference in secondary angulations and no re-fractures in either group

Authors Conclusions: *"BT for impacted greenstick fractures of the distal forearm is a safe technique, patients treated with bandage suffer greater pain at the start of the treatment, are able to return to normal activities sooner, and have less discomfort when compared with the standard CT."*

Commentary: This is a well-conducted randomized trial. The patients are generalizable to the population presenting to the ED and the outcome measures are clinically relevant. The sample size is moderate (n=90)

Bottom Line: As long as parents are aware that BT is associated with increased pain in the first week post-injury, this is a safe alternative to traditional casting. Patients will be more likely to return to normal function faster and experience less itching.

Reference: Boutis et al. Cast vs. Splint in Children with Minimally Angulated Fractures of the Distal Radius: A Randomized Control Trial. CMAJ 2010

- **Population:** Convenient sample of children age 5-12 years old presenting to ED with minimally angulated/displaced greenstick or transverse fractures of the distal radius (EXCLUDED buckle/ growth plate or open fractures)
- **Intervention:** Prefabricated wrist splint worn for 4 weeks
- **Control:** Short arm fiberglass cast worn for 4 weeks
- **Outcome:** Primary: physical function at 6 weeks using (ASK), Secondary: fracture angulation, pain, use of splint, grip strength, patient preference

Results:

- Primary: No difference in ASK score at 6 weeks mean 1.44 (95% CI -1.75 to 4.62)
- Secondary: No difference in fracture angulation, pain, grip strength BUT patient and parental preference was for a splint

Authors Conclusions: *"In children with minimally angulated greenstick or transverse fractures of the distal radius, use of a prefabricated splint was as effective as a short arm cast with respect to recovery of physical function. In addition, the devices did not differ significantly with regard to the maintenance of fracture stability and the occurrence of complications, and the splint was superior to the cast in terms of parental and patient satisfaction and preferences."*

Commentary: This is a well-conducted randomized trial of 96 children. The methodology was sound and the follow-up was excellent. The researchers focused on clinically relevant outcomes and there was no significant differences found between the cast group and the splint group. This is the first study examining this research question and further studies will help solidify these conclusions**.**

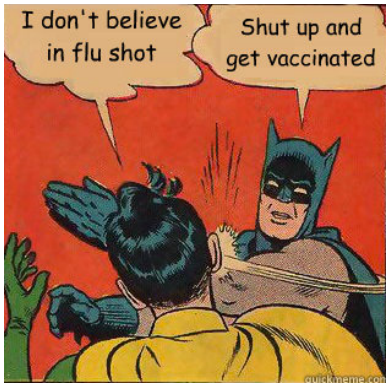
Bottom Line: Splinting appears to be a viable option for minimally angulated/displaced fractures of the distal forearm in children**.**

Further Reading:

- Ransborg and Siversten. Distal radius fractures in children: substantial difference in stability between buckle and greenstick fractures. Acta Orthopaedica 2009. They concluded that buckle fractures are stable; do not require follow-up and 6/207 had mild complication because of plaster casting.
- Abraham et al. Interventions for treating wrist fractures in children. Cochrane 2008

Case Resolution: A discussion was held with the father about his 9-year-old ringette star. Risks and benefits of casting vs. splinting/BT were reviewed. A shared decision was made to remove the cast and go with a splint. Also, he preferred following up with his local primary care physician in 2 weeks rather than driving 1 hour to the pediatric orthopedic fracture clinic. The patient did well and is back on her team with full function.

SGEM #20: Hit Me with your BEST Shot



Date: 20 January 2013

Guest Skeptic: Lauren Westafer

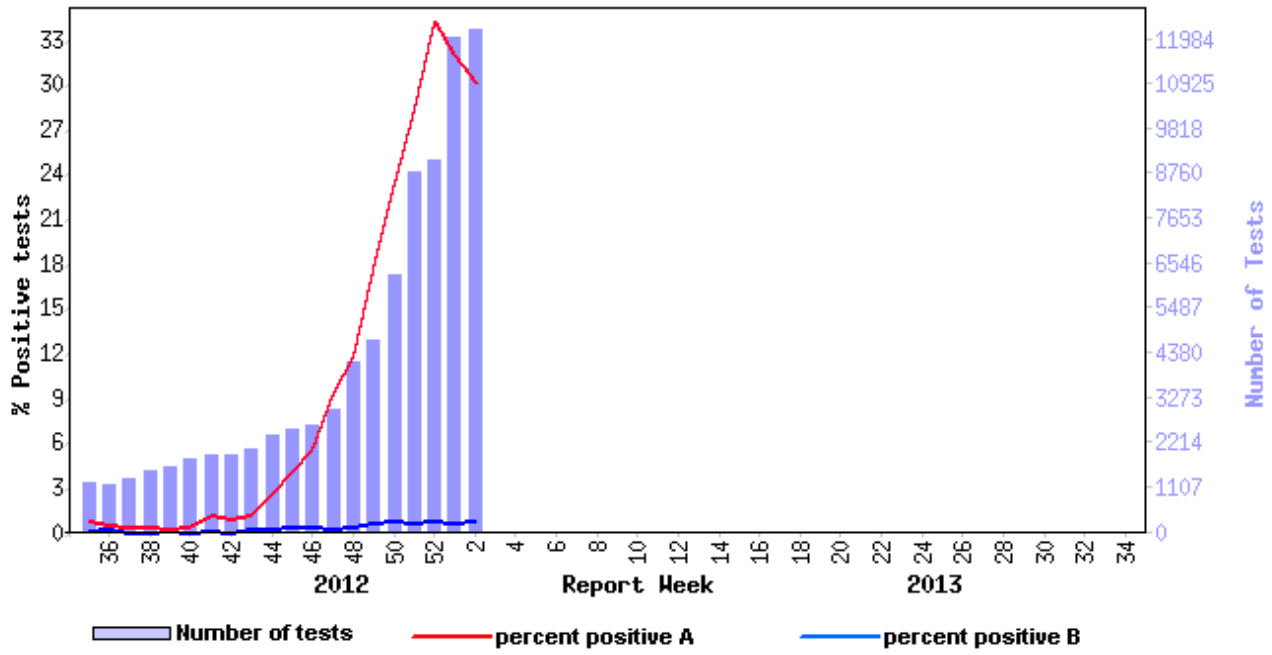
Case Scenario: You walk into the ED for your shift and find chairs completely full of patients with flu-like illnesses. The triage nurses look exhausted and are discussing the flu shots. The conversation appears quite animated with strong opinions being expressed. They turn to you as the doctor and ask…what do you think?

Current flu outbreak:

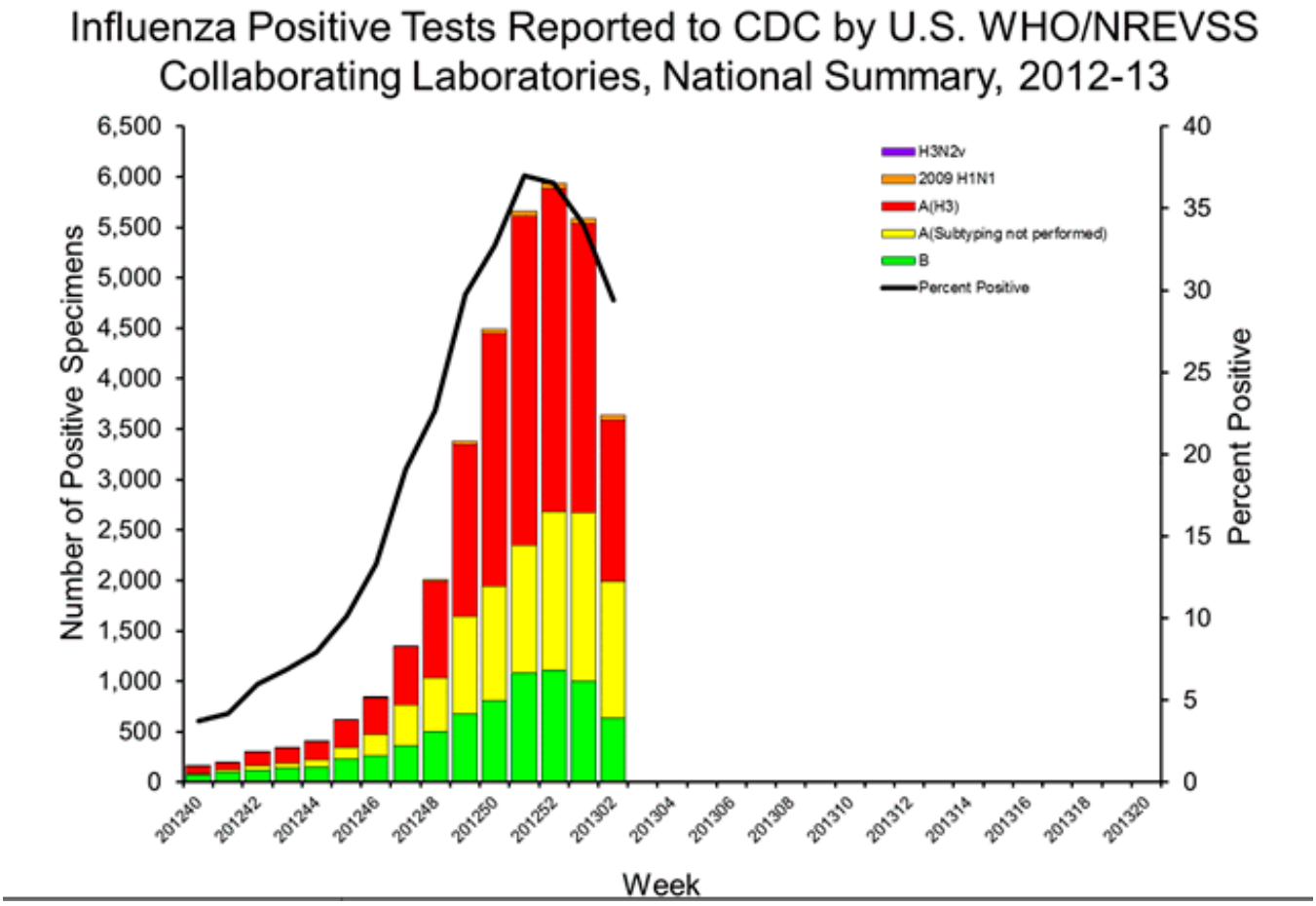
It has been a bad flu season in North America. The CDC and Health Canada both have detailed websites tracking how bad the 2012-13 season has been.

Figure 4. Influenza tests reported and percentage of tests positive, Canada, by report week, 2012-2013

Top of



Canadian Stats



USA Flu Stats

Question #1: Does the flu shot work in the general public?

Immunization has been one of the most significant advances in modern medicine. Some vaccines have been highly successful (Haemophilus Influenzae B, small pox, polio) while others have been not as successful (HIV). Some vaccines work well but their effectiveness are decreases with time (whooping cough).

CDC at the start of the 2012-13 flu season estimated the flu vaccine this year to be about 60% effective. A recent report by BC Centre for Disease Control shows the vaccine is protecting about half of those people who were immunized. There are a number of reasons the flu vaccine is not as effective as other vaccines for a variety of reasons.

Question #2: Is the flu shot effective in preventing transmission from health care workers (HCW)?

There is a Cochrane review that attempts to answer this question. It showed that vaccinating HCW, in addition to other preventative interventions, might protect the elderly in long-term care facilities.

"We conclude that there is no evidence that only vaccinating healthcare workers prevents laboratory-proven influenza, pneumonia, and death from pneumonia in elderly residents in long-term care facilities. Other interventions such as hand washing, masks, early detection of influenza with nasal swabs, anti-virals, quarantine, restricting visitors and asking healthcare workers with an influenza-like illness not to attend work might protect individuals over 60 in long-term care facilities and high quality randomized controlled trials testing combinations of these interventions are needed."

The evidence contained in the Cochrane review was not great and had high risk of bias. However, if you are waiting for 100% proof medicine is not the job for you. Sometimes the BEST evidence is not great. Being

a critical and skeptical thinker you need to consider the face validity or a priori whether something would work. We do not have 100% proof that seat belts guarantee you will not be hurt in a motor vehicle collision but it makes sense to hedge your bet and buckle up.

Question #3: Are there other things that are effective besides the flu shot

There is some evidence that hand washing and wearing a mask if used within 36 hours after onset of symptoms can decrease household transmission (EPmonthly). Specific *"complimentary alternative medicine"* (CAM) medicines have been tried (TCM and Homeopathy) and do not work. Neuraminidase inhibitors have some weak evidence demonstrating modest effectiveness (BMJ 2009). The CDC has some recommendations on how these antivirals should be used.

Recent controversy has arisen about oseltamivir. A concern that the majority of phase III clinical trial data was not published. The manufacture, Roche, has not provided independent scientists full access to the studies. The BMJ has launched an initiative called Open Data Campaign. The Cochrane Collaboration has updated their review of these drugs and lodged a formal complained to the European Ombudsman about the issue.

Question #4: Top Five myths about the flu shot?

- I'll get the flu from the flu shot - **MYTH**
- The flu shot is worse than the flu - **MYTH**
- It doesn't work, so there's no point – **MYTH**
- I can't get the flu shot -**MYTH**
- I never the get flu. – **We never know**

Question #5: What about the growing trend of mandatory flu shots for health care workers?

The Canadian Medical Association Journal (CMAJ) advocated in an editorial October 2012 that all HCW to be vaccinated. This was in part because the immunization rate of physicians was historically poor. Failing to protect patients from a contagious disease also violated the principle of *primum non nocere* (first, do no harm).

However, there have been some concerns from HCW about forcing them to be immunized. Balancing the personal rights of the HCW vs. the rights of the patients is a complicated issue. In my opinion the right of the patient not to get a contagious disease from their HCW takes should be the #1 right. For those who cannot be immunized due to contra-indications listed by the CDC, they can wear a mask with direct patient contact. This solution has been criticized for labeling the HCW as "dirty".

HCW have to be vaccinated against a number of other diseases to prevent them from contracting the illness and transmitting it to patients. Other jobs have mandatory immunization policies such as members of the US Military. Some things are just part of the job. I would argue that taking reasonable measures to prevent infecting our patients should be a basic expectation. The evidence of effectiveness of the flu shot may be weak but the risk to the HCW is low while the risk to the sick patient is deadly.

South Huron Hospital, the Little Hospital that Does, made flu shots part of our medical staff privileges this year. This was part of our Choose Wisely initiative. We also made a YouTube video for the community discussing the flu shot myths.

For a sarcastic podcast about HCWs not getting the flu shot listen to Dr. Mark Crislips Budget of Dumb Asses. For a Canadian perspective on the flu shot watch Rick Mercer's YouTube video.

Case Resolution: You answer all the difficult EBM questions by saying…***"It all depends"***. Then validate the nurses concerns on both sides of the issue. Suggest that an EM journal club be done in a social setting

over a few hours rather than a debate at the triage desk or set up a unique, grand rounds debate. Put the flu shot on trial and have a prosecutor as well as a defender carry out a debate. Pick a judge to oversee the trial and supply them with a white wig, black robe and reflex hammer as a gavel. Invite different staff (RN, doc, admin staff) to form the jury of peers.

You then head back into the department and get ready to say over and over again, it's the flu, antibiotics are not indicated, here are the symptomatic measures you can take, make shared decisions about Tamiflu, advise them of measures to prevent household transmission and remind them they can always come back if their symptoms get worse, if they develop new ones or are concerned.

SGEM #21: Ice, Ice, Baby

Date: 27 January 2013

Case Scenario: Stop, collaborate and listen. A 72-year-old man has a witnessed arrest while watching his grandson's hockey game. By-standard CPR is started and he is shocked out of ventricular fibrillation using the automatic external defibrillator (AED). EMS arrives and finds a patient with vital signs stable but unconscious. The paramedic calls base hospital and asks if they should start cooling on-route.

Background: Two randomized control trials showed that hypothermia post cardiac arrest resuscitation was neuroprotective. One trial (n=273) in NEJM 2002 used a cooled air mattress to demonstrate good outcome at 6 months (55% vs. 39%). The smaller Australian study (n=77) also published in NEJM 2002 showed good neurologic outcome at time of hospital discharge (49% vs. 26%).

Benefits in NNT	Harms in NNT
• 1 in 6 were helped (neurologically-intact life saved)	• None were harmed

Dr. David Newman has calculated the NNT=6 for mild therapeutic hypothermia for neuroprotection following cardiopulmonary resuscitation. The Cochrane Collaboration updated their review on hypothermia for neuroprotection in adults after CPR in 2012. They concluded:

"Conventional cooling methods to induce mild therapeutic hypothermia seem to improve survival and neurologic outcome after cardiac arrest. Our review supports the current best medical practice as recommended by the International Resuscitation Guidelines."

