Practice-changing updates in Emergency Medicine

May 2014

Fluid boluses in septic children: FEAST trial

- Fluid boluses for shock are an international standard of practice. For a febrile child in shock first-hour fluid resuscitation (60 ml/kg of isotonic fluid within 15 minutes of shock diagnosis) is recommended.

- Maitland et al. N Engl J Med 2011; 364:2483-2495
- 3,141 children over 60 days old with severe febrile illness and impaired perfusion randomised to one of three arms:
  - 20 to 40 ml/kg of 5% albumin boluses
  - 0.9% saline boluses
  - no bolus at all
- At hospital admission in six sites located in Uganda, Kenya, or Tanzania.
- Forty-eight-hour mortality was 10.6% and 10.5% in the albumin-bolus and saline-bolus groups, respectively, and 7.3% in the control group.
- Four-week mortality rates were 12.2%, 12.0%, and 8.7%, respectively.
- Most deaths (87%) occurred before 24 hours.
- Trial stopped early. “We could not identify any subgroup in which fluid resuscitation was beneficial”

CRASH-2 study

- Tranexamic acid (1g IV load then 1g over 8 hours) significantly improves mortality when given to potentially bleeding trauma patients within 8 hrs of injury.
- ?generalisability to areas with developed trauma systems.
- PATCH-Trauma study pending

PECARN study

- Kuppermann N et al. Lancet. 2009 Oct 3;374(9696):1160-70.
- Head injury in children
- Decision rules for <2y and >2y groups
- Recent systematic review shows the PECARN rules outperform CHALICE and other decision rules

Antibiotics for appendicitis

- Evidence is accumulating.
- NOTA Study (Non Operative Treatment for Acute Appendicitis) *Di Saverio S et al. Ann Surg 2014 Mar 18*
- 159 patients without serious illness or complicated appendicitis were admitted for short term observation and started on amoxicillin-clavulanate. Patients who failed to improve or worsened went to the OR. Others were discharged and re-examined at 5-7 days as an outpatient, and, again, those without significant improvement went to the OR.
  - Within 7 days, there were 19 (12%) treatment failures;
    - 17 of 19 were acute appendicitis
    - 2 were tubo-ovarian abscess with secondary appendiceal inflammation.
  - Over the 2 year follow-up, 22 (13.8%) patients had recurrent appendicitis
    - 14 of which were managed with antibiotics without complication.
    - 8 went to the OR, 6 of which were confirmed as acute appendicitis.

The case against cricoid pressure

- Never validated as a manouvre - what is the correct force to apply?
- Ineffective
  - never been shown to reduce the risk of aspiration
  - esophagus is lateral to the cricoid cartilage 90% of the time
  - aspiration despite cricoid pressure is well documented in anesthestic and EM literature
- Often poorly performed, and the assistant may get tired over time
- Compresses the airway 80% of the time and displaces the larynx laterally 67% of the time
  - obscures laryngoscopic view potentially making intubation more difficult
  - makes bag-mask ventilation and LMA ventilation more difficult
  - may block tube passage into the trachea
- Can be harmful
  - excessive force may cause airway obstruction - 11% of patients have complete airway occlusion
  - if the patient vomits there is the risk of oesophageal rupture, so cricoid pressure must be immediately released
  - cricoid pressure decreases lower esophageal sphincter tone
  - can be uncomfortable for patient if applied before the patient is adequately sedated
  - may trigger coughing or vomiting
- Adds complexity, increases cognitive load on the intubator and may lead to distraction from other priorities
  - requires an additional assistant
  - may interfere with bimanual laryngoscopy
  - requires additional commands from the intubator (when to apply, when to release)

Reliable Clinical Prediction Scores

- *STONE score – identifies patients with a very high probability of uncomplicated ureteral stone, who are therefore unlikely to have an alternative diagnosis and don't need a CTKUB.*
- *HEART score -*

CT scans and cancer in Australia

- Matthews JD *et al. BMJ 2013;* ***346: f2360***
- Used centralised data from Medicare to identify all Australians aged 19 or under at 1985 and those born until the end of 2005.
- This cohort was divided into those who had had a CT (680 000) and those who had not (10.3 million).
- 16% increase in incidence rate ratio per scan. This effect was greatest for younger children and occurred over a wide range of malignancies.
- The background risk for the non-exposed was 1 in 178 (0.56%) over a mean of 17 years of follow up.
- For those scanned, overall risk of 1 in 154 (0.65%)
- CT was 4.5mSv average. We know that for head CT, the most common scan, is 2mSv, and increase in cancers is 1 per 4000 scans.

