



## EM CASES SUMMARY

Episode 97 – EM Literature Review 2016

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### 1. What is the safety and efficacy of IV procainamide compared to IV amiodarone in treating stable ventricular tachycardia? The PROCAMIO Study

**Background:** Current guidelines include procainamide and amiodarone as class II recommendations for the management of stable VT. There is no evidence to support the benefit of one treatment over the other.

**The Study:** Multi-center, open-label, RCT of 62 patients in Spain. Compared procainamide 10mg/kg IV over 20 minutes versus amiodarone 5mg/kg IV over 20 minutes. Followed for 40 minutes after the start of infusion for termination of dysrhythmia and major cardiac events.

**Results:** Major cardiac events in patients who received procainamide was 9% versus 41% in patients who received amiodarone. Amiodarone was less effective in terminating dysrhythmia.

**Conclusions:** Procainamide therapy was associated with fewer major cardiac events and a higher proportion of tachycardia termination compared to amiodarone.

#### Issues:

- Small sample size
- In Spain, patients with stable VT can be treated in the prehospital care setting, therefore, patients may have been missed if they converted in the prehospital setting.
- The dose of amiodarone used in the study is higher than what is currently recommended for the treatment of VT in guidelines. This could contribute to the increased number of side effects seen with amiodarone.

**Take Home Message and expert commentary:** *This study provides compelling evidence that procainamide is safer and more effective in terminating stable VT compared to amiodarone. Do not forget that electrical cardioversion is also an option. In the stable patient, use shared decision making and discuss the available options with the patient.*

### 2. Does platelet transfusion with standard care compared to standard care alone reduce death or dependence after intracerebral hemorrhage (ICH) in patients taking antiplatelet agents? The PATCH study

**Background:** Patients with intracerebral hemorrhage who are on antiplatelet therapy have worse outcomes. In theory, it is thought that platelet infusions in patients with ICH who are on antiplatelet agents could limit hematoma expansion and improve patient outcomes.

**The Study:** Multi-center, open-label, RCT of 190 patients in Europe. Patients had to present to hospital within 6 hours of symptom onset, must have had antiplatelet agents on-board for at least 7 days, GCS of at least 8, and not surgical candidates. Compared platelet infusion (platelets dose dependent on whether antiplatelet was a COX inhibitor versus ADP inhibitor) and standard care versus standard care alone.

**Results:** More patients in the platelet transfusion group had worse outcomes at 3 months (death and dependency) compared to the standard treatment group (OR: 2.05, 95% CI 1.18-3.56). No significant differences in safety.

**Conclusions:** Platelet transfusions increase the risk of death or dependency among patients with ICH who are on antiplatelet therapy.

**Issues:**

- Not enough patients in the clopidogrel group to determine whether outcomes would be similar in this group
- Small sample size

**Take Home Message:** Avoid platelet transfusions in patients with ICH who are on antiplatelet therapy.

### 3. Does intensive blood pressure lowering in acute intracerebral hemorrhage improve patient outcomes? The ATACH II trial

**Background:** Previous guidelines for the treatment of ICH suggested to “consider” lowering blood pressure to 160/90 with a MAP of 110. Theoretical concern that higher blood pressure increases hematoma expansion in ICH, and that if blood pressure was lowered the hematoma

may not expand as much. The data showing this strategy to be effective is weak.

**The Study:** Multi-center, open-label, RCT of 1000 patients. Patients randomized to target SBP of 140-180 versus target SBP of 110-140. The target BP was maintained for 24 hours.

**Results:** No difference in death or severe disability between the two groups compared in this study. Study terminated early because of futility. Higher rates of adverse events in the intensive BP lowering group.

**Conclusions:** There is no difference in death and disability between intensive blood pressure lowering and standard care.

**Take Home Message and expert commentary:** Avoid lowering SBP to < 140 in all patients with ICH. Treat symptoms such as pain, agitation which may lower BP. If the BP remains high following these measures, consider previous recommendations to lower SBP to ~160. Be cautious in patients showing signs of raised ICP, as lowering BP in these patients may decrease blood flow to the injured area of the brain causing secondary ischemia.

### 4. What is the efficacy of adjunctive antibiotics in patients with uncomplicated skin abscesses treated with I&D in the ED?

**Background:** It is unclear whether adjunctive antibiotics after I&D for cutaneous abscesses improve outcomes. There are few guidelines to help guide management in these cases.