Question: Does pre-hospital therapeutic hypothermia improve patient outcomes after successful resuscitation?

Reference: Bernard SA et al. Induction of therapeutic hypothermia by paramedics after resuscitation from out-of-hospital ventricular fibrillation cardiac arrest: a randomized controlled trial, Circulation. 2010;122:737-742

- **Population:** Adults (n=234) with out-of-hospital cardiac arrest with an initial rhythm of ventricular fibrillation
- **Intervention:** Pre-hospital rapid infusion of 2L of ice-cold lactated Ringer's
- **Control:** Cooling after hospital admission
- **Outcome:** Functional status at hospital discharge. Patients who were discharged directly home or to a rehab facility were considered to have a favorable outcome. Patients who died or were discharged to a long-term nursing facility, either conscious or unconscious, were considered unfavorable outcomes.
- **Exclusion criteria**: Not intubated, previously dependent on others for activities of daily living before the cardiac arrest, already hypothermic (< 34 degrees Celsius), or pregnant women

Results:

- Patients allocated to paramedic cooling received a median of almost 2L (1900ml). The mean decrease in core temperature was 0.8 degrees C (P=0.01)
- 47.5% paramedic-cooled patients had a favorable outcome at hospital discharge compared vs. 52.6% in the hospital-cooled group (risk ratio 0.90, 95% confidence interval 0.70-1.17 P=0.43)

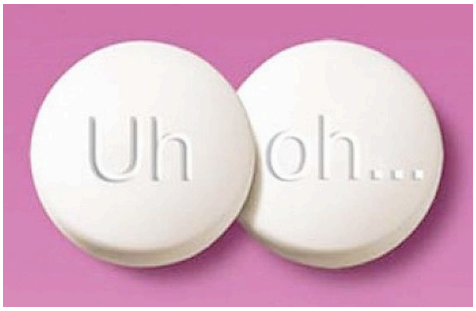
Authors Conclusions: *"In adults who have been resuscitated from out-of-hospital cardiac arrest with an initial cardiac rhythm of ventricular fibrillation, paramedic cooling with a rapid infusion of large-volume, ice-cold intravenous fluid decreased core temperature at hospital arrival but was not shown to improve outcome at hospital discharge compared with cooling commenced in the hospital."*

Commentary: There has been a great deal of interest in cooling patients after out of hospital cardiac arrest in the last decade. Some laboratory studies suggest that sooner is better. Therefore, the hypothesis was generated that perhaps pre-hospital cooling by paramedics would improve outcome. This study stopped prematurely. The sample size calculated to detect a change in favorable outcome from 45% to 60% required a sample size of 372 patients to achieve 80% power at an Type I (alpha) error of 0.005. A planned interim analysis after 200 patients noted no difference in primary outcome and was extremely unlikely that a difference would be found between the two groups. Although the results of the present trial do not support the pre-hospital use of hypothermia, caveats to the interpretation include the short EMS transport times (may not apply to rural setting where time-to-hospital can be protracted) and premature study closure. In addition, future investigations should assess treatment started during CPR since prior to return of spontaneous circulation, all subjects had received 1L of non-cooled IVF.

Bottom Line: Scoop and run; no cooling required in the field.

Case Resolution: Patient was not cooled in the field but on arrival. He was admitted and one week later he was the 1 in 6 person to walk out the ICU neurologically intact.

SGEM #22: Papa Don't Preach



Date: 3 February 2013

Case Scenario: A21 year-old presents to the ED at 8 am very distraught. She reports that the condom broke last night during intercourse and requests the morning after pill.

Background: Each year here are more than 40 million aborted pregnancies worldwide. Primary prevention of pregnancy is advocated with induced abortion as the back up method. The definition of emergency contraception (EC) is the use of a device or drug as an emergency measure after unprotected intercourse to prevent pregnancy. This method of preventing pregnancy only became effective in the 1960's with the introduction of hormonal regimens. The Yuzpe method (combination of estrogen and progestogen) became the popular method in the 1970's. This was followed by other hormone treatments including progestogen only, anti-gonadotropin (danazol) and anti-progestins (mifepristone and ulipristal acetate). A copper intrauterine device (IUD) is a non-hormonal option that can be inserted postcoital up to five days after the estimated time of ovulation. It can also be left in the uterus as a long-term contraceptive method.

- Combo estrogen/progestogen (Yuzpe)
- Progestogen only (levonorgestrel LNG/Plan B)
- Anti-gonadotropin (Danazol)
- Anti-progestins (mifepristone/Ru486 and ulipristal acetate/UPA)
- Intrauterine device (IUD)

Question: What is the best intervention for emergency contraception?

Reference: Cheng I, Che Y, Gulmezoglu AM. Interventions for emergency contraception. Cochrane Database of Systematic Reviews 2012, Issue 8.

- **Population:** Adult woman attending for emergency contraception after a single episode of unprotected intercourse
- **Intervention:** Several different emergency contraceptive medications
- **Comparison:** Placebo, no therapy, or alternative emergency contraceptive medication
- **Outcome:** Pregnancy, adverse events

Results: Mid or low dose Ru486 was significantly more effective than LNG in 11 trials. This was only a marginal difference when only the four high-quality studies were included (RR 0.70, 95% CI 0.49-1.01. LNG given as a single dose of 1.5mg was just as effective as the more common 0.75mg BID in three trials (RR 0.84, 95% CI 0.53-1.33). LNG was consistently better then Yuzpe method in five trials (RR 0.54, 95% CI 0.36-0.80). UPA as a single oral dose showed no difference compared to LNG in two trials (RR 0.63, 95% CI: 0.37 – 1.07).

Some of the medications caused nausea and vomiting and others affected menses. The side effects in all the studies were minor and there were no safety concerns.

Authors Conclusions: *"Intermediate-dose mifepristone (25-50 mg) was superior to LNG and Yuzpe regimens. Mifepristone low dose (< 25 mg) may be more effective than LNG (0.75 mg two doses), but this was not conclusive. UPA may be more effective than LNG. LNG proved to be more effective than the Yuzpe regimen. The copper IUD was the most effective EC method and was the only EC method to provide ongoing contraception if left in situ."*

Commentary: This is a very large Cochrane systematic review and meta-analysis with excellent methodology as we can usually expect from Cochrane. This review included 100 studies with over 55,000

women. The majority of the studies were from China, but there were also some WHO multi-national studies that confirmed many of the findings.

Bottom Line: In Canada and USA if Plan A fails then Plan B (LNG) as a single dose of 1.5mg levonorgestrel. The anti-progestins (Ru486 and UPA) are not currently available in Canada, but are apparently available in the US. The Yuzpe method is available in Canada but must be prescribed by a physician, is less effective than LNG, and therefore, should no longer be routinely used. Since the introduction of LNG in Canada, the Emergency Department visits solely for Emergency Contraception has declined dramatically, but knowledge of the agents and their effectiveness is still important for Emergency Physicians.

Case Resolution: The young woman was provided with information on her options including EC. The effectiveness and common side effects of EC were discussed. Shared decision-making took place and you provide her with levonorgestrel (Plan B).

SGEM #23: A Bump Up Ahead

Date: 10 February 2013

Case Scenario: 28-year-old woman presents to the ED at 2 am with steadily increasing right lower quadrant (RLQ) pain. She has a past medical history of ovarian cysts. Her vital signs are stable; she is afebrile and tender over the RLQ. The blood work is unremarkable and specifically her pregnancy test is negative. Ultrasound and CT scan are not available overnight. What is your disposition and management of this patient?

Background: Undifferentiated abdominal pain is a high volume, high-risk complaint. It represents approximately 7% of ED visits. Acute appendicitis is the second most common cause of malpractice litigation in children 6 – 17 years old. Ten percent of all closed malpractice cases are due to missed diagnoses of appendicitis. It is not practical to image everyone with lower abdominal pain to rule out acute appendicitis in every case.

- Lifetime acute appendicitis incidence is 8.6% in males and 6.7% in females
- Lifetime appendectomy rates are 12% for males and 23.1% for females
- Negative laparotomy rate is 10-20%.
- Appendectomy complications rate is 4-13%

Question: Does a bumpy car ride predict appendicitis?

Reference: F. Ashdown el al. Pain over speed bumps in diagnosis of acute appendicitis: A diagnostic accuracy study. BMJ Christmas Issue 2012

- **Population:** Adults >16 years old referred to on-call surgery for assessment
- **Intervention:** Speed bumps
- **Comparison:** Migratory pain, nausea and vomiting, and rebound tenderness
- **Outcome:** Sensitivity/specificity and likely hood ratios for appendicitis

Results: A total of 101 patients were included in this study. Sixty-eight reported driving over speed bumps on the way to the hospital. Four patients were excluded from the 68 (1-no histology available and 3-treated with antibiotics). Fifty four were *"speed bump positive"* of the 64. The diagnosis of appendicitis was confirmed histologically in 33 or the 34 who reported worsened pain over speed bumps. This gives a sensitivity of 97% (85% to 100%) and a specificity of 30% (15% to 49%). The positive predictive value (PPV) was 61% (47% to 74%), and the negative predictive value (NPV) was 90% (56% to 100%). The positive likelihood ratio (LR) was 1.4 (1.1 to 1.8) and the negative LR was 0.1 (0.0 to 0.7).

Table 1

Pain over speed bumps in relation to appendicitis

	Appendicitis		
Pain over speed bumps	**Positive**	**Negative**	**Total**
Positive	33	21	54
Negative	1	9	10
Total	34	30	64

Table 2

Diagnostic performance (with 95% CI) of pain over speed bumps compared with other clinical diagnostic variables for appendicitis

Diagnostic variable	Sensitivity (%)	Specificity (%)	Positive predictive value (%)	Negative predictive value (%)	Positive likelihood ratio	Negative likelihood ratio
Pain over speed bumps	97 (85 to 100)	30 (15 to 49)	61 (47 to 74)	90 (56 to 100)	1.4 (1.1 to 1.8)	0.1 (0.0 to 0.7)
Migratory pain	65 (46 to 80)	33 (17 to 53)	52 (36 to 68)	45 (24 to 68)	1.0 (0.7 to 1.4)	1.1 (0.5 to 2.1)
Nausea or vomiting	79 (62 to 91)	17 (5.6 to 35)	52 (38 to 66)	42 (15 to 72)	1.0 (0.8 to 1.2)	1.2 (0.4 to 3.5)
Rebound tenderness	71 (53 to 85)	50 (31 to 69)	62 (45 to 77)	60 (39 to 79)	1.4 (0.9 to 2.2)	0.6 (0.3 to 1.1)

Additional Resources:

- Evidence-Based Emergency Care: Diagnostic Testing and Clinical Decision Rules. This is a great reference book for emergency physicians and fellows training in emergency medicine. Dr. Chris Carpenter and his fellow editors explain various diagnostic tests and clinical decision instruments.
- Diagnostic testing: an emergency medicine perspective. Worster et al. CJEM 2002; 4(5). This is an excellent article written by the founder of BEEM, Dr. Andrew Worster. It helps emergency physicians understand the statistics of diagnostic testing.

Authors Conclusions: *"The presence of pain while traveling over speed bumps was associated with an increased likelihood of acute appendicitis. As a diagnostic variable, it compared favorably with other features commonly used in clinical assessment. Asking about speed bumps may contribute to clinical assessment and could be useful in telephone assessment of patients."*

BEEM Commentary:

- **Anthony:** Cannot be generalized to a pediatric population and more potholes than speed bumps in Canada
- **Jo-Ann:** There was referral bias in this study because patients had to be referred to surgery to be included in the study
- **Suneel:** Likelihood ratios (LR) are a good way to present the results because LR are immune to prevalence of events
- **Ken:** Relatively small study (n=101) but inexpensive and no delay in lab turn around time

Bottom Line: Perhaps we should ask our patients if it was a bumpy ride to the ED and did the bumps hurt?

SGEM #24: The Strokes

Date: 17 February 2013

Case Scenario: 68-year-old man arrives to the ED with 15 minutes of tingling in his right arm and leg. He has a history of hypertension and previous TIA. The examination is completely normal. He is already taking ASA 325mg OD.

Background: Stroke is a leading cause of disability. It is the third most common cause of death in the USA. Twenty-five percent of ischemic strokes are lacunar. ASA has been the accepted standard of care. Dual therapy for cardiovascular problems like ACS and stenting has shown to be of benefit in other studies (ex: CURE Trial). Clopidogrel in Unstable Angina to Prevent Recurrent Events

Question: Should you add clopidogrel to prevent a stroke for someone already taking ASA?

Reference: Benavente OR et al. Effects of clopidogrel added to aspirin in patients with recent lacunar stroke: SPS3 Trial. NEJM. 2012 Aug 30; 367(9):817-25.

- **Population:** 3020 patients from 82 centers in North America, Latin America, and Spain with recent symptomatic lacunar infarcts identified by MRI
- **Intervention:** Clopidogrel 75mg and ASA 325mg
- **Comparison:** Placebo and ASA 325mg
- **Outcome:** Recurrent stroke (ischemic or intra-cranial hemorrhage)

Results:

NO BENEFIT (efficacy)

- Recurrent CVA 2.5%/year C+ASA vs. 2.7%/year ASA (HR 0.92; 95% CI,0.72 to 1.16)
- Recurrent ischemic CVA (HR 0.82; 95% CI, 0.63 to 1.09)
- Disabling or fatal CVA (HR 1.06; 95% CI, 0.69 to 1.64)

Table 2. Primary Efficacy Outcomes.*

Outcome	Aspirin plus Placebo (N=1503)		Aspirin plus Clopidogrel (N=1517)		Hazard Ratio (95% CI)	P Value
	no.	*rate (%/yr)*	*no.*	*rate (%/yr)*		
All strokes (ischemic and hemorrhagic)	138	2.7	125	2.5	0.92 (0.72–1.16)	0.48
Ischemic stroke	124	2.4	100	2.0	0.82 (0.63–1.09)	0.13
Intracranial hemorrhage	13	0.25	21	0.42	1.65 (0.83–3.31)	0.15
Unknown†	1	0.02	4	0.08	3.97 (0.44–35.47)	0.22
Disabling or fatal stroke‡	40	0.78	42	0.84	1.06 (0.69–1.64)	0.79
Transient ischemic attack without stroke	39	0.78	28	0.57	0.73 (0.45–1.18)	0.19
Myocardial infarction	38	0.71	31	0.59	0.84 (0.52–1.35)	0.47
Other thromboembolic events§	12	0.22	21	0.40	1.81 (0.89–3.68)	0.10
Major vascular event¶	174	3.4	153	3.1	0.89 (0.72–1.11)	0.29
All deaths	77	1.4	113	2.1	1.52 (1.14–2.04)	0.004
Vascular causes	19	0.35	27	0.51	1.46 (0.81–2.64	0.20
Cerebral	9	0.17	10	0.19	1.13 (0.46–2.78)	0.79
Noncerebral	10	0.18	17	0.32	1.77 (0.81–3.87)	0.15
Probable vascular causes	6	0.11	18	0.34	3.09 (1.23–7.80)	0.02
Nonvascular causes	31	0.57	39	0.73	1.31 (0.82–2.10)	0.26
Uncertain	21	0.39	29	0.55	1.41 (0.82–2.52)	0.21

MORE HARM (bleeding and death)

- Major hemorrhage doubled 2.1%/year C+ASA vs. 1.1%/year ASA (HR 1.97; 95% CI, 1.41 to 2.71; P<0.001)
- All-cause mortality increased n=113 C+ASA vs. n=77 ASA (HR 1.52; 95% CI, 1.14 to 2.04; P=0.004)

Table 3. Safety Outcomes.*

Outcome	Aspirin plus Placebo (N=1503)		Aspirin plus Clopidogrel (N=1517)		Hazard Ratio (95% CI)	P Value
	no.	*rate (%/yr)*	*no.*	*rate (%/yr)*		
All major hemorrhages	56	1.1	105	2.1	1.97 (1.41–2.71)	<0.001
Intracranial hemorrhages†	15*	0.28	22	0.42	1.52 (0.79–2.93)	0.21
Intracerebral	8	0.15	15	0.28	1.92 (0.82–4.54)	0.14
Subdural or epidural	6	0.11	7	0.13	1.23 (0.41–3.64)	0.72
Other	4	0.07	2	0.04	0.53 (0.10–2.89)	0.46
Extracranial bleeding	42	0.79	87	1.7	2.15 (1.49–3.11)	<0.001
Gastrointestinal‡	28	0.52	58	1.1	2.14 (1.36–3.36)	<0.001
Fatal hemorrhages	4	0.07	9	0.17	2.29 (0.70–7.42)	0.17
Intracranial	4	0.07	7	0.13	1.78 (0.52–6.07)	0.36
Extracranial	0	0	2	0.04	—	—

Authors Conclusions: *"Among patients with recent lacunar strokes, the addition of clopidogrel to aspirin did not significantly reduce the risk of recurrent stroke and did significantly increase the risk of bleeding and death."*

Commentary: This was a large 2×2 factorial design randomized control trial. It showed adding clopidogrel to ASA did NOT reduce recurrent CVA and DID increase risk of bleed and death. The study was stopped early due to harm and lack of efficacy.