Therapeutic Hypothermia after OOHCA

- *Nielsen N et al. N Engl J Med 2013 Nov 17*
- Patients cooled to 33°C fared no better than those cooled to 36°C, but about half of each group survived.
- Current guidelines recommend therapeutic hypothermia as a cornerstone of management for patients who remain unconscious after cardiac arrest, as it has been demonstrated to reduce mortality and improve neurologic function. However, the optimal target temperature (typically between 32°C and 35°C) has been unclear. Researchers randomized 950 patients in 36 European and Australian intensive care units to target temperatures of either 33°C or 36°C, to determine which might be more effective.Of 939 patients included in the primary intention-to-treat analysis, 460 had died by the end of the trial (mean follow-up, 256 days). All-cause mortality was similar in the 33°C and 36°C groups (50% and 48%), as was the composite secondary outcome of death or poor neurologic function at 180 days (54% and 52%, respectively). Rates of serious adverse events also were similar in the two groups (93% and 90%).
- Comment This eye-opening and well-performed study convincingly argues against more-aggressive cooling after cardiac arrest. However, outcomes in both groups were reportedly better than historical outcomes without therapeutic hypothermia, and the underlying benefits of active temperature regulation in these patients remain unchanged.

Urine pregnancy test, without urine

- Most urine pregnancy test kits are approved for both urine and serum
- Whole blood pregnancy test
  - Sensitivity 95.8%
  - Specificity 100%
  - NPV 97.9%
  - PPV 100%
- Not fingerprick blood.
- Wait at least 5 minutes before reading result.

proCESS study

- Early Antibiotics and Fluids Are More Important than Strict Protocol Adherence in the Treatment of sepsis
- early goal-directed therapy (EGDT) bundle used in that study required invasive central venous pressure and central venous oxygen saturation monitoring, in addition to other treatments. To determine which aspects of EGDT are truly necessary
- investigators in the NIH-funded ProCESS study randomized patients with septic shock at 31 U.S. emergency departments to one of three groups: EGDT, a less invasive 6-hour protocol involving peripheral access and slightly different hemodynamic goals, or provider-directed usual care.The primary endpoint of 60-day mortality did not differ significantly among the three groups (21% for EGDT, 18% for protocol-based care, and 19% for usual care). Cumulative 90-day and 1-year mortalities also were similar among groups. Patients in the EGDT and protocol-based groups received more intravenous fluids and vasopressors than the usual-care group, however, 97% to 98% of patients in all three groups received antibiotics within 6 hours. Comment This result suggests that frequent monitoring of central venous pressure and central venous oxygen saturation does not improve care of patients with septic shock. The lesson for clinical practice is that the interventions of the 2001 Rivers study were important, but the diagnostic testing probably was not. Patients with septic shock require close attention by a vigilant physician and should be given as much isotonic crystalloid as they can tolerate, fast. Attention to early antibiotics, source-of-infection control, lung-protective ventilation, and patient safety are more likely to make a difference than invasive monitoring.