**The Study:** Multi-center, double-blinded, placebo-controlled RCT of 1265 patients who underwent an uncomplicated I&D for a cutaneous

abscess. Patients randomized to a 7-day course of trimethoprim sulphamethoxazole (two double-strength septrax bid) or placebo. Follow-up visits at 14-21 days for test of cure.

**Results:** Cure rate at follow-up for the trimethoprim sulphamethoxazole group was 80.5% versus 73.6% in the placebo group. MRSA rate in the population was 45%.

**Conclusions:** Septra treatment resulted in higher cure rates among patients with a drained abscess versus placebo in a MRSA prevalent population.

**Issues:**

- Sample may not be representative of all patients with abscesses
- High dose of trimethoprim sulphamethoxazole used

***Take Home Message and expert commentary:** There may be a role for antibiotics in patients with skin abscesses, however this study does not help clarify which patients will benefit from antibiotics. Reserve antibiotics for patients with associated cellulitis, systemic symptoms such as fever or have a high risk of complications (e.g. immunocompromised).*

## 5. What is the incidence of missed subarachnoid hemorrhage on CT imaging among patients with aneurysmal SAH?

**Background:** Many clinicians use the ‘6-hour rule’ for CT imaging in the work-up of SAH (If the CT head is done within 6 hours of headache onset and is negative, SAH can effectively be ruled out based on the study “Sensitivity of Computed Tomography Performed Within Six Hours of Onset of Headache for Diagnosis of Subarachnoid

*Haemorrhage: Prospective Cohort Study”* BMJ 2011.) However, false negatives on CT heads for SAH are may occur.

**The Study:** Retrospective review of 452 patients diagnosed with an aneurysmal SAH. All initial noncontrast CTs from SAH cases diagnosed by LP and angiography following a negative CT were then reviewed in a blinded, independent fashion by two board-certified neuroradiologists to assess for missed evidence of SAH. The neuroradiologists categorized CTs as: probable, definite, or no evidence of SAH.

**Results:** 7 cases of CTs were initially interpreted as negative for SAH and done within 6 hours of symptom onset. 5 of these CTs were categorized as probable or definite evidence of SAH by the blinded radiologists in this study and the other two patients had other signs/symptoms that would have lead to the diagnosis.

**Conclusions:** There is a small but significant incidence of CT negative SAH that is due to misinterpretation of the CT by the radiologist.

***Take Home Message and expert commentary:** In a patient in whom you have a high suspicion for SAH but has a negative CT, have a discussion with your radiologist about your concerns of SAH and ask them to take a second look at the CT.*

## 6. What is the effect of post-discharge oxygen desaturations on subsequent medical visits in infants discharged from the ED with bronchiolitis?

**Background:** Since pulse oximetry became routine in the ED, many clinicians use oxygen saturation as a criteria for admission among children with bronchiolitis. Hospital rates have more than doubled for bronchiolitis admissions.

**The Study:** Prospective cohort study of 118 infants between 6 weeks to 12 months of age discharged home from the ED with acute bronchiolitis. The study examined whether there was a difference in unscheduled medical visits for bronchiolitis in infants who have desaturations during home oximetry monitoring compared to those without desaturations. Desaturation was defined as oxygen saturation < 90% for more than 1 minute.

**Results:** 64% of patients had at least 1 desaturation event, 50% had at least 3 desaturations, 43% had desaturations lasting more than 3 minutes, and 10% had desaturations more than 10% of the time that they were monitored. 79% of patients had desaturation of < 80% for at least one minute, 39% had desaturations < 70% for at least one minute. There were no differences in medical visits for bronchiolitis between patients who experienced desaturations compared to those who did not.

**Conclusions:** The majority of children with mild bronchiolitis have desaturations. There are comparable rates of return medical visits among patients with and without desaturations.

**Take Home Message:** Do not make the decision to admit patients with bronchiolitis based on oxygen saturation alone.

## 7. Does early participation in physical activity following an acute concussion impact the persistence of post-concussive symptoms?

**Background:** Current concussion treatment guidelines recommend rest after a concussion until the patient's symptoms resolve. However, there is no clear evidence that avoiding physical activity improves recovery.

**The Study:** Prospective, multi-center cohort study of 3063 children and adolescents (5-18 years old) with acute concussion. Patients were

offered web-based survey or telephone follow-up at 7 and 28 days. Early physical activity participation was defined as any level of physical activity other than no activity at 7 days.

**Results:** Among the whole group, 70% were active. Among active patients, 31% were symptom free and 48% had at least 3 persistent or worsening symptoms. Among non-active patients, 79.5% had at least 3 persistent or worsening symptoms.