Bottom Line: The risk of adding clopidogrel to patients already on ASA for secondary CVA prevention exceeds the benefits.

SGEM #25: Who Are You?

Date: 24 February 2013

This is the 25th podcast of the Skeptics Guide to Emergency Medicine. Every so often I like to take a 10,000-foot view of things. In previous episodes we have looked at the top five FOAMed sites and the Choosing Wisely campaign. That reminds me, congratulations to ACEP for finally joining the Choosing Wisely initiative to not over test and over treat our patients in the emergency department.

So back to the title of today's podcast, **Who Are You?** There has been lots of great feedback since launching TheSGEM in the fall of 2012. A few individuals have really helped improve the project including Drs. Chris Carpenter and Jason Wagner.

One of my biggest constructive critics has been Dr. Katrin Hruska from Sweden. She is very interested in social media and follows TheSGEM podcast.

TheSGEM wants to turn MedEd on its head. We want to use social media as a disruptive technology to provide the front line provider with the high quality, clinically relevant information to the patient's bedside. The podcast lets TheSGEM listener turn their car into a classroom for a 15-20 minutes commute. Rather than eminence based medicine from the grey hairs and no hairs trickling down to the masses, TheSGEM tries to bubble it up from the grass root providers.

Much of the information for TheSGEM comes from the Best Evidence in Emergency Medicine (BEEM) project started by Dr. Andrew Worster of McMaster University. He is my evidence based medicine guru/ mentor. Dr. Worster put together the BEEM Dream Team of EBM.

The social media is the message. Gen Y can teach their baby boom teachers about podcasts and twitter. Twitter must have been designed with ED doctors in mind. If you can't get the message across in 140 characters or less we have lost their interest.

The Skeptics Guide to Emergency Medicine was a revolution when it started but now has become an evolution. The hard part was getting the project started. I have adapted new technology, learned garage band and figured out how to edit a podcast. Some things have worked well like the Keener Kontest, PUB cast in Oxford and having great guests like Dr. Tony Seupaul and medical student Lauren Westafer. Some things I have struggled with like finding the best microphone for good audio quality. I have fallen down at times, made mistakes but picked myself up to try again.

Katrin Hruska's Questions of TheSGEM:

- **Question#1:** What problem is TheSGEM trying to solve?
- **Question#2:** After listening to TheSGEM what do you want the listener to do differently?
- **Question#3:** Who should not listen to TheSGEM?
- **Question#4:** What has TheSGEM achieved so far?
- **Question#5:** What is the purpose of the Keener Kontest?

SGEM #26: Honey, Honey

Date: 3 March 2013

Guest Skeptic: Dr. Anthony Crocco MD FRCPC, Deputy Chief, Pediatric Emergency Department, McMaster Children's Hospital Assistant Clinical Professor, McMaster University, Member of the BEEM Dream Team.

Case Scenario: 5-year-old boy presents to the emergency department with a 2-day history of rhinorrhea and congestion. He has been coughing and it is especially bad at night. Mild fever is reported at home. He is eating and drinking well. On examination he looks well, is in no apparent distress and vital signs are all normal. Chest exam reveals no focal crackles or wheeze. You diagnose him with an upper respiratory tract infection (URI) "cold".

Background: Brief differential diagnosis for child with cough presenting to the emergency department:

- **Infectious:**
  - Upper (pharangitis, otitis media, croup)
  - Lower (bronchiolitis or pneumonia)
- **Non-Infectious:**
  - Asthma
  - Foreign body aspiration
- **Gastro esophageal reflux disease (GERD)**

Question: Do Over the Counter medications work for cough in Children & Adults?

Reference: Smith et al. Over-the-counter (OTC) medications for acute cough in children and adults in ambulatory settings. Cochrane Database of Systematic Reviews 2012, Issue 8.

- **Population:** 18 adult and 8 children trials with total of 4,037 patients
- **Intervention:** Variety of OTC cough medications
- **Comparison:** Placebo
- **Outcome:** Symptom relief of cough

Results: The pharmaceutical industry sponsored 11 of the 26 trials. Eight of the 11 industry sponsored trials showed positive results and only 3 of the non-industry sponsored trials showed benefits.

Authors Conclusions: "*There is no good evidence for or against the effectiveness of OTC medicines in acute cough. The results of this review have to be interpreted with caution due to differences in study characteristics and quality. Studies often showed conflicting results with uncertainty regarding clinical relevance. Higher quality evidence is needed to determine the effectiveness of self care treatments for acute cough.*"

Commentary: Heterogenicity was too high to perform a meta-analysis in this systematic review. The overall results of the review was that there was insufficient evidence that cough medicines provide any benefit over placebo. In their study, the authors' systematic review found conflicting evidence, with the majority of the studies that found in favor of beneficial effect having been funded by the pharmaceutical industry.

HARM: There are significant dangers to children from cough and cold medicines. Data from the 2011 National Poison Data System in the USA documented the following for children from over the counter cough and cold medicines:

- 35,000 calls to poison control centres
- 3% of all pediatric poison control calls
- 5 pediatric deaths
- 10% of all pediatric toxicological deaths

In 2011 the Food and Drug Administration (FDA) pulled 500 cough, cold and allergy medicines off the market. The FDA sent a specific advisory warning that OTC cough medicines should not be used in children under 2 years of age.

"FDA has completed its review of information about the safety of over-the-counter (OTC) cough and cold medicines in infants and children under 2 years of age. FDA is recommending that these drugs not be used to treat infants and children under 2 years of age because serious and potentially life-threatening side effects can occur."

The American Association of Family Physicians(AAFP) in 2012 recommends that these treatments not be used in children under the age of four.

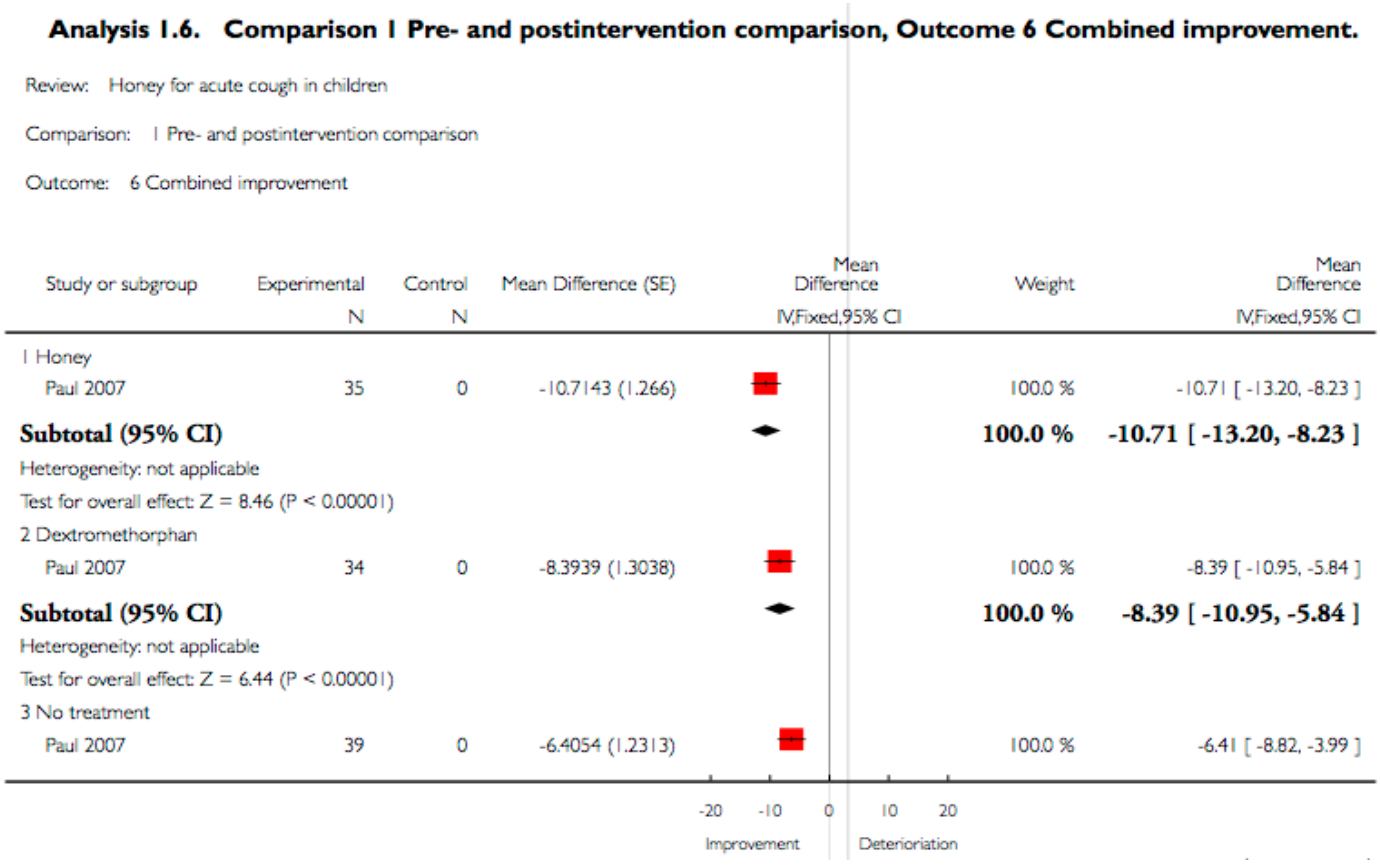
"In children, there is a potential for harm and no benefits with over-the-counter cough and cold medications; therefore, they should not be used in children younger than four years."

Question: What about honey for cough in children?

Reference: Oduwole et al. Honey for acute cough in children. Cochrane Database of Systematic Reviews 2012, Issue 3. Art. No.: CD007094. DOI: 10.1002/14651858.CD007094.pub3.22419319

- **Population:** Two randomized control trials of 265 children age 2 to 18 in ambulatory setting with cough from upper respiratory infection
- **Intervention:** Honey +/- antibiotics
- **Comparison:** Placebo, cough medication or no treatment
- **Outcome:** Primary outcome was duration of cough and symptomatic relief. Secondary outcomes included quality of sleep for children and caregivers, adverse effects and other issues.

Results:



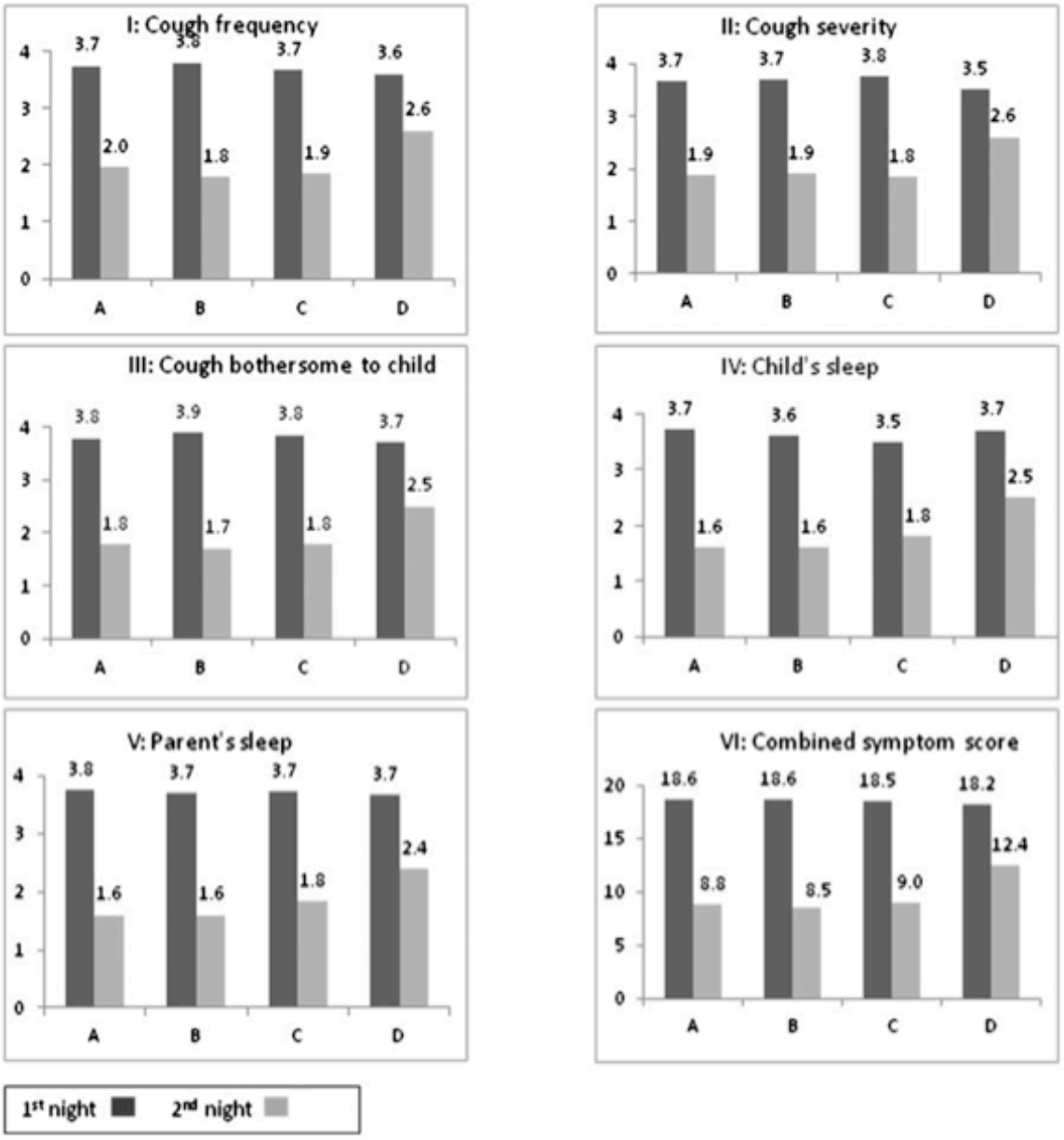
Authors Conclusions: *"Honey may be better than 'no treatment' and diphenhydramine in the symptomatic relief of cough but not better than dextromethorphan. There is no strong evidence for or against the use of honey."*

Commentary: Well performed systematic review. However, only two small studies were included. These suggested that honey may be of benefit over no treatment. However, these two studies had high risk of bias.

Reference: Cohen et al. Effect of Honey on Nocturnal Cough and Sleep Quality: A Double-blind, Randomized, Placebo-Controlled Study Pediatrics; originally published online August 6, 2012; DOI: 10.1542/peds.2011-3075 cohen-honey-cough

- **Population:** 300 children age 1-5 years with upper respiratory infection
- **Intervention:** Three different types of honey
- **Comparison:** Placebo
- **Outcome:** Cough

Results:



Authors Conclusions: *"Parents rated the honey products higher than the silan date extract for symptomatic relief of their children's nocturnal cough and sleep difficulty due to URI. Honey may be a preferable treatment for cough and sleep difficulty associated with childhood URI."*

Bottom Line: If you have a child with a cough older than 1 year of age try a teaspoon of honey every 6 to 8 hours as needed.

BOTULISM WARNING:

Honey should NOT be given to children under 1 year due to the risk of botulism.

SGEM #27: Bad to the Bone

Date: 10 March 2013

Case Scenario: 62-year-old man presents to the emergency department feeling weak. His vital signs at triage are normal but his glucometer reading is high. He is a known type 2 diabetic and states his sugars have been running a little high lately. After conducting an appropriate history and directed physical examination you have not yet determined the cause of his generalized weakness. There is nothing to suggest respiratory or urinary tract infection. Before leaving the room you take off his socks to check out his feet. What you see and smell is a diabetic foot ulcer on the plantar aspect of his left foot.

Question: Does this patient with diabetes have osteomyelitis of the lower extremity?

Background: Complications from diabetes are common presentations to the emergency department. These ED presentations will likely go up with the worldwide prevalence of diabetes projected to increase to 333 million by 2025. More than 30% of diabetics in the US have lower extremity disease including 7.7% with ulcers. These ulcers can lead to infection, osteomyelitis and ultimately limb amputation. Diabetic patients are 10 times more likely than non-diabetics to require osteomyelitis-related limb amputations. The first step in preventing such amputations would be identifying and treating patients with diabetes. Milne WK and Carpenter RC Annals of Emerg Med, May 2009

Reference: Butalia et al. Does this patient with diabetes have osteomyelitis of the lower extremity? JAMA 2008;299:806-813

- **Population:** Diabetic patients with foot infections and suspected osteomyelitis
- **Intervention:** N/A
- **Comparison:** N/A
- **Outcome:** Diagnostic accuracy (sensitivity, specificity, likelihood ratio) for bedside physical exam, lab tests (WBC, ESR, CRP), plain film imaging, and other imaging tests

Results: No studies looked at the precision of signs or symptoms. Temperature was only reported in one poor quality study. It was possible to report the test characteristics of those shown below:

Table. Diagnostic criteria for osteomyelitis of the lower extremity in patients with diabetes.

Diagnostic Criteria	Positive LR (95% CI)	Negative LR (95% CI)
Ulcer size <2 cm^2	7.2 (1.1–49)	0.48 (0.31–0.76)
Positive probe-to-bone test result	6.4 (3.6–11)*	0.39 (0.20–0.76)
Clinical gestalt	5.5 (1.8–17)*	0.54 (0.30–0.97)
ESR >70 mm/h	11 (1.6–79)*	0.34 (0.06–1.90)
Abnormal radiograph result	2.3 (1.6–3.3)*	0.63 (0.51–0.78)
Positive MRI result	3.8 (2.5–5.8)*	0.14 (0.08–0.26)

LR, Likelihood ratio; *ESR*, erythrocyte sedimentation rate.
*Summary likelihood ratio.

Authors Conclusions: *"An ulcer area larger than 2cm, a positive probe-to-bone test result, an erythrocyte sedimentation rate of more than 70 mm/h, and an abnormal plain radiograph result are helpful in diagnosing the presence of lower extremity osteomyelitis in patients with diabetes. A negative MRI result makes the diagnosis much less likely when all of these findings are absent. No single historical feature or physical examination reliably excludes osteomyelitis. The diagnostic utility of a combination of findings is unknown."*

Commentary: This review attempted to summarize the test characteristics of the history, physical examination, routinely available laboratory tests and imaging studies and MRI for diagnosing osteomyelitis in diabetic patients. The review had a number of limitations including a search strategy of English only manuscripts. Of the 21 studies included only 8 were prospective and 11 were judged to be of poor quality. "Clinical gestalt" was never clearly defined. No assessment of reliability (Kappa) for subjective measures were reported. None of these studies were ED based raising problems of external validity. No attempt was made to create a clinical decision rule/instrument using a combination of the tests. Finally, no patient oriented outcomes were assessed in this diagnostic accuracy study.

EBM Commentary: This review included studies with verification/work-up bias. The diagnostic performance of a test is determined by comparing it to the gold standard or reference standard. This is the most accurate established test for the disease in question. A bone biopsy was considered the reference standard for osteomyelitis in this review relative to ulcer size.

However, only those patients believed to have a high likelihood of disease are fully worked up (i.e., undergo bone biopsy). This may mean that those patients with a positive result on the test being evaluated (ulcer size) are more likely to have the full evaluation, including bone biopsy, which leads to false "verification" of ulcer size by ensuring that those with larger ulcers are more likely to undergo bone biopsy, whereas those with smaller ulcers will either not be included in the data or will be presumed, perhaps falsely, to be disease negative. The main result of this bias will be incorrect elevation of the tests sensitivity and specificity.
To eliminate this work-up or verification bias, all patients with diabetic foot ulcers regardless of its size would need to be biopsied for the presence of osteomyelitis. This would be both expensive and invasive, making researchers less likely to obtain a bone biopsy.

Bottom Line: First thing to do when trying to diagnose osteomyelitis of the lower extremity is determining whether or not the patient is diabetic. An ulcer size of >2 cm and a positive bone-to-probe test each significantly increases the LR of a DM osteomyelitis. Clinical gestalt was almost a useful as these two things. An ESR>70 strongly suggests the diagnosis in the correct clinical setting. An abnormal plain film can increase the probability, only MRI substantially reduces the LR. No single physical exam finding or test reliably excludes the diagnosis of osteomyelitis in a diabetic patient.

Case Resolution: You order standard blood work on this diabetic man including an ESR, which comes back elevated at 77. Plain films are also performed showing some focal loss of trabecular bone and periosteal reaction. You make a diagnosis of osteomyelitis and him on appropriate antibiotics and consult orthopedics.

SGEM #28: Bang your Head

Date: 17 March 2013

Guest Skeptic: Dr. Chris Carpenter

Case Scenario: 39-year-old woman known to your emergency department with a long history of migraine headaches presents in her usual way. There is nothing to suggest anything other than her typical migraine headache. You treat her successfully with IV fluids, DHE and metoclopramide. She is feeling much better and is ready for discharge.

Background: More than 10% of people (6% men and 18% women) suffer from migraines. This condition represents a significant source of both medical costs and lost productivity. Direct costs are estimated at ~17 billion dollars a year. There are also indirect costs of about 15 billion dollars a year mainly due to missed work. Up to half of patients presenting to the ED with their migraines will "bounce-back" to the ED in a few days. Dexamethasone has been tried in randomized control trials to prevent bounce-backs. Giuliano et al did a good review on this topic in Postgraduate Medicine last year.

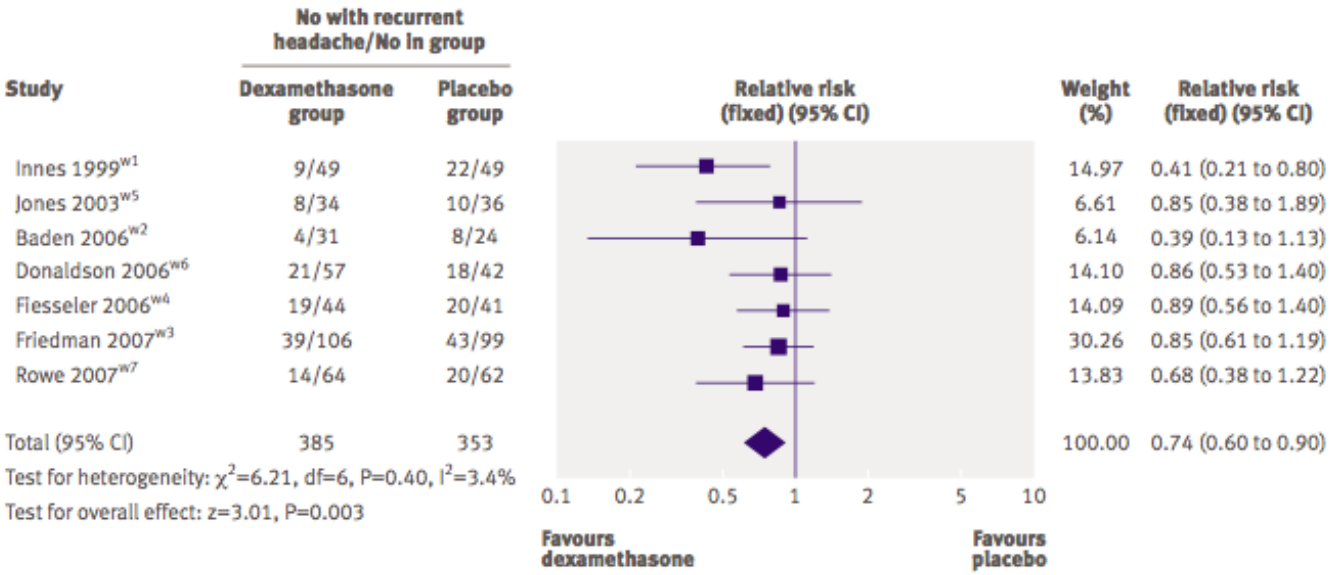
Question: Can dexamethasone prevent migraine patients from bouncing back to the ED in the next few days?

Reference: Coleman et al. Parenteral dexamethasone for acute severe migraine headache: meta-analysis of randomized controlled trials for preventing recurrence BMJ 2008; 336:1359

- **Population:** Adult patients (>18 years old) with acute severe migraine headache, meeting reasonable criteria to distinguish migraine from other non-migraine headaches. Seven studies were included in the meta-analysis (n=738)
- **Intervention:** Parenteral dexamethasone (in conjunction with acute abortive therapy); dosing variable
- **Control:** Placebo
- **Outcome:** Primary outcome was recurrence of migraine within 24-72 hours of treatment. Secondary outcome was pain relief scores on 10pt VAS, and adverse events

Results:

- **Primary Outcome:** Recurrence of migraine within 24-72hrs RR=0.74 (95% CI; 0.60-0.90) NNT=9 (95%CI; 6-25)
- **Secondary Outcome:** Pain relief score 10pt VAS was WMD=0.37 (95%CI; -0.20-0.94) NNT (not calculated)
- **Adverse Events:** 6 trials (n=626). Patients treated with dexamethasone were more likely to have dizziness (RR=2.15, 95%CI; 0.98-4.74) but less likely to have nausea (RR=0.70, 95%CI; 0.48-1.02) or "other" adverse events (RR=0.50, 95%CI; 0.30-0.82).



Authors Conclusions: *"When added to standard abortive therapy for migraine headache, single dose parenteral dexamethasone is associated with a 26% relative reduction in headache recurrence (number needed to treat=9) within 72 hours."*

Commentary: This review discusses the epidemiology and burden of migraine illness on health care systems and emergency departments. It also illustrates the potential public health and economic benefits of reducing these visits. Recurrent migraine is the second-most important therapeutic goal (after acute pain control) for migraineurs. It is a valuable endpoint from both patient and physician viewpoints. Dexamethasone is a cheap and easy medication to administer parenterally. Its relative risk reduction in early recurrent migraines of 26% with an NNT=9. There were no significant adverse effects and dexamethasone is readily familiar to most emergency physicians. There were some limitations with this review. What "*reasonable criteria to distinguish migraine from other headache types*" did the authors use? Was it the International Headache Society criteria for migraine?. There was a failure to reference CONSORT guidelines for reporting studies. There was no assessment for publication bias (funnel plot). Regardless of these limitations, this review, provides information that should help emergency physicians treat these patients more effectively and reduce early recurrent migraine attacks and ED visits.

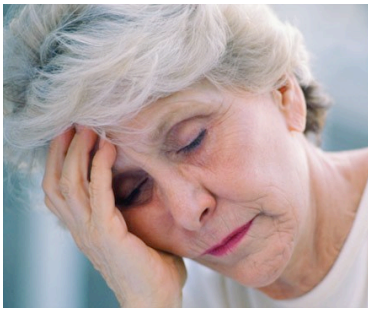
EBM Commentary: Consolidated Standards of Reporting Trials or CONSORT Statement. This was an initiative to try and address the problem of inadequate reporting of randomized control trials (RCTs). It consists of a checklist of 25 items to standardize the way authors report clinical trial findings. This allows for transparency, critical appraisal and interpretation of the study. It also includes a flow diagram to show what happened to all the participants in the trial.

Washington University in St. Louis has an amazing Emergency Medicine Journal Club started by Capt. Cranium (Dr. Chris Carpenter). They did a great job looking at this literature and can provide more depth than this short podcast.

Bottom Line: For patients successfully aborted for a migraine attack, a single parenteral dose of dexamethasone ≥15 mg will significantly reduce early recurrences (NNT=9) with no significant side effects.

Case Resolution: You discussed dexamethasone treatment with the patient. She decided it was worth a try and you give her 15mg of IV dexamethasone. You plan on checking to see if she re-presents in the next week.

SGEM #29: Stroke Me, Stroke Me



Date: 24 March 2013

"Now everybody, Have you heard, If you're in the game (of emergency medicine), Then the stroke's the word, Don't take no rhythm, Don't take no style, Gotta thirst for killin', Grab your vial (of tPA) and stroke me, stroke me…" Billy Squier The Stroke

Case Scenario: An 83-year-old woman arrives from home with right-sided weakness beginning 4 hours prior. You diagnose acute ischemic CVA with no contra-indications to thrombolysis.

Question: Does thrombolysis given to acute ischemic CVA in <6 hours increase the proportion of people who are alive and independent at 6 months?

Background: Acute ischemic strokes represent the leading cause of disability in our society and the third most common cause of death. There have been many studies performed looking at thrombolysis for acute CVA. For a summary of the major trials check out Dr. David Newman's Number Needed to Treat site. Another good review of the topic is a paper done by Dr. Chris Carpenter published in the Journal of Emergency Medicine.

When tPA was approved in the European Union it was restricted to 3 hours and age less than 80 years old. A Cochrane review suggested that tPA might be beneficial up to 6 hours. Older people (>80 years old) have been under represented in the previous tPA stroke trials. This sets the basis for the study we will be talking about today. The IST-3 study was to establish the balance of benefits and harms of tPA in patients not meeting license criteria (mainly older patients and up to 6 hours).

Reference: IST-3 Collaborative Group. The benefits and harms of intravenous thrombolysis with recombinant tissue plasminogen activator within 6 hours of acute ischemic stroke (the third international stroke trial [IST-3]): a randomized controlled trial Lancet 2012

- **Population:** Multi-center, open-label, randomized control trial (n=3035)
- **Intervention:** tPA 0.9mg/kg
- **Control:** Placebo
- **Outcome:** Alive/independent on OHS at 6 months

Handicap	Lifestyle	Grade
none	no change	0
minor symptoms	no interference	1
minor handicap	some restrictions but able to look after self	2
moderate handicap	significant restriction; unable to lead a totally independent existence (requires some assistance)	3
moderate-to-severe handicap	unable to live independently but does not require constant attention	4
severe handicap	totally dependent; requires constant attention day and night	5

Results: Total of 3035 patients (1515 treatment and 1520 control). 95% did not meet the European Union license approved criteria. Over half (53% were >80 years old. Mean time to treatment was 4.2 hours.

- **Primary Outcome:** Alive/independent of activities of daily living (OHS 0-2) **NO DIFFERENCE**
  - 37%tPA vs. 35% control with adjusted OR 1.13 (95% CI; 0.95-1.35)
- **Harm:**
  - Died at 7 days: 11%tPA vs. 7% control with adjusted OR 1.6 (95% CI; 1.22-2.08)
  - Fatal or non-fatal ICH: 7% tPA vs. 1% control with adjusted OR 6.94 (95%CI; 4.07-11.8)
  - Death 6 months: no difference 27% tPA vs. 27% control
- **Secondary Outcome:** significant difference in ordinal shift
  - Common OR 1.27 (95%CI; 1.10-1.47)

Authors Conclusions: *"For the types of patient recruited in IST-3, despite the early hazards, thrombolysis within 6 hours improved functional outcome. Benefit did not seem to be diminished in elderly patients."*

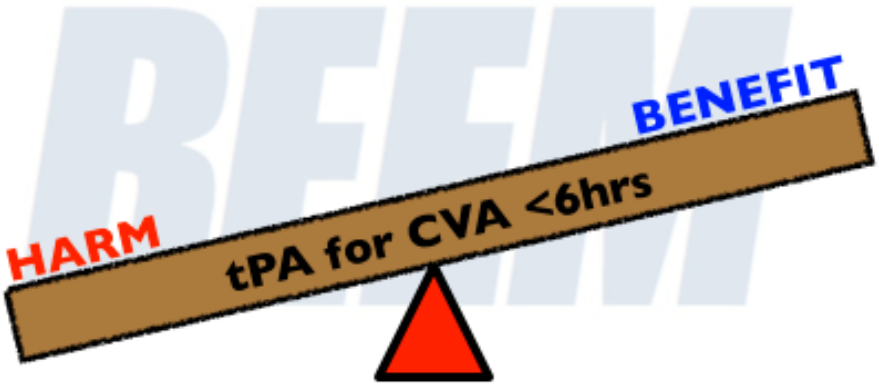
Commentary: This was a pragmatic, multi-center, randomized controlled, open-label trial. It sought to determine if older patients and patients treated <6 hours of CVA onset would benefit from tPA. The trial did not meet its target of 6,000 . The outcomes of patients >80 years old were no different than those of younger patients. Also, patients treated with tPA >3 hours showed no significant benefit over those treated with placebo.

The quotation *"The lady doth protest too much, methinks"* comes from Shakespeare's Hamlet, Act III, scene II, where it is spoken by Queen Gertrude, Hamlet's mother. The phrase has come to mean that one can "insist so passionately about something not being true that people suspect the opposite of what one is saying." Wikipedia

Limitations and EBM Commentary: There were many limitations to the IST-3 study. It represents an excellent opportunity to discuss a number of evidence based medicine issues.

- Pragmatic trial
- Open Label/Allocation Concealment
- Only patients thought to benefit were included
- Missed their target of 6,000 patients by 50%
- After seven years they seemed to move the goal posts
- Another statistician was brought in to *"persuade"* them
- Big harm (death and bleeding)
- Came up with a secondary outcome which was significant
- Primary outcome showed **NO DIFFERENCE**
- Was reported as a positive study????

Bottom Line: Treatment with tPA in this study harmed (death) 1 in 25 early, the fatal and non-fatal bleed rate went up significantly and there no benefit was seen at 6 months in the primary outcome.



Comments on IST-3 by other Experts:

- Newman Letter to Editor
- Fatovich Letter to Editor
- ISH-3 Study Reply
- EM Literature of Note
- Schrodinger's Fence
- Hoffman EMA
- Fatovich EMA

Case Resolution: You discuss the options with the patient and their family. Given her age and the time now being over 4.5 hours you reach a shared decision not to use tPA.

SGEM #30: My Generation

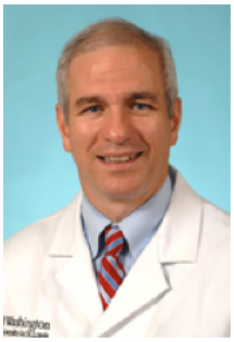
Date: March 2013

Case Scenario: Emergency Medicine resident approaches her staff physician after listening to an episode of TheSGEM. The information she is being taught by her supervisor is in conflict with what she had heard on the podcast.

Question: How does she deal with this situation?

Guests:

- Dr. Chris Carpenter: Director Evidence Based Medicine, Washington University
- Dr. Greg Polites : Course Master Practice of Medicine, Washington University
- Dr. Peter Panagos : Director of Stroke Network, Washington University

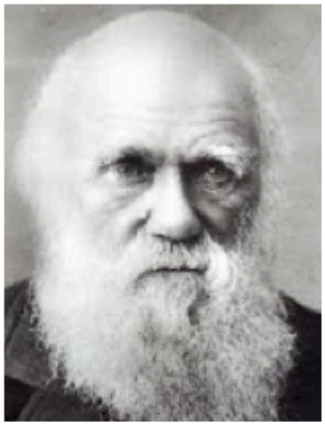


The Multi-Generational Workforce

Demographic Group	Born: Age Range	Values, Traits, Characteristics	Learning Styles
Traditionalists	1928-1945 (61+ years old)	Hierarchical, loyal to institutions, motivated by financial rewards and security	Traditional, instructor-led, reading, homework ***"teach me"***
Boomers	1946-1964 (42-60 years old)	Idealistic, competitive, striving to achieve	Traditional, group effort, expert-driven, self-driven, ***"lead me to information"***
Generation X	1966-1980 (26-41 years old)	Self-reliant, willing to change rules, tribal and community oriented	Team-driven, collaborative, "wisdom of crowds," peer-to-peer ***"connect me to people"***
Millenials	1980-2000 (6-26 years old)	Confident, impatient, socially conscious, family centric, technology savvy	Give context and meaning, make it fun, search and explore, entertain me ***"connect me to everything"***

Quotes from Ken:

- **Disruptive Innovation:** Disruptive innovation, a term of art coined by Clayton Christensen, describes a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up market, eventually displacing established competitors.
- **The medium is the message:** A phrase coined by Marshall McLuhan meaning that the form of a medium embeds itself in the message, creating a symbiotic relationship by which the medium influences how the message is perceived.
- Wit**h great power, comes great responsibility**: Said to Peter Parker by Uncle Ben. Stan Lee, the writer of Spiderman, may have borrowed this from Voltaire who said it in French years earlier.
- **Master/Learner:** The cycle is now complete. When I left you I was but the learner. Now I am the master. (Darth Vader)
- **Competition:** I think it inevitably follows, that as new species in the course of time are formed through natural selection, others will become rarer and rarer, and finally extinct. The forms which stand in closest competition with those undergoing modification and improvement will naturally suffer most (Charles Darwin).



Additional Resources:

- Healthy skepticism
- McMaster Evidence Based Clinical Practice
- NYAM TEACH course
- UCSF Evidence Based Diagnostics course
- 21st Century Flexner Report

SGEM #31: She's Got Legs

Date: 7 April 2013

Case Scenario: A 58-year-old woman arrives to the ED with a painful leg. You do an appropriate history and physical examination. She is Well's criteria low and d-dimer positive. The ultrasound comes back saying "no evidence of deep vein thrombosis". You make the diagnosis of superficial thrombophlebitis.

Question: What should you do to treat this woman's superficial thrombophlebitis (NSAIDs, Coumadin, LMWH, surgery, nothing)?

Background: Superficial thrombophlebitis is a common problem usually involving the superficial veins of the leg. The two components of this condition are clot (thrombus) and inflammation of the vein (phlebitis). Besides local pain, superficial thrombophlebitis can cause red, itchy skin with hardening of the surrounding tissue. There has been a concern that superficial thrombophlebitis could lead to the more serious deep vein thrombosis.

Wells' Criteria for DVT
Calculates Wells' Score for risk of DVT.

Active cancer?	☐ Yes +1
Bedridden recently >3 days or major surgery within four weeks?	☐ Yes +1
Calf swelling >3cm compared to the other leg?	☐ Yes +1
Collateral (nonvaricose) superficial veins present?	☐ Yes +1
Entire leg swollen?	☐ Yes +1
Localized tenderness along the deep venous system?	☐ Yes +1
Pitting edema, greater in the symptomatic leg?	☐ Yes +1
Paralysis, paresis, or recent plaster immobilization of the lower extremity	☐ Yes +1
Previously documented DVT?	☐ Yes +1
Alternative diagnosis to DVT as likely or more likely?	☐ Yes -2
Patient has none of these	None Present
Score	Click! points

Reference: Di Nisio et al. Treatment for superficial thrombophlebitis of the leg. Cochrane Database of Systematic Reviews 2012, Issue 3. Art. No.: CD004982.

- **Population:** RCTs that included participants with a clinical diagnosis of superficial thrombophlebitis of the legs and objective diagnosis of a thrombus in the superficial vein. 26 trials involving 5,521 patients
- **Intervention:** Topical treatments, compression stockings/bandages, leg elevation, medical (LMWH, NSAIDs, unfractionated heparin, fondaparinux) and surgery (ligation, vein stripping, crossectomy)
- **Comparison:** Compared to another form of treatment, placebo or no intervention.
- **Outcome:** Symptoms, extension or recurrence of ST, progression to DVT/PE and quality of life. Secondary outcomes included mortality or adverse effects of treatment.

Results: Fondaparinux given for 45 days, compared to placebo, reduced the composite primary end point (death, symptomatic PE/DVT, extension or recurrence of ST) by 85% (RR 0.15; 95% CI 0.08 to 0.26) with a NNT of 20 (95% CI, 15 to 25). Each component of this composite primary end point was reduced except for death. The risk of the composite of DVT or PE was also reduced by 85% (RR 0.15; 95% CI 0.04 to 0.50) with an NNT to prevent one PE or DVT of 88 (95% CI, 54 to 190). There was no increased risk of bleeding compared to placebo.

Fondaparinux: Synthetic factor Xa inhibitor. A potential advantage of fondaparinux is the lower risk for heparin-induced thrombocytopenia (HIT) compared to LMWH or unfractionated heparin. It needs to be used with caution in patients with renal dysfunction because of its renal excretion. There is a black box warning about epidural/spinal hematoma risk for fondaparinux.

Authors Conclusions: *"Prophylactic dose fondaparinux given for six weeks appears to be a valid therapeutic option for ST of the legs."*

Commentary: This is a typical Cochrane review with good methods addressing a common problem seen in the ED. The quality of most included trials was poor due to inadequately reported randomization and allocation concealment. One very large placebo controlled randomized trial (CALISTO, n=3002) dominated this SR, with over half of all the patients.

This systematic review showed fondaparinux worked. In the other smaller studies, LMWH or NSAIDs compared to placebo, appear to reduce the extension and recurrence of superficial thrombophlebitis but had problems with methods and risk of increasing gastric complications. These studies showed no significant difference in the progression to PE or DVT. The evidence for topical treatment or surgery was too limited to draw any conclusions.

Bottom Line: Fondaparinux subcutaneously daily for 6 weeks should be considered for treating thrombophlebitis of the leg.

Case Resolution: You treat this woman with Fondaparinux to relieve her symptoms and prevent extension to DVT/PE.

Black Box Warnings ⓘ

Epidural/Spinal Hematoma Risk

epidural/spinal hematoma risk after neuraxial anesthesia or spinal puncture in anticoagulated pts; hematoma may result in long-term or permanent paralysis; incr. risk if indwelling epidural catheter use, concomitant use of drugs affecting hemostasis incl. NSAIDs, platelet inhibitors, or other anticoagulants, traumatic or repeated epidural or spinal puncture hx, spinal deformity, or spinal surgery hx; monitor s/sx neurologic impairment, treat urgently if needed; consider benefit vs. risk before neuraxial intervention in anticoagulated pts or planned anticoagulation for thromboprophylaxis

SGEM #32: Stone Me

Date: 14 April 2013

Case Scenario: A 46-year-old man presents to the emergency department doing the renal colic shuffle (not the Harlem Shake). He has a history of kidney stones. Nothing in his physical examination or investigations suggest anything other than another renal colic attack. He wants to know if there is a way to flush the stone out.

From TheSGEM Episode #04 (Getting Un-Stoned) you know that an alpha-blocker does not help pass stones beyond the placebo effect. We are still waiting for the big systematic review by Zhu from Cochrane on the topic.

Question: Does pushing oral/IV fluids or diuretics help in passing kidney stones?

Reference: Worster AS, Bhanich Supapol W. Fluids and diuretics for acute ureteric colic. Cochrane Database of Systematic Reviews 2012, Issue 2. Art. No.: CD004926. DOI: 10.1002/14651858.CD004926.pub3.

- **Population:** Adults ED patients with acute renal colic
- **Intervention:** High volume IV or oral fluids or diuretic use
- **Control:** Placebo, no treatment or maintenance IV or oral hydration
- **Outcome:** Symptoms and duration, physician visits, hospital admit, surgical procedures or adverse events

Results: Two studies (n=118) looked at IV fluids

- No difference in pain at six hours (RR 1.06, 95% CI 0.71 to 1.57)
- No difference in stone clearance (1 study 43 participants: RR 1.38, 95% CI 0.50 to 3.84), hourly pain score or patients' narcotic requirements (P >0.05 for all comparisons)
- No difference surgical stone removal (1 study, n=60: RR 1.20, 95% CI 0.41 to 3.51)
- No difference manipulation by cystoscopy (1 study, 60 n=60: RR 0.67, 95% CI 0.21 to 2.13)

Authors Conclusions: *"We found no reliable evidence in the literature to support the use of diuretics and high volume fluid therapy for people with acute ureteric colic. However, given the potential positive therapeutic impact of fluids and diuretics to facilitate stone passage, the capacity of these interventions warrants further investigation to determine safety and efficacy profiles."*

Commentary:

- Two small studies (n=118)
- Lack of clinical evidence of benefit
- Theoretical potential harm (renal impairment or ureteric rupture from high volume IV)
- These treatments should not be routinely used

Bottom Line: You don't need to push fluids (oral/IV) or use diuretics to pass kidney stones.

Case Resolution: You treat him with some IV fluids and 30mg ketorolac IV. His symptoms resolve. Imaging demonstrates a small, distal stone with no hydronephrosis. He is instructed to return if new symptoms or existing symptoms get worse or if he is concerned. His follow up is with his primary care provider or urologist.

SGEM #33: Boston 2013

Date: 21 April 2013

Everyone has a story to tell and their own perspective on the recent tragic events in Boston. It will impact us all in a unique way. Here is my way of remembering, honoring, saying thanks and trying to understand what happened. It is told through words, music, pictures and video. Boston 2013-Medium

As of today they have caught one person and killed another thought to be responsible for this horrific attack. We do not know what their motives or goals were.

I am absolutely sure their goals were not to make me feel closer to my best friend Rick who I drove to Boston with, ran the marathon and shared the experience. Their goal was not to strengthen my relationship with my beautiful wife Barb and definitely not to cherish my children Ethan, Sage and Zoe more.

The event has also pulled me closer to all of you who were worried, tried to contact me and offered support.

I had the privilege of sharing the experience with an amazing group of runner from London, Ontario. They welcomed Rick and I into their world even if it was only for a brief time. Each one of these guys showed kindness and good-hearted banter. It is easy to see why our friend Steve Beasley (Beaser) goes back year after year to run Heart Break Hill with these wonderful guys.

It was my first marathon. I was in the third wave of the last coral of the charity runners. I was surrounded by people not driven by the clock, but motivated by caring. They were running for the memory of those lost to illness or trying to cure or prevent illness.

It was 4 hours of positive energy moving forward in a wave of resolute enthusiasm. I ran through all the little towns, did not kiss any girls from Wellesley College and survived the four big hills.

At mile 23 the Captain Kilometer cape came out to help me fly into the finish line. Beasley was there to cheer me on for the final 3 miles. Hugs, kisses and encouragement came from the cousins stationed at Mile 24; the same family who the day before played a game of soccer with me, went to Target to get poster boards for decoration and shared a large pasta dinner before the race. I made it into Boston feeling well at Mile 25. The roar of the crowd chanting *"one more mile"* was deafening. So deafening I did not hear the bombs explode…

The police stopped me at a barricade before I could turn right on Hereford and left on Boylston. My Garmin GPS watch said 480 meters to the finish line. It was not chaos. The first responders were amazing. The paramedics, police and fire fighters all ran towards the danger. They did what they were trained to do, put the lives of others before their own. BAA volunteers and spectators who put themselves at risk to help strangers in need showed the same courage.

It will go on record officially as a DNF (did not finish)…No glory, no celebrating just somber reflection. I did however get a medal. This was from a very generous man who finished his

20th Boston Marathon. He said as far as he was concerned I completed the run, earned the recognition and he gave me his medal.

Our hearts may be breaking over the loss of life and those who survived with physical and mental injuries. However, the spirit of the many will not be broken by the horrible acts of a few.

It is good to be back home safe; happy to have been a witness to history rather than a victim of history.

Will I be back next year to complete the 26.2 miles?

– I don't know.

Will I forget The Boston Marathon Bombing on April 15th, 2013?

– Never.

SGEM #34: This is Spinal Tap

Date: 28 April 2013

Case Scenario: A 66-year-old man presents with a 48-hour history of fever, lethargy and headache. No significant past medical history. On physical examination he has a temperature of 38.8C, GCS 15, stiff neck on flexion and no rash. Urinalysis and CXR are normal. Laboratory testing reports an elevated WBC with a left shift. You decide he needs a lumbar puncture (LP) to check for meningitis.

Question: How to perform the lumbar puncture?

Reference: Straus SE, Thorpe KE, Holroyd-Leduc J, "How do I perform a lumbar puncture and analyze the results to diagnose bacterial meningitis?" JAMA 2006, Oct 25; 296(16):2012-2022

- **Population:** Adults patients undergoing diagnostic lumbar puncture (15 studies included)
- **Intervention:** Variations in techniques including positioning, needle type, stylet technique and post-procedure care
- **Outcome:** adverse post-LP patient events
- **Analyses:** LRs with 95% CI

Background: Quincke described the first lumbar puncture in 1891 to sample the cerebral spinal fluid. It has been used since as a diagnostic tool to evaluate the CSF for evidence of things including infection and subarachnoid hemorrhage. It was only a few years later that post LP headache was described in 1899 by Bier. While headaches are a common complication of LPs there are a number of rare adverse events: cerebral herniation, intracranial subdural hemorrhage, spinal epidural hemorrhage and infection.

A concern that often comes up in these cases is whether or not a CT needs to be done prior to performing the LP. This review article states that there is no evidence supporting universal neuroimaging prior to LP. They suggest the use of clinical judgment but that is not defined well. The two references given are Gopal et al 1999 and Hasbun et al 2001.

Gopal (n=113) had internal medicine residents not emergency physicians examine patients. The sample population had a median age of 42 with 36% immunocompromised and 46% had altered mentation.

Hasbun (n=301) had emergency physicians or general internist evaluate the patients. The mean age was 40 with 25% being immunocompromised. Of the 301 only 235 got CTs prior to LPs.

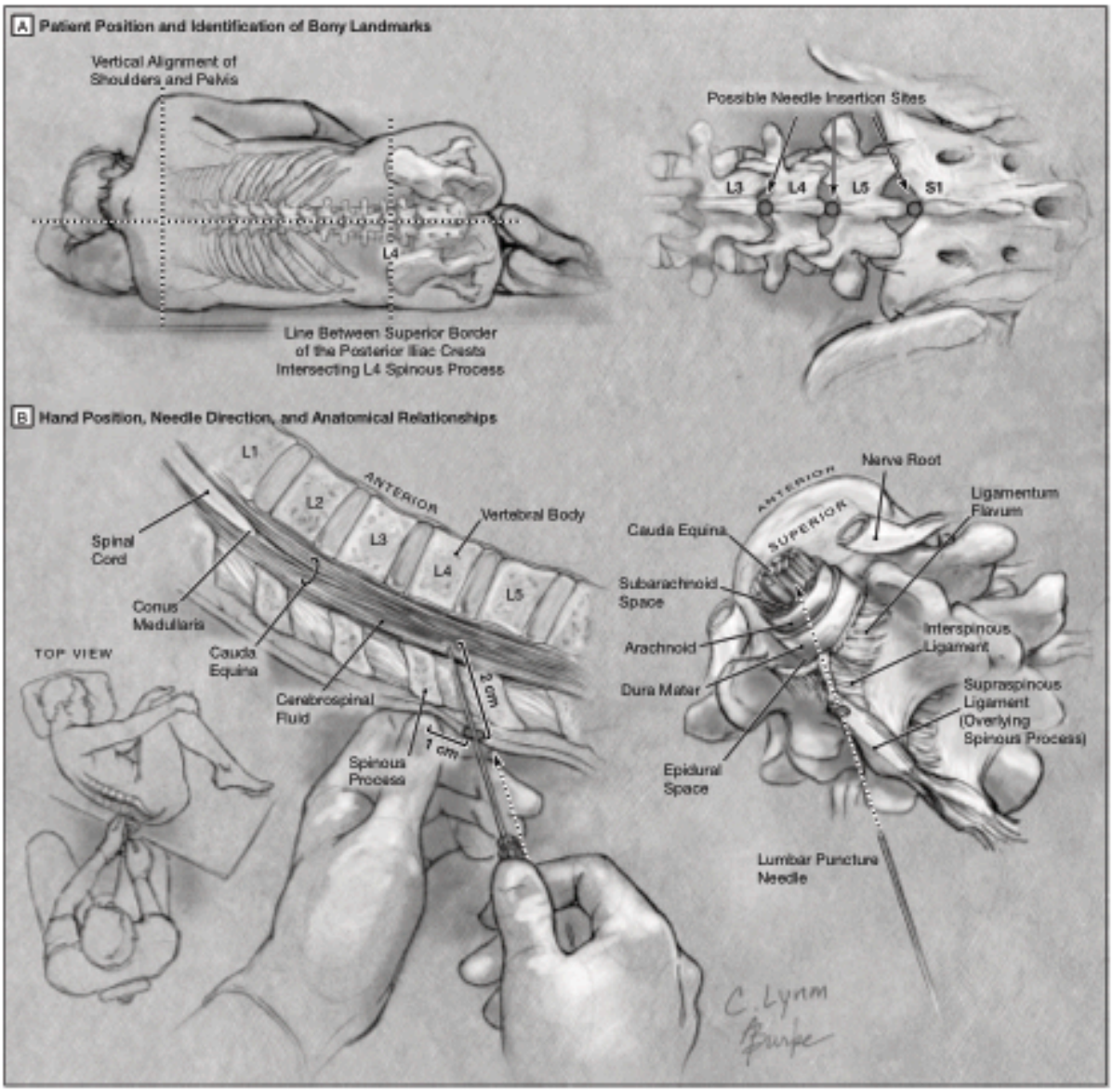
Neither of these two studies has been validated prospectively in other independent populations.

This podcast will not be discussing the diagnostic accuracy of LP for meningitis or subarachnoid hemorrhage. The concept of whether or not you need to do an LP post CT to rule out a SAH has been debated lately (Newman's 700 Club). SmartEM did a good podcast on this topic already.

Results:

Operator Experience: No randomized studies and little evidence from lesser-quality studies to indicate any significant effect from experience.

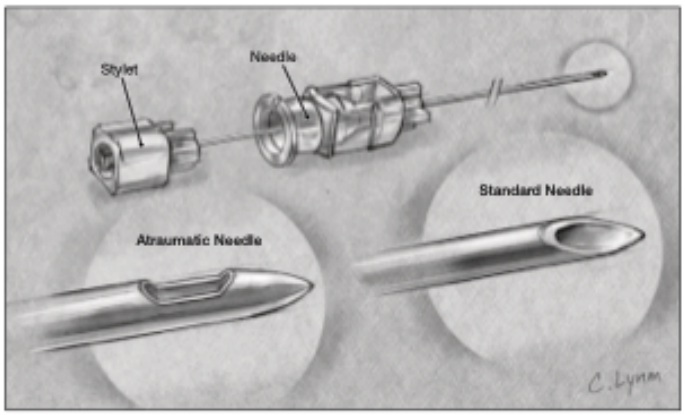
Positioning of Patient: Unable to identify studies that evaluated the success of LP with different patient positions or the impact of patient positioning on the risk of adverse events. Note is made that maximal interspinous distance is achieved in the seated-with-feet-supported position from an n=16 physiologic measurement study.



Number of attempts: Nonsignificant increase (ARI 4.9%; CI: -13% to 3.4%) in risk of requiring 2 or more attempts when an atraumatic needle is used. No increased risk of backache despite this.

Needle Choice: Suggestion of (nonsignificant) decrease (ARR 12.5%, CI: -1.72% to 26.2%) in headache among patients in which an atraumatic needle is used (Figure 2), statistically significant heterogeneity primarily due to the inclusion of one small 1993 study. Single study, n=100, demonstrated a significant reduction in risk of headache (ARR 26%; CI: 11%-40%) with a 22 gauge Quincke needle instead of a 26 gauge Quincke needle.

Figure 1. Types of Lumbar Puncture Needles



Stylet Reinsertion: single study, n=600, concluded reduced risk of headache when stylet was reintroduced before needle withdrawal (ARR 11%; CI 6-5%-16%) but no details on randomization or blinding was available.

Bed rest post-LP: Four studies, n=717, no significant heterogeneity. Decrease in risk of headache with immobilization was nonsignificant (ARR 2.9%; CI: -3.4% to 9.3%)

Supplementary Fluids: No convincing evidence found.

Sudlow CLM, Warlow CP. Posture and fluids for preventing post-dural puncture headache. Cochrane Database of Systematic Reviews 2001, Issue 2. Art. No.: CD001790. DOI: 10.1002/14651858.CD001790.

THE COCHRANE COLLABORATION®

Cochrane Conclusions: *There is no good evidence from randomized trials to suggest that routine bed rest after dural puncture is beneficial. The role of fluid supplementation in the prevention of post-dural puncture headache remains uncertain.*

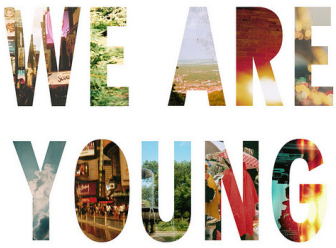
Authors Conclusions: *"These data suggest that small-gauge, atraumatic needles may decrease the risk of headache after diagnostic LP. Reinsertion of the stylet before needle removal should occur and patients do not require bed rest after the procedure. Future research should focus on evaluating interventions to optimize the success of a diagnostic LP and to enhance training in procedural skills."*

Bottom Line: The following procedures may decrease the risk of post-LP headache:

- Small-gauge atraumatic needles
- Reinsertion of the stylet prior to the removal of the spinal needle
- Mobilization of patients after completing the LP

Case Resolution: You perform a successful LP and send off the CSF to the lab for analysis to rule out meningitis.

SGEM #35: We are Young



Date: 5 May 2013

This is a follow-up to Episode#30: My Generation. Every five episodes or so I like to deviate from the case based evidence based medicine (EBM) formula where we critically review an article or topic.

The goal of TheSGEM however remains the same, to cut the knowledge translation (KT) window from 10 years to 1 year. This is so you the listener can provide the best EBM care to the patients you treat. It uses social media to turn Med Ed on its head.

TheSGEM is part of the Free Open Access to Medical Education or FOAMed. Episode 30 was well received. It looked at the generational tension the SGEM has created between baby boomer faculty and Gen Y learners. These two groups have different priorities, styles, and goals among other things. Information technology and specifically social media has been embraced by the Gen Ys more so than the boomers.

TheSGEM has empowered students to have the latest, greatest, EBM in the palm of their hand. They also can listen to the podcast when working out or turn their car into a classroom. While they may have the information readily available in the lecture hall or at the patient's bedside they may also lack the experience to put this information into perspective.

Episode #30 discussed these issues BUT and yes there is a BUT, one of TheSGEMs skeptical listener (and she knows who she is) correctly pointed out two things. The first was that all the guests on the show were boomers. The second constructive criticism was that they were all men. So I have searched high and low for a group of Gen Yers to provide that *"fair and balanced"* perspective.

Today, I have three very bright and talented students joining TheSGEM. Alia taught the twitter lecture at the Society of Rural Physicians of Canada(SRPC) meeting last month in Victoria BC. I was immediately impressed with her and enjoyed the presentation. I hope she didn't mind that I was tweeting throughout the whole lecture. Jimmy is a medical student who will be working with me this summer on a new social media project we are launching this fall. Beth is the third guest who I also met at SRPC and went wow! She attended my lecture on social media and kept me on my toes by asking questions and being skeptical. Yes, she is Gen Yer who is skeptical of all social media and how it fits into medical education and life in general.

Alia the twitter expert (@alia_dh):

- How do you see twitter fitting into medical education?
- Do you think you can teach complicated topics like medicine in 140 characters or less?
- Do you think it is rude to twitter during lecture?
- How about twittering on clinical rounds?
- How does it make you feel when a patient twitters during an office visit?

Jimmy the social media machine (@Jimmy_Yan):

- What podcasts would you recommend? Surgery 101 and JMTM podcast
- How do you handle the issue of professors not being up to date?
- What expectations do you have of your professors to be up to date on the latest evidence based medicine?
- Do you think professors should be listening to podcasts and why?

Beth the social media skeptic:

- Why are you skeptical of social media?
- Do you think there is a role for social media in med ed?
- Do you think there should be course taught to students AND professors on social media?
- What do you think is the BEST aspect of social media?

Bottom Line: The #SoMe world is an extension of you as a learner; so as on the wards, be thoughtful, curious, respectful, humorous, and use good grammar!

SGEM #36: Mac and CCBs

Date: 12 May 2013

Case Scenario: 67-year-old woman presents with a one-week history of productive cough with no fever. She is a non-smoker and has no history of lung disease. Her past medical history is positive for hypertension and she is taking a calcium channel blocker. She has no allergies to medication. On exam she has no fever, oxygen saturation is 97% on room air, and has clear air entry. X-ray is reported as slight patchy infiltrate in right lower lobe with possible early pneumonia.

Question: Do macrolides cause serious hypotension in patients on CCBs?

Reference: AJ Wright et al. CMAJ, February 22, 2011;183(3)

- **Population:** Patients 66+ years old admitted to hospital with a diagnosis of hypotension or shock (ICD-9 codes) while receiving a CCB (n=7,100) between 1994-2009. There was a almost 1 million patients who received single CCB during study period.
- **Intervention:** Prescription of macrolide in the 7 days before admitted to hospital
- **Control:** Each person served as there own control. Patients on CCBs were contrasted to exposure 7 days prior to admission with 7 day control period one month earlier.
- **Outcome:** Hypotension or shock resulting in hospital admission

EBM Commentary: Case-crossover design was used in this study. These types of studies have some advantages over a randomized longitudinal study. In crossover trials each patient serves as their own control reducing confounding influence of confounding covariates. The design is also more statistically efficient and so require fewer subjects.

"A case-control design involving only cases may be used when brief exposure causes a transient change in risk of a rare acute-onset disease." Maclure Am J Epidemiol 1991

Results: 176 patients of the 7,100 had received a macrolide during either the risk or control intervals.

Table 2: Odds of admission to hospital for the treatment of hypotension or shock associated with recent exposure to macrolide antibiotics among patients already taking a calcium-channel blocker*

Antibiotic	Use during risk interval	Use during control interval	*p* value	OR (95% CI)
Erythromycin	30	6	< 0.001	5.80 (2.25–14.98)
Clarithromycin	77	23	< 0.001	3.70 (2.26–6.06)
Azithromycin	24	16	0.21	1.50 (0.8–2.82)

Note: CI = confidence interval, OR = odds ratio.
*Risk interval = seven days before hospital admission; control interval = seven-day period one month before admission.

Table 3: Odds of admission to hospital for the treatment of hypotension or shock and use of macrolide antibiotics among patients receiving a dihydropyridine calcium-channel blocker*

Antibiotic	Use during risk interval	Use during control interval	*p* value	OR (95% CI)
Erythromycin	17	≤ 5†	0.01	3.40 (1.25–2.78)
Clarithromycin	51	12	< 0.001	4.25 (2.23–7.97)
Azithromycin	12	10	0.67	1.20 (0.52–2.78)

Note: CI = confidence interval, OR = odds ratio.
*Nifedipine, felodipine or amlodipine.
†Cells with five or fewer observations are suppressed in accordance with institutional privacy policy.

Authors Conclusions: *"In older patients receiving a calcium-channel blocker, use of erythromycin or clarithromycin was associated with an increased risk of hypotension or shock requiring admission to hospital. Preferential use of azithromycin should be considered when a macrolide antibiotic is required for patients already receiving a calcium-channel blocker."*

Commentary: Calcium channel blockers (CCBs) are the ninth most commonly prescribed class of drugs in the USA with almost 90 million prescriptions in 2008. Macrolides are the most commonly prescribed class of antibiotics in the USA with over 66 million prescriptions in 2008. They both affected the cytochrome P450 system (specifically the iso-enzyme 3A4) and raised the possibility of complications, which were noted in several case reports. This study of seniors from 1994 to 2009 identified almost one million patients who were prescribed a single CCB. During that time 7,100 patients were admitted to hospital for treatment of hypotension. There were 176 patients had also received a macrolide showing a strong association between erythromycin and clarithromycin use. No association was found with azithromycin, which does not work through the same P450 system.

Bottom Line: If prescribing a macrolide antibiotic to a patient 66+ years old pick azithromycin or risk admitting them on your next shift for hypotension and shock.

Case Resolution: You diagnose the patient with community-acquired pneumonia and prescribe a course of azithromycin.

SGEM #37: TNT (To Not Treat)

Date: 20 May 2013

Case Scenario: An otherwise healthy 21-year-old male patient who has been drinking alcohol all day at the beach. He tries to jump into the back of his friend's moving Jeep and does a face plant. He arrives by ambulance on a board with a GSC 15 collar and raccoon eyes. Since your small hospital does not have a CT scanner you ship him out for the CT head scan, which shows a non-displaced basilar skull fracture. You admit him to the hospital for neurological observation while the alcohol wears off.

You wonder should you start prophylactic antibiotics to prevent meningitis?

Question: Are prophylactic antibiotics effective in preventing meningitis in patients with basilar skull fractures?

Background: Basilar skull fractures from non-penetrating head trauma is estimated to be about 10%. Cerebral spinal fluid leakage associated basilar skull fractures is also about 10% with a range from 2-20%. The concern with basilar skull fracture is the direct contact of bacteria in the paranasal sinuses, nasopharynx or middle ear, which could predispose patients to meningitis. Physicians often give prophylactic antibiotics to decrease the risk of meningitis in these cases.

Signs and Symptoms of a Basilar Skull Fracture:

- Battle Sign
- Hearing loss
- Tympanic membrane perforation
- CSF otorrhea/rhinorrhea
- Bilateral periorbital ecchymosis (raccoon eyes)
- Peripheral facial nerve palsy
- Vestibular dysfunction
- Anosmia

Reference: Ratilal BO, Costa J, Sampaio C, Pappamikail L. Antibiotic prophylaxis for preventing meningitis in patients with basilar skull fractures**. Cochrane Database of Systematic Reviews 2011, Issue 8. Art. No.: CD004884.**

- **Population:** Patients of any age with recent basilar skull fracture. 5 RCT's (n=208) and 17 non-RCTs (n=2168) analyzed separately.
- **Intervention:** Prophylactic antibiotics administered at the time of primary treatment of basilar skull fracture n=109
- **Control:** Placebo n=99
- **Outcome:** Primary: Meningitis suspected clinically and confirmed by lumbar puncture. Secondary: All-cause mortality/meningitis-related mortality. Need for surgical correction in patients with CSF leakage. Non-CNS infection.

Results: 5 RCTs (n=208) and 17 non-RCTs (n=2168) All 208 participants from the 5 RCTs included in the meta-analysis. There were no significant differences between the two groups (antibiotic prophylaxis vs. and control). This included the primary outcome of meningitis and all the secondary outcomes (all-cause mortality, meningitis-related mortality, and need for surgical correction in patients with CSF leakage). A meta-analysis of the non-RCT had results similar to the RCT data. No adverse effects were reported with the use of antibiotic.

Comparison 1. Frequency of meningitis

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Frequency of meningitis by subgroup	4	208	Odds Ratio (M-H, Fixed, 95% CI)	0.63 [0.25, 1.59]
1.1 CSF leakage (rhinorrhoea or otorrhoea)	3	92	Odds Ratio (M-H, Fixed, 95% CI)	0.44 [0.09, 2.15]
1.2 No CSF leakage	2	106	Odds Ratio (M-H, Fixed, 95% CI)	0.77 [0.25, 2.41]
1.3 Presence of CSF leakage not specified	1	10	Odds Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Frequency of meningitis	4	208	Odds Ratio (M-H, Fixed, 95% CI)	0.69 [0.29, 1.61]
2.1 Frequency of meningitis	4	208	Odds Ratio (M-H, Fixed, 95% CI)	0.69 [0.29, 1.61]

Authors Conclusions: *"Currently available evidence from RCTs does not support prophylactic antibiotic use in patients with BSF, whether there is evidence of CSF leakage or not. Until more research is completed, the effectiveness of antibiotics in patients with BSF cannot be determined because studies published to date are flawed by biases. Large, appropriately designed RCTs are needed."*

BEEM Commentary: The studies included in this review all had important methodological flaws. Curiously, the frequency of meningitis in the Eftekhar 2004 trial was significantly higher than in the other trials. This may be because they only enrolled patients with a basilar skull fracture and pneumocephalus. This could represent patients at higher risk for developing meningitis. There was no difference overall in the frequency of meningitis in the prophylactic antibiotic group versus the control group, even when the subgroups with and without CSF leakage were analyzed. There was a possible adverse effect of increasing susceptibility to infection with more pathogenic organisms in those treated with antibiotics. None of the studies reported data on outcomes of safety and tolerability of prophylactic antibiotics.

BEEM Bottom Line: There is no support for routine prophylactic antibiotics in all patients with basilar skull fracture. Further RCTs are needed to assess its benefits and risks clearly.

Case Resolution: You decide not to give prophylactic antibiotics to this young man who tried to jump into a moving vehicle and sustained a basilar skull fracture.

SGE M #38: TheSGEM Down Under

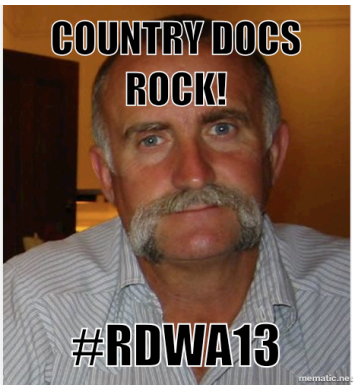
Date: 26 May 2013

This week I had the pleasure of giving a keynote address on social media and rural medicine. The cool thing about it was giving it virtually. I was in Goderich, Canada and the presentation was streamed live to Adelaide, Australia. Social Media is shrinking the world. Viva FOAMed. I will share the keynote address with you. If you are interested, you can check out the YouTube video prepared for the conference.

Social Media Presentation:

- **Definition of SoMe:** *"The means of interactions among people in which they create, share, and exchange information and ideas in virtual communities and networks."* Ahlqvist, Toni; Bäck, A., Halonen, M., Heinonen, S (2008). "Social media roadmaps exploring the futures triggered by social media". VTT Tiedotteita – Valtion Teknillinen Tutkimuskeskus (2454): 13.
- **Knowledge Translation Problem:** Pathman Leaky Pipe (Awareness, Acceptance, Applicable, Able, Act On, Agree, Adhere)
- **Examples of SoMe:** Podcasts, Twitter, YouTube, Facebook and Meme
- **Solution to KT Problem:** The Skeptics Guide to Emergency Medicine
- **New SoMe Project:** Just Out of the Gate (JOG)

Some Cool FOAMed Sites Down Under:



- **Broomedocs:** Free educational blog for rural GP and proceduralists. Country docs are "jacks of all trades", GPs, anesthetists, part-time intensivists, O&G, paeds, psych …. basically the doctors in the country who have to deal with whatever rolls in the door.
- **Ruraldoctors:** This site is for rural doctors who want to keep in touch with the latest in FOAMed concepts relevant to rural practice, listen to relevant podcasts and share thoughts on typical cases – using the info from the wider FOAMed community. Rural Doctors are a disparate bunch. Whilst I reckon that rural medicine is one of the best jobs in the world due to the sheer diversity (primary care, emergency medicine, obstetrics, anesthetics), it can be hard for the isolated rural doctor to keep up to date.

SGEM #39: Weak in the Knees

Date: 2 June 2013

Guest Skeptic: Dr. Chris Carpenter

Case Scenario: 40-year-old construction worker presents to the emergency department with a swollen and painful right knee. No history of injury. No significant past medical history. Palpable effusion on examination with no overlying redness or warmth to touch. Any movement of the joint is very painful. He is taking no medications. Vital signs are normal.

Question: What history, physical or diagnostic studies can help in the diagnosis of septic arthritis?

Background: There are many causes for monoarticular arthropathies, which present to the emergency department. These include trauma, rheumatoid, lupus and infectious (viral, fungal, and bacterial). Septic arthritis due to bacteria has an incidence rate of 10 per 100,000 each year in the USA. The incidence is higher in patients with prosthetic joints or pre-existing rheumatoid arthritis. Immunocompromised patients with HIV are also at increase risk of septic arthritis.

Septic Monoarticular Arthropathies:

- Knees (50%)
- Hips, shoulders and elbows
- Any joint can ultimately be infected

Prompt diagnosis and appropriate treatment is required to prevent morbidity and mortality. Previous research has suggested that most cases of acute monoarticular arthropathies can be diagnosed using history, physical examination and diagnostic testing in three days. However, most emergency physicians only have a few hours not three days to differentiate between septic and non-septic arthritis.

Reference: Carpenter CR et al. Evidence-based Diagnostics: Adult Septic Arthritis. Academic Emergency Medicine 2011

- **Population:** Adult patients
- **Intervention:** History and physical examination and laboratory testing (serum and synovial)
- **Control:** Unaided clinical gestalt
- **Outcome:** Diagnostic accuracy (sensitivity, specificity and likely hood ratios)

EBM Commentary:

- MOOSE Criteria: Meta-analysis of Observational Studies in Epidemiology (MOOSE). The statement is intended for the reporting of meta-analyses of observational studies.
- QUADAS: Quality Assessment of Diagnostic Accuracy Studies (QUADAS). This is an evidence based quality assessment tool to be used in systematic reviews of diagnostic accuracy studies.
- STARD Criteria: Standards for Reporting Studies of Diagnostic Accuracy (STARD). The objective of the initiative is to improve the accuracy and completeness of reporting of studies of diagnostic accuracy, to allow readers to assess the potential for bias in the study (internal validity) and to evaluate its generalizability (external validity).

Results: Prevalence of non-gonococcal septic arthritis in the ED patients

Table 2
Risk Factors for Septic Arthritis from History and Physical Examination

	Sensitivity, %	Specificity, %	+LR (95% CI)	–LR (95% CI)	OR
Risk factor					
Age > 80 yr*	18.9	94.6	3.5 (1.7–6.4)	0.86 (0.70–0.96)	3.5
Diabetes mellitus*	10.8	96.0	2.7 (1.1–6.2)	0.93 (0.79–1.0)	3.3
Rheumatoid arthritis*	67.6	72.5	2.5 (1.9–2.9)	0.45 (0.27–0.67)	4.0
Joint surgery (<3 months ago)*	24.0	96.5	6.9 (3.7–11.6)	0.78 (0.63–0.90)	5.1
Hip or knee prosthesis*	35.1	88.6	3.1 (1.9–4.5)	0.73 (0.55–0.88)	15.0
Skin infection (no prosthesis)*	32.4	88.4	2.8 (1.7–4.2)	0.76 (0.58–0.91)	27.2
Prosthesis *and* skin infection*	24.3	98.4	15.0 (8.0–26.0)	0.77 (0.62–0.88)	72.7
HIV infection	75.0	38.8	1.2 (0.76–1.5)	0.64 (0.23–1.37)	N/A
Rigors	16.0–21.0	N/A	N/A	N/A	N/A
Subjective fever	44.0–97.0	N/A	N/A	N/A	N/A
Sweats	31.0	N/A	N/A	N/A	N/A
Pain affected joint	85.0	N/A	N/A	N/A	N/A
New joint swelling	77.0	N/A	N/A	N/A	N/A
Physical examination					
Pain with motion	100.0	N/A	N/A	N/A	N/A
Limited motion	92.0	N/A	N/A	N/A	N/A
Tender	68.0–100	N/A	N/A	N/A	N/A
Swelling	45.0–92.0	N/A	N/A	N/A	N/A
Joint effusion	92.0	N/A	N/A	N/A	N/A
Increased heat	18.0–92.0	N/A	N/A	N/A	N/A
Redness	13.0–64.0	N/A	N/A	N/A	N/A
Fever > 37.5°C	34.0–54.0	N/A	N/A	N/A	N/A
Axial load pain	36.0	N/A	N/A	N/A	N/A

*These history risk factors are derived from Kaandorp 1995.[4]
HIV = human immunodeficiency virus; +LR = positive likelihood ratio; –LR = negative likelihood ratio; N/A = not available because not reported.

Authors Conclusions: *"Recent joint surgery or cellulitis overlying a prosthetic hip or knee were the only findings on history or physical examination that significantly alter the probability of nongonococcal septic arthritis. Extreme values of WBCs (>50 · 109⁄L) can increase, but not decrease, the probability of septic arthritis. Future ED-based diagnostic trials are needed to evaluate the role of clinical gestalt and the efficacy of nontraditional synovial markers such as lactate."*

Commentary:

- Limited search to English
- Low to moderate QUADAS scores
- Excluded gonococcal infections
- Lacked definitive septic arthritis treatment randomized controlled trials
- No patient-centered outcomes reported

Bottom Line: When it comes to the accuracy of history, physical examination, serum tests or synovial tests for the diagnosis of septic arthritis in ED patients we just don't know but synovial lactate looks promising.

Case Resolution: You successfully tap the knee and send the synovial fluid off for examination. Orthopedics is consulted. Three days later you get the lab tests back describing urate crystals consistent with gout.

SGEM #40: Great White North (CanFOAMed)

Date: 9 June 2013

Last week I attended the Canadian Association of Emergency Physicians (CAEP) meeting in Vancouver. While at the CAEP conference we did THREE CanFOAMed initiatives:

1) BoB (Best of BEEM) Talk

Dr. Anthony Crocco, Peds EM guru, and part of the BEEM Dream Team and I gave a **BoB** (Best of BEEM) **Talk**. We presented the top five adult and pediatric papers of the last year. The audience was amazing and enthusiastically participated in the talk. It was standing room only, spilled out into the hallway and people were dancing in their seats. We used social media (music, memes and videos) to teach core EBM concepts. It ended with the world premiere of the LMFAO video called ***"I'm an Emerg Doc and I know it".*** This video celebrates being and emergency physician and was a unique way to recruit doctors to the Chatham-Kent Health Alliance. The video has gone fungal with about 4,000 views in one week. We hope it goes bacterial (more than 10,000 views) but shooting for viral may be unrealistic.

2) **Great White North Vodcast:**

A vodcast was also created at CAEP and posted on YouTube with the help of Brent Thoma. Brent was the winner of the prestigious CAEP Resident of the Year Award – well deserved. We interviewed four leaders in the CanFOAMed movement. This was done in the style of Bob and Doug McKenzie's show on Second City TV (SCTV) called The Great White North. This SCTV show celebrated unique aspects of the Canadian experience.

"Bob and Doug play on the stereotypical Canadian image: the hoser. The segment was created after a request from the executives at the CBC to include two minutes of broadcast that included specific, identifiable Canadian content. Thus Bob (Rick Moranis) and Doug (Dave Thomas) were born. They were a satirical projected image of the typical beer drinking, plaid and toque wearing, great white North residing Canadian citizen. Bob and Doug's image of the Hoser is (for the most part) divorced from the reality of what a Canadian actually looks like, values, and how the act and speak. For any Canadian, the image of the Hoser is so clearly satirical and a joke, yet the stereotypes embodied by these characters still play a roll in the creation of the Canadian identity."

We hope you enjoy watching our version of the Great White North and our attempt at CanFOAMed humor.

Here are the four individuals we interviewed on the Great White North parody show. Each was asked to discuss their FOAMed initiative while suggesting another FOAMed resource they found useful.

Chris Bond: SOCMOB (@SOCMOBEM)

The SOCMOB is a blog for all types of medical trainees, including nurses, EMS providers, RTs, med students, residents and staff/consultants. The goal is to address common medical myths and pseudo axioms, as well as provide free open access medical education (FOAM) on a variety of emergency and critical care topics.

Chris is an emergency medicine resident in Canada, and has a passion for medical education, teaching, EBM and FOAM. He made a very popular YouTube video explaining Wenckebach to the Justin Timberlake song *Sexy Back*.

Suggested FOAMed resource by Chris is EMCrit by Scott Weingart.

Elisha T: The Chart Review (@ETTube)

The Chart Review is a case based blog looking at cases Elisha has seen in the emergency department.

Elisha T is a community emergency physician in Canada. Interests include teaching and social media in medical education. Supporter of the #FOAM and #FOAMed (free open/online access medical education) movement.

Suggested FOAMed site ERCast by Rob Orman

Eve Purdy: Manu et Corde (@Purdy_Eve)

Manu et Corde blog was created to document life in medical school and Eve's road to becoming a physician. It is a mix of personal reflections, FOAM designed as reference for other medical students and health professionals and commentary on medical education.

Eve is a Canadian medical student. Her recommended FOAMed site is The Short Coats in EM by Lauren Westafer.

Stella Yiu: Flipped EM Classroom (@Stella_Yiu)

The flipped classroom model is based on reversing the traditional approach to teaching. Stella does this project with Dr. Rahul Patwari from Chicago. The flipped model, as the name suggests, reverses this situation. Students review lecture material at home while they are alone. Homework is then completed in the classroom where students have the benefit of asking one another questions or drawing upon the knowledge of the instructor. The goal is to create a series of lectures based on the flipped classroom model using the curriculum created by the Clerkship Directors in Emergency Medicine.

Flipped EM Classroom

Stella Yiu is an Assistant Professor in the Department of Emergency Medicine at the University of Ottawa. She is the Undergraduate Clerkship Associate Director. Stella is also one of the organizers of the CAEP 2014 meeting to be help in Ottawa. We hope she will build on the success of social media initiatives at CAEP 2013. Her suggested FOAMed site is Academic Life in Emergency Medicine by Michelle Lin.

Brent Thoma: BoringEM (@BoringEM)

The BoringEM blog was inspired by the realization that that the majority of Free Open-Access Meducation (FOAM) is about sexy stuff. Ultrasound and critical care are awesome, but the boring (nevertheless common and important) aspects of emergency medicine also need some love. This site attempts to fill that niche by publishing on EM topics of intense disinterest.

Brent is a Canadian ER resident who loves emergency medicine, simulation, education, mentorship, leadership, quality improvement, writing, parliamentary procedure, Star Wars, dodgeball, his dog and a few people.

Brent recommends using GoogleFOAM to search out FOAMed resources on the internet.

Ken Milne: TheSGEM (@TheSGEM)

TheSGEM wants you to be able to give the BEST possible care to the patients you serve. It does this using social media to turn Med Ed on its head. Its goal is to shorten the knowledge translation window from about ten years down to one year. The high-quality, clinically relevant content comes from the Best Evidence in Emergency Medicine (BEEM) faculty who critically appraise the literature. Listen to TheSGEM and turn your car into a classroom.

Ken is a front line emergency room physician who has been practicing for 16 years in small rural communities. He has been doing medical research for 30 years and is passionate about teaching. He is married with three wonderful children and has a dog. He is struggling to stay physically fit by doing endurance sports.

VIEW Vodcast on YouTube of TheSGEM **Episode#40: Great White North**

3) RANThony:

Continuing along with the Canadian content and the focus on CanFOAMed we created our 1st RANThony. Dr. Anthony Crocco has been known for his teaching rants on various pediatric emergency medicine topics. We decided that doing a video similar to the rants done by Rick Mercer a famous Canadian political satirist would be a great idea. Check out Rick's Rant on the **Flu Shot** to understand what we were trying to achieve.

CAEP offered the perfect opportunity to record Anthony give his **Fever Fear Rant**.

SGEM #41: Ultra Spinal Tap

Date: 16 June 2013

Case Scenario: A 66-year-old man presents with a 48-hour history of fever, lethargy and headache. No significant past medical history. On physical examination he has a temperature of 38.8C, GCS 15, stiff neck on flexion and no rash. Urinalysis and CXR are normal. Laboratory testing reports an elevated WBC with a left shift. You decide that he needs a LP to check for meningitis.

Question: Can ultrasound be used to improve successful LP attempts?

Background: The following procedures may decrease the risk of post-LP headache. Listen to SGEM#34: This is Spinal Tap for all the details.

- Small-gauge atraumatic needles
- Reinsertion of the stylet prior to the removal of the spinal needle
- Mobilization of patients after completing the LP

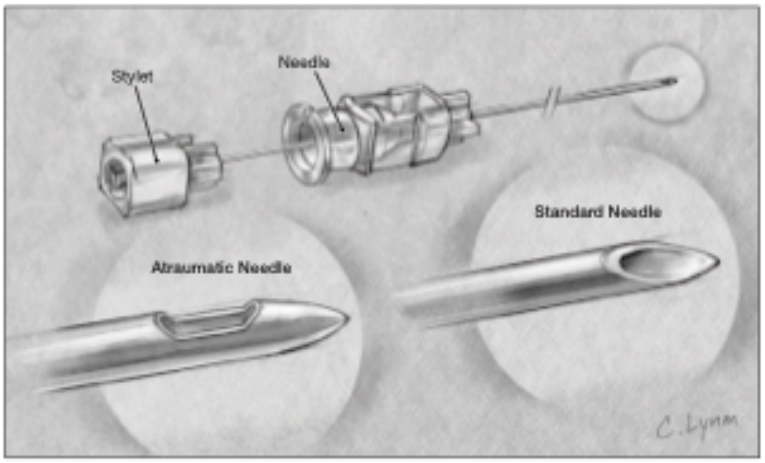
Reference: Shaikh F et al. Ultrasound imaging for lumbar punctures and epidural catheterizations: systematic review and meta-analysis. . BMJ 2013; 346:f1720 doi: 10.1136/bmj.f1720

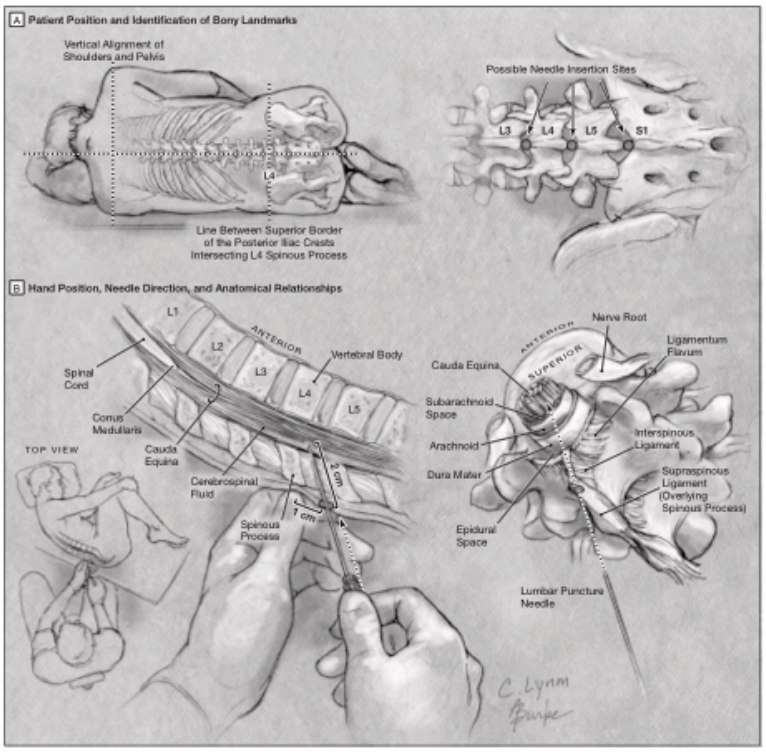
- **Population:** 14 studies (n=1334)
- **Intervention:** U/S assisted LPs (5 studies) and epidurals (9 studies)
- **Control:** Unassisted
- **Outcome:** Reduction of failed attempts

Results:

- Failed procedures 12 studies (n=1234) 79% RRR (95% CI: 57-90) NN 16 (95% CI: 12-25)
- Traumatic Procedures 5 studies (n=?) 73% RRR (95% CI: 33-89) NN 17 (95% CI: 11-44)

Figure 1. Types of Lumbar Puncture Needles





	Effect (95% CI)	P	I^2 (%)
No of failed procedures (12 studies)			
Risk ratio	0.21 (0.10 to 0.43)	<0.001	0
Absolute risk reduction	0.063 (0.041 to 0.084)	—	—
Number needed to treat	16 (12 to 25)	—	—
No of traumatic procedures (5 studies)			
Risk ratio	0.27 (0.11 to 0.67)	0.005	0
Absolute risk reduction	0.059 (0.023 to 0.095)	—	—
Number needed to treat	17 (11 to 44)	—	—
No of insertion attempts (8 studies)			
Mean difference	−0.44 (−0.64 to −0.24)	<0.001	73
No of needle redirections (8 studies)			
Mean difference	−1.00 (−1.24 to −0.75)	<0.001	69

Authors Conclusion: *"Ultrasound imaging can reduce the risk of failed or traumatic lumbar punctures and epidural catheterizations, as well as the number of needle insertions and redirections. Ultrasound may be a useful adjunct for these procedures."*

Commentary: There was no blinding for the patients. This might effect subjective outcomes such as post-LP headaches. It would be easy to do a sham ultrasound. However, the lack of blinding should not effect objectives outcomes such as failed or traumatic attempts.

Only 5 of 14 studies were done for LPs with the rest for epidurals. Half of the patients in the studies were obstetrical patients. All the physicians involved were ultrasound 'keeners". These things weaken the external validity of the results to the emergency department setting.

Bottom Line: There needs to be an adequately powered blinded RCT of ED doctors on consecutive ED patients in need of an LP showing a difference in patient oriented outcomes. Until then we suggest maximizing the methods proven to improve LP technique before we start adding unproven modalities (Straus et al).

Case Resolution: You successfully perform the LP without an ultrasound and send off the CSF to the lab for analysis to rule out meningitis.

SGEM #42: Don't Panic

Date: 30 June 2013

Welcome to the Skeptics' Guide to Emergency Medicine. Meet 'em, greet 'em, treat 'em and street 'em. This will be the final podcast in Season #1 of TheSGEM. It seems like a natural place to pause at Episode #42 given the references to The Hitchhikers Guide to the Galaxy.

The plan is to take the summer off and return in the fall with a new batch of critical reviews done by the Best Evidence in Emergency Medicine Group. BEEM is the project started by Dr. Andrew Worster from McMaster University about eight years ago. He had a vision and process of taking the tsunami of publications, filtering them down to those clinically relevant papers and critically appraising them. These critical reviews are then packaged into a 12 hour BEEM course taught by the BEEM Dream Team around the world.

Here are just 5 reasons why BEEM is amazing:

- BEEM has the ONLY validated instrument to distinguish the signal from the noise in order to identify EM-relevant, practice-enhancing evidence for your clinical practice based upon YOUR input — no other CME products seeks pre-appraisal input from the end-user bedside clinician.
- BEEM publishes our critical appraisals in the world's leading peer reviewed journals and authored multiple books and textbook chapters about the practice of EBM.
- BEEM faculty has been awarded national teaching awards from CAEP and EMRA based upon their work in EBM and KT.
- BEEM faculty is also faculty on leading EBM courses like the McMaster EBCP workshop and the UCSF Evidence Based Diagnostics course.
- BEEM faculty holds Chair positions in the SAEM EBM Interest Group (the leading EM society section for Evidence Based Medicine).

Despite the success of the BEEM project I felt we could reach a wider audience by using social media. The BEEM content was excellent but the distribution was traditional (conferences). Hence The Skeptics' Guide to Emergency Medicine was created. Using a weekly podcast on iTunes, Twitter, Facebook and YouTube to reach a global audience of EM practitioners interested in providing the best care for their patients based on the best evidence.

To make the idea even better TheSGEM is free. It is part of the Free Open Access to Meducation (FOAMed) movement also started last year. *"FOAM is the movement that has spontaneously emerged from the exploding collection of constantly evolving, collaborative and interactive open access medical education resources being distributed on the web with one objective — to make the world a better place. FOAM is independent of platform or media — it includes blogs, podcasts, tweets, Google hangouts, online videos, text documents, photographs, Facebook groups, and a whole lot more."*

Dr. Joe Lex 2012:

- If you want to know how we practiced medicine 5 years ago, read a textbook
- If you want to know how we practiced medicine 2 years ago, read a journal
- If you want to know how we practice medicine now, go to a (good) conference
- If you want to know how we will practice medicine in the future, listen in the hallways and use FOAM

Let us look back at the first year of using social media to cut the knowledge translation window from an average of 10 years down to less than one year. TheSGEM was launched in the fall of 2012 as a knowledge translation/dissemination project. The first few episodes were recorded in Algonquin Park while volunteering as a camp doctor. It was a learning curve for sure with one of the most important lessons to use a good microphone.

I then had the amazing opportunity to attend Oxford University to take their EBM Teaching course. Spending a week learning at Oxford was surreal being surrounded by history, beauty and wonderful people interested in EBM.

After traveling across the Atlantic Ocean guess who was one of my group leaders? Dr. Worster, my EBM guru and the founder of BEEM. It was in Oxford where he taught me that when it comes to an EBM question the answer is always *"it all depends"*. Who could ever forget the first podcast with Group 7 doing a critical review of the BMJ article whether Orthopedic surgeons were as strong as an ox and almost twice as clever over a few pints.

TheSGEM hit its stride early with great guests like Dr. Tony Seupaul who is part of the BEEM Dream Team and Chairman at the University of Arkansas. With his smooth style and quick wit, TheSGEM was up and running. More and more episodes followed and many had cheesy 80's theme music. Note that the topic is picked first not the music.

Another great guest was Captain Cranium, Dr. Chris Carpenter from Washington University in St. Louis. He literally wrote the book on Evidence-Based Emergency Care. Having access to such a brilliant physician was an honor and privilege.

It was not all Ivory Tower academics that came on TheSGEM. There were also bright and talented medical students from across Canada and the USA. Lauren Westafer from the blog The Short Coat was on a couple of times. We also had a panel of generation Y'ers (Bethany, Jimmy and Alia) on an episode called We Are Young to balance out the Baby Boomer episode called My Generation.

TheSGEM was not afraid to tackle difficult and controversial issues such as the Dogma of Wound Care, mandatory flu shots for health care workers (Hit Me with Your Best Shot), thrombolysis in acute stroke (Stroke Me, Stroke Me), proton pump inhibitors for upper GI bleeds (Ho, Ho, Hold the PPI) and even birth control (Papa Don't Preach).

There were also skeptics and critics who kept providing great constructive feedback. These people all had great input and made TheSGEM much better. One skeptic stood out from the rest so much that Dr. Katrin Hruska was invited to discuss her questions on Episode #25: Who Are You.

The BEEM Dream Team got together at the annual SkiBEEM conference. It was a great chance to tap into the EBM expertise in the group. We used the opportunity to do another podcast and reviewed the BMJ article on speed bumps in diagnosing appendicitis (A Bump Up Ahead).

There were some low points during the year. Being a witness to the tragedy at the Boston Marathon was a profound experience. The episode discussing the bombing was one of the most popular and downloaded shows. I am not sure if it was more of an emotional impact because it happened when I was physically exhausted. I was standing on the road, 480 meters from the finish line, hearing the reports of death and injury and not being able to do anything. Time passes, scars heal and people move on. There were thousands of us who did not finish (DNF) due to the horrific act of two young men. The Boston Athletic Association has decided to give all the DNFers a chance to run in the 2014 marathon. To me DNF now stands for **Do Not Forget Boston 2013**.

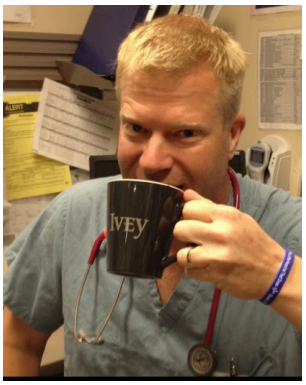
There were some really fun times doing TheSGEM as well. Any podcast done with our BEEM Peds expert Dr. Anthony Crocco (Honey, Honey) is worth a listen. He was a great co-presenter at CAEP for our BoB (not TED) Best of BEEM talk. In order to get an idea about how cool Anthony is, check out his RANThony on fever fear. Another very funny show was the Bob and Doug McKenzie spoof The Great White North (CanFOAMed). Brent, Chris, Elisha, Eve and Stella were great hosers to have on TheSGEM.

The year was capped off for me this month when I received two teaching awards. One was from Western University for excellence in teaching by an adjunct faculty member. The other award was the Canadian Association of Emergency Physicians Teacher of the Year Award. These were given in part due to the work done on TheSGEM.

The project started as an idea, grew into a concept and finished with accolades. TheSGEM might be free but after 42 episodes it has made me a rich man in many other ways. Thanks to everyone who has supported the project, provided inspiration, gave feedback, and listened to the podcasts. Clearly you are interested in cutting that KT window from 10 years to less than 1 year so you can provide your patients the best care based on the best evidence.

The most important person I would like to thank is my wife Barb. She has put up with all the crazy ideas, tolerates the cheesy 80's music, rolls her eyes at my jokes and has always believed in me.

About the Authors



Ken Milne, MD, MSc, CCFP-EM, FCFP
Dr. Milne is the Chief of Staff at South Huron Hospital Association in Exeter, Ontario, Canada. He has been doing research for 30 years publishing on a variety of topics. He is passionate about skepticism and critical thinking. He is the creator of the knowledge translation project, The Skeptics' Guide to Emergency Medicine. When not working clinically or doing research he is trying hard to be an endurance athlete. Dr. Milne is married and has three amazing children.

Alia Dharamsi, BSc (MD '14)
Ms. Dharamsi is a 4th year medical student studying at the UBC. She aspires for a career in Emergency Medicine with an interest in global health, addictions and mental health, urban poverty, and rural medicine. She aspires to use social media and technological innovation in medical education, to bring critical care resources to remote communities only otherwise accessible by air or sea. In her spare time she's an avid runner and swimmer, and can usually be found on the trails or in the lakes of BC's great outdoors.

Christopher Carpenter, MD, MSc, FACEP, FAAEM, AGSF
Dr. Carpenter is the Director of EBM for the Division of EM Medicine at Washington University in St. Louis. He is the Chair of the SAEM EBM Interest Group and ACEP Geriatric Section. He is Associate Editor of Academic Emergency Medicine, as well as Associate Editor of Annals of Internal Medicine's ACP Journal Club. He co-authored the textbook "Evidence-Based Emergency Care: Diagnostic Testing and Clinical Decision Rules, 2nd Edition". Dr. Carpenter lives in St. Louis Missouri with his wife, two children, and wonder-dog and is an avid St. Louis Cardinals fan.

The Skeptics' Guide to Emergency Medicine

All Bleeding Stops...Eventually

Remember to be skeptical of anything you learn, even if you learned it from The Skeptics' Guide to Emergency Medicine.