

