**Conclusions:** Physical activity within 7 days of injury compared with no physical activity is associated with a reduced risk of post concussive symptoms at 28 days.

**Issues:** Not a randomized study, so there may be bias between patients in the two groups. Future randomized prospective studies are needed to further examine this question.

**Take Home Message:** Restricting physical activity in children with concussion may not be preferred to activity based on symptomatology. More studies are needed to examine this question.

## 8. What is the optimal dosing of intravenous ketamine for procedural sedation in children?

**Background:** There is no consensus on what the best dose of ketamine for procedural sedation in children is.

**The Study:** Double-blind, RCT of 125 children (age 3-18) who received IV ketamine for procedural sedation. Randomized to receive: 1mg/kg, 1.5mg/kg, or 2mg/kg of IV ketamine.

**The Results:** Need for re-dosing: 16% vs. 3% vs. 5%, respectively. No difference in sedation scores, sedation duration in minutes, or adverse

events between different doses of ketamine. Physician satisfaction was lowest with 1mg/kg dose.

**Conclusions:** Higher doses of ketamine did not increase adverse events or prolong sedation. Higher doses required less re-dosing and had better physician satisfaction.

***Take Home Message:** For procedural sedation in children, 1.5-2.0 mg/kg IV of ketamine appears to be the best dose.*

## 9. What is the incidence of true Salter-Harris 1 fractures of the distal fibula in children?

**Background:** Lateral ankle injuries without evidence of fracture on x-ray are common in children. These children are sometimes treated as a Salter-Harris 1 fracture of the distal fibula with immobilization and outpatient follow-up. Previous small studies have suggested the majority of these injuries may be ankle sprains and not true growth plate fractures.

**The Study:** Prospective cohort study of 135 children (5-12 years old) with a clinically suspected Salter-Harris I fracture of the lateral ankle. Patients underwent MRI to determine frequency of true Salter-Harris 1 fractures. Children were managed with removable brace and allowed to return to activity as tolerated.

**Results:** Only 5 of 135 (3%) patients had a true Salter-Harris I fracture. The majority (80%) had ligamentous injuries, and 22% had bone contusions.

**Conclusion:** Salter-Harris 1 fractures in children with lateral ankle injuries and negative x-rays are uncommon.

***Take Home Message:** Salter-Harris 1 fractures of the lateral ankle in patients with negative x-rays are less frequent than previously believed. Consider treating these patients with a simple ankle brace and return to activity as tolerated.*

## 10. Are there increased asthma-related complications among children who frequently use ibuprofen?

**Background:** Some studies have suggested that there is an association between ibuprofen use and asthma complications in children. However, there is a no strong evidence to support this suggestion.

**The Study:** Multi-center, prospective, double-blind, RCT of 300 children (age 12-59 months) with mild persistent asthma. Patients randomized to acetaminophen or ibuprofen as needed for fever or pain over 48 weeks. Primary outcome was the number of asthma exacerbations that led to treatment with systemic glucocorticoids.

**Results:** No difference in the number of asthma exacerbations between patients who received acetaminophen versus ibuprofen.

**Conclusions:** Among children with mild asthma, ibuprofen was not associated with a higher incidence of asthma exacerbations compared to acetaminophen.

***Take Home Message:** The use of ibuprofen for fever and pain control does not increase asthma exacerbations in children with mild persistent asthma.*

## 11. How optimal and timely is pain managed in children with suspected acute appendicitis?

**Background:** Children with suspected acute appendicitis are at risk of suboptimal pain management. This study sought to describe pain management patterns for suspected appendicitis across Canadian pediatric EDs.

**The Study:** Retrospective chart review at 12 pediatric EDs, included 619 children (3-17 years) admitted to hospital with suspected appendicitis.

**Results:** 61% of patients received IV morphine (initial dose of morphine for the majority of patients was 0.06mg/kg), 25% received acetaminophen. Time to triage to first dose of analgesia was 196 minutes, 43% received analgesia only after being seen by a consultant, and 43% received analgesia only after ultrasound.

*Conclusion/Take Home Message: Suboptimal and delayed analgesia for children with suspected appendicitis is common.*

## 12. Does standardizing care for febrile young infants improve timeliness and variability in care as well as improve stewardship of antibiotics?

**Background:** Febrile infants are commonly seen in the ED. Delays in care or ineffective management could increase morbidity and mortality. Standardized clinical pathways may improve patient care.

**The Study:** Before-and-after retrospective, observational study of 521 infants 56 days or younger with a rectal temperature of 38.0°C or higher. Introduction of a standardized order set for febrile infants.