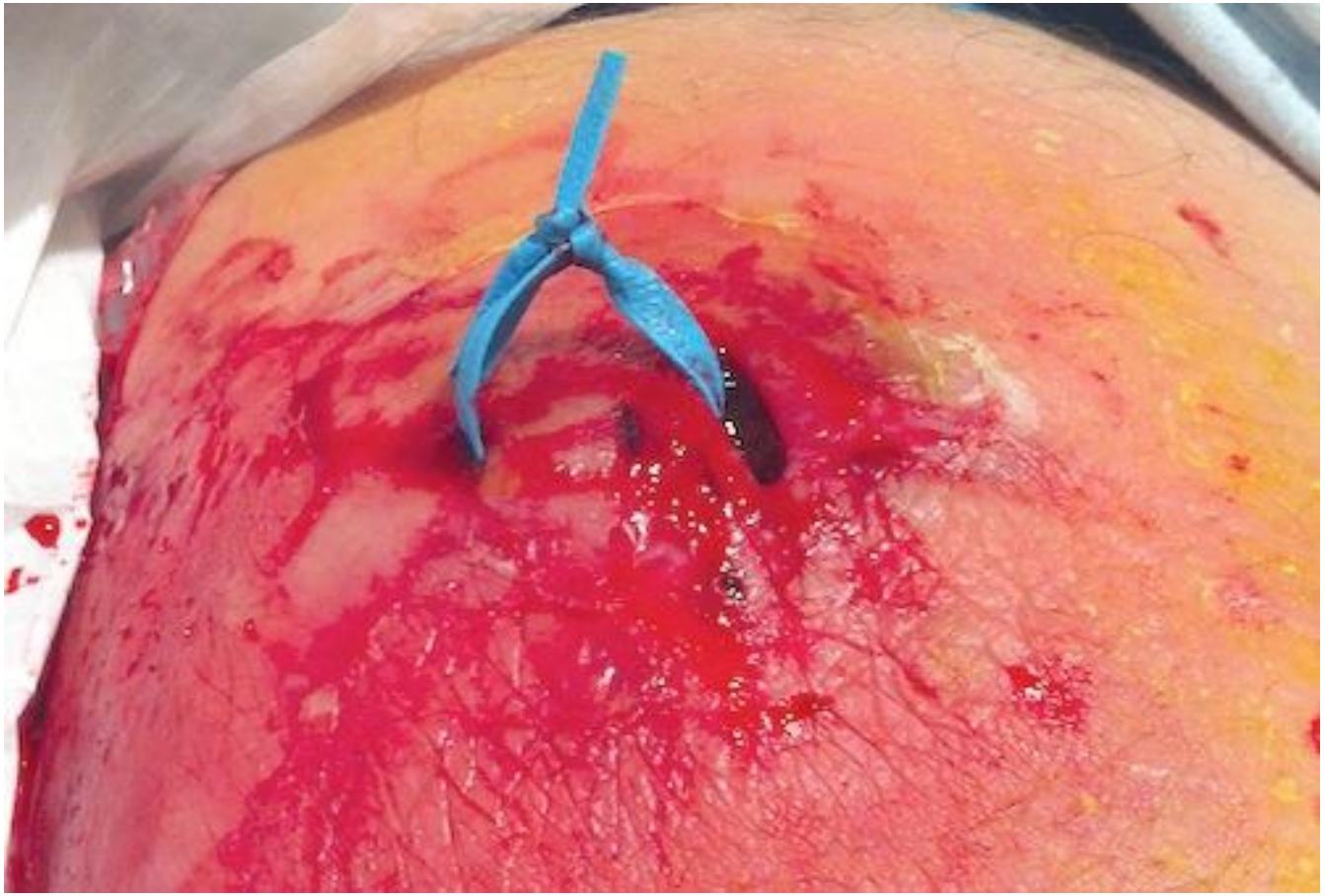
Age specific D-dimer cutoffs to rule out PE

- Righini M et al. JAMA 2014 Mar 19.
- D-dimer cutoffs:
  - <50 years: 500 µg/mL
  - >50 years: age x 10 µg/mL
- 2898 patients with low or moderate clinical probability for PE
- Patients with a positive result underwent CTPA.
- All patients were followed for 3 months.
  - 12% absolute decrease and a 41% relative decrease in the proportion of positive D-dimer results.
  - Of 331 patients 50 and older with D-dimer levels between 500 µg/mL and their age-adjusted cutoff, only one (0.3%) was found to have PE during follow-up.
- Customizing the cutoff for “normal” according to the patient's age can reduce the number of patients requiring CT-PA without sacrificing sensitivity.

Abscess management

- No need to pack abscesses
- Primary closure non-inferior to leaving open
  - but no difference to patient satisfaction
  - and more work
- Bedside ultrasound significantly improved the ability to identify pus in paediatric abscesses.

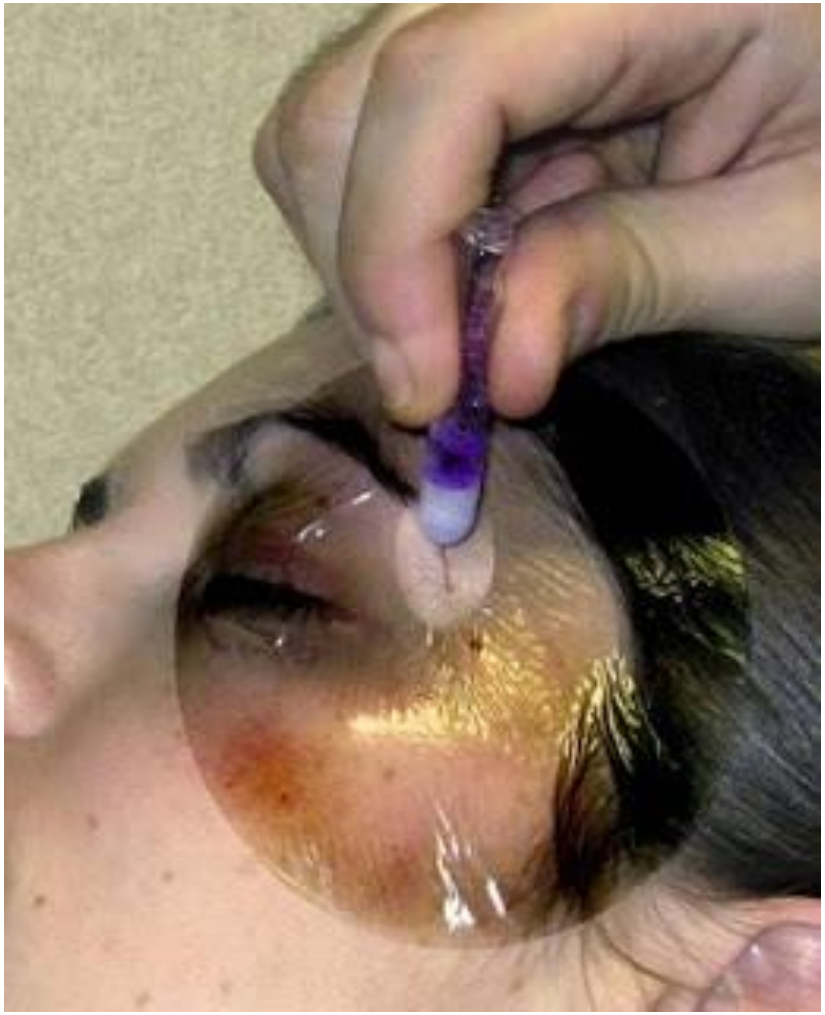
Incision and loop drainage



Wound management

- It is OK to irrigate wounds with tap water
- Probably OK to use non-sterile gloves during closure.
- Simple lacs on the fingers <1cm don't need primary closure.
- OK to do primary closure on wounds with delayed presentation.
- Diabetes, laceration size, site, and degree of contamination are associated with wound infections, but there is no evidence to support the routine use of prophylactic antibiotics.
- Debridement of devitalized tissue, removal of foreign bodies, and large-volume properly performed irrigation are the most important factors in preventing wound infections.

Using tissue adhesive near the eye



Presentation patterns to urgent care centres

- Baker T, Dawson SL. EMA (2014) 26, 131-8.

- Year long review of 5 urgent care centres in regional South West Victoria.

- Despite current bypass guidelines, these centres saw:
  - a similar proportion of triage category 1 and 2 patients
  - almost the entire range of clinical problems that are seen in designated EDs

The 5 best ways to reduce emergency care costs.

- JAMA Intern Med 2014 Feb 17

1. Do not order CT of the cervical spine for patients who do not meet the NEXUS criteria or the Canadian C-Spine Rule.
2. Do not order CTPA to diagnose PE without first risk stratifying by determining pretest probability and measuring d-dimer in low-risk patients.
3. Do not order MRI of the lumbar spine for patients with low back pain without high-risk features.
4. Do not order CT head for adult patients with mild traumatic head injury who do not meet the New Orleans Criteria or the Canadian CT Head Rule.
5. Do not order coagulation studies for patients without hemorrhage or suspected coagulopathy

Use of antibiotics in COPD exacerbations

- Patients with severe chronic obstructive pulmonary disease (COPD) exacerbations are treated with antibiotics, but do patients with less-severe disease also need them?

- Am J Respir Crit Care Med 2012; 186:716. Amoxicillin/clavulanate v. placebo:
  - 80% of 152 placebo patients had satisfactory outcomes

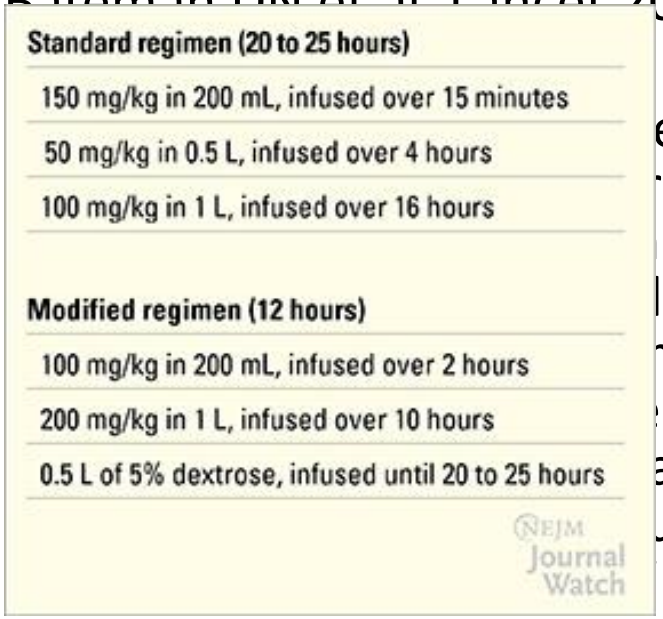
- Miravitlles M et al. Chest 2013 Nov. Examined the data from the placebo group.

- The two best predictors of potential benefit from antibiotics were:
  - purulent sputum
  - CRP >40 mg/L.

Prehospital adrenaline in OHCA

- *Nakahara S et al. BMJ 2013 Dec 10.*
- *In a Japanese study, prehospital epinephrine was associated with better neurological outcomes only in patients with nonshockable rhythms.*
- *Other Japanese registry study.*
- *Hagihara et al. JAMA.* 2012;307(11):1161-1168.
- 417 188 OHCAs occurring in 2005-2008 in Japan in which patients aged 18 years or older had an OHCA before arrival of emergency medical service
- Among patients with OHCA in Japan, use of prehospital epinephrine was significantly associated with
  - increased chance of ROSC before hospital arrival
  - decreased chance of survival and good functional outcomes 1 month after the event.

12 hour NAC infusion

- Bateman DN et al. Lancet 2013 Nov 28.
- 

for rescue antiemetics within 2 hours
eine was less frequent in patients
egimen (36% vs. 65%; adjusted odds
domized to ondansetron (41% vs. 63%;
lactoid reactions occurred in 28% of
ment group, but only 5% of those in the
proportion of patients with a 50%
ansferase activity did not differ between
ups, but was higher in ondansetron
pients.
- We may soon see a reduction in treatment times to the point that we can fully manage acetaminophen-overdose patients in emergency department observation units, thereby decreasing hospital admissions.

Transfusion

- Using a value-based transfusion target (eg 80g/L) creates higher mortality.
- Asymptomatic patients do not necessarily need acute transfusion. Consider iron infusion etc.

Top 10 patient safety strategies

recommend immediate adoption of the following 10 strategies:

- Preoperative and anesthesia checklists to prevent operative and postoperative events
- Bundles (with checklists) to prevent central line–associated bloodstream infections
- Interventions to reduce urinary catheter use
- Bundles to prevent ventilator-associated pneumonia
- Hand hygiene
- Do-not-use list for hazardous abbreviations
- Multicomponent interventions to prevent pressure ulcers
- Barrier precautions to prevent healthcare-associated infections
- Real-time ultrasonography for central line placement
- Interventions to improve prophylaxis for venous thromboembolism

IV catheters that we don’t use

- *Limm EI et al. Ann Emerg Med 2013 Apr 23.*
- *Half of all IV catheters placed in an Australian emergency department were never used to infuse fluids or medications.*

Chest compressions – change operator more frequently

- *Badaki-Makun O et al. Pediatrics 2013 Mar.*
- *In a simulation study, percent adequate chest compressions performed by in-hospital providers fell below 70% within 120 seconds in child and adult manikins.*

HINTS exam for vertigo

ED copayment for unnecessary presentations

- Dr Judkins said designing an emergency department fee would be difficult, too, because many patients who could be considered ‘‘GP type’’ patients present with problems that can escalate into serious illnesses such as meningitis or stroke.
- ‘‘The logistics of determining what is a GP-type visit or what is an emergency visit can only be done retrospectively and the bureaucracy and infrastructure that you would have to put into place to monitor that would far outweigh the cost or revenue made from such a co-payment,’’ he said.
- ‘‘We think any disincentive for anybody to come to an emergency department when they think they have a genuine health emergency needs to be strongly opposed.’’
- Raven MC et al. JAMA 2013 Mar 20.
- This study suggests that emergency department presenting complaints are similar for patients with serious and nonserious discharge diagnoses
- This study invalidates any strategy that uses diagnoses derived from administrative data to identify inappropriate emergency department visits. Instead of penalizing patients for using the ED, wouldn't it be better to figure out what features of the ED are attractive to them, and incorporate such features in the medical home?

Procedural sedation using one doctor/one nurse model – safe for orthopaedic procedures

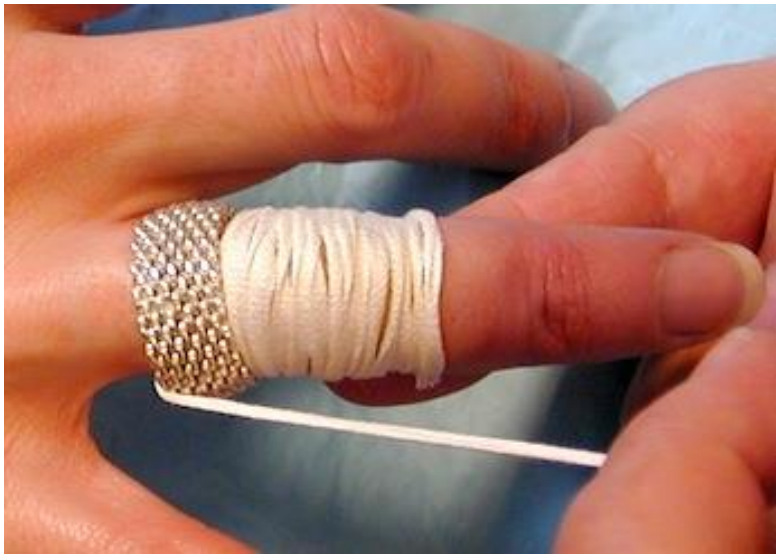
- *Vinson DR and Hoehn C. West J Emerg Med 2013 Feb.*
- *This supports the recent change in recommendations reducing the number of physicians required for procedural sedation from two to one*

Clean catch urine in neonate

- Herreros-Fernandez ML *et al. Arch. Dis. Child. 2013;* ***98: 27–9***
- The technique involves first feeding the child, waiting 25 min, cleaning the genitals with soap and water and applying non-pharmacological analgesia (dummy or sucrose syrup).
- The baby is then held up by the armpits, and a second person taps the suprapubic region for 30 s and then massages the lumbar paravertebral region for 30 s. This is repeated until micturition occurs.
- There were 80 children tested, the average age was 6 days and the most common reasons for urine assessment were jaundice (49%) and an infection screen(20%).
- Success was defined as urine collected within 5 min and this was achieved in 69 (86%) children.
- The mean time was 57 s, with a median time of 45 s. It was quicker for girls than boys.

Ring removal

- Winding technique:



- But using the elastic strap from a hudson mask.

Smelly Feet

- 30ml of antacid (Mylanta) into each disposable boot