**Results:** The clinical pathway in febrile infants improved timeliness of care and decreased variability in care. There was a reduction of 23 minutes in time to urine collection, a 36 minute reduction in time to first antibiotic and improved stewardship of antibiotics.

*Conclusion/Take Home Message: A clinical Pathway for febrile infants may improve timeliness of care and decreased variability of care.*

## 13. Does a quality improvement initiative improve early recognition and timely treatment of children with septic shock?

**Background:** Septic shock impacts morbidity, mortality and health care costs. The aim of this study was to determine whether quality improvements initiatives in the ED impact patient outcomes.

**The Study:** Introduction of a sepsis bundle (i.e. screening, standard order sets, antibiotics, etc.) over an 8-year period. 1380 children presented with septic shock during the study.

**Results:** The odds of death were five times higher for children who did not receive bundle-compliant care.

**Conclusions:** Sepsis bundle improved goal adherence & decreased mortality without increasing PICU admissions or ED length of stay.

*Take Home Message: Standardizing care for pediatric sepsis may improve mortality rates.*

## 14. Is higher BMI during adolescence associated with the risk of cardiovascular death in adulthood?

**Background:** The incidence of obesity in adolescents has been increasing in developed countries. Previous studies suggest that BMI in adolescence is associated with an increased risk of death from cardiovascular causes.

**The Study:** National database of 2.3 million Israeli adolescents, with over 42 million person years of follow-up looking at rate of cardiovascular death in adulthood.

**Results:** Over the study period, 9% of deaths were cardiovascular in nature. They found a graded increase in cardiovascular death starting at the 50<sup>th</sup> to 74<sup>th</sup> percentile of BMI in adolescence.

**Conclusions:** Obesity is strongly associated with increased cardiovascular death in adulthood.

*Take Home Message: Take the time in the ED to advocate for kids to maintain an active and healthy lifestyle in adolescence.*

## 15. Do children undergoing procedural sedation need to be kept NPO?

**Background:** There is little evidence to support that children undergoing procedural sedation should be kept NPO for a minimum time period to prevent aspiration.

**The Study:** Retrospective review of 139,142 procedural sedation/anesthesia encounters. Compared major adverse events (aspiration, death, cardiac arrest, or unplanned hospital admission patients) in patients who were kept NPO to those who were not.

**Results:** No difference in aspiration or major adverse events between patients kept NPO and those not kept NPO. Aspiration rate was 1/10,000 in both groups.

**Conclusion:** Aspiration is uncommon in procedural sedation. NPO status does not predict aspiration or major complications.

**Issues:** Retrospective study, confounders are likely present.

*Take Home Message: Long NPO times for pediatric procedural sedation are of no benefit.*

## 16. What is the optimal dose of IV ketorolac?

**Background:** Ketorolac is commonly used for pain control in the ED. The dosages commonly used may be above the analgesic ceiling, offering no additional analgesic advantage while potentially increasing side effects.

**The Study:** Double-blind RCT trial of 240 adult patients presenting to the ED with acute pain. Patients randomized to receive 10mg, 15mg, or 30mg of IV ketorolac. Pain scores measured at baseline and at up to 120 minutes, and patients monitored for side effects.

**Results:** No difference in pain relief with higher doses of ketorolac. No difference in side effects with higher doses.

**Conclusion:** Ketorolac has similar efficacy at IV doses of 10, 15, and 30 mg.

*Take Home Message: Consider routinely using 10mg of IV ketorolac in the ED for patients who are unable to tolerate oral ketorolac.*

## 17. Should patients with first episode syncope routinely be worked up for pulmonary embolism? The PESIT trial

**Background:** Prevalence of PE in patients with syncope is not well documented.

**The Study:** Multi-center, cross-sectional study in Italy of 560 patients hospitalized for first episode of syncope.

**Results:** PE ruled out in 58.9% of patients based on Wells score and d-dimer. Of the remaining patients PE was found in 42.2% of patients with a 17.3% prevalence for PE.

**Conclusion:** PE is prevalent in patients admitted to hospital for syncope (1 in 6 patients).

### Issues:

- Selection bias: only included patients admitted to hospital (did not include discharged patients)
- Imaging to confirm PE was not done on admission, even if there was clinical suspicion of PE
- Many patients with confirmed PE had evidence of PE based on history and physical, and would likely have been picked up anyhow

**Take Home Message:** Do not routinely workup patients with first episode syncope for PE. Continue to consider the diagnosis of PE in patients with syncope based on history and physical exam.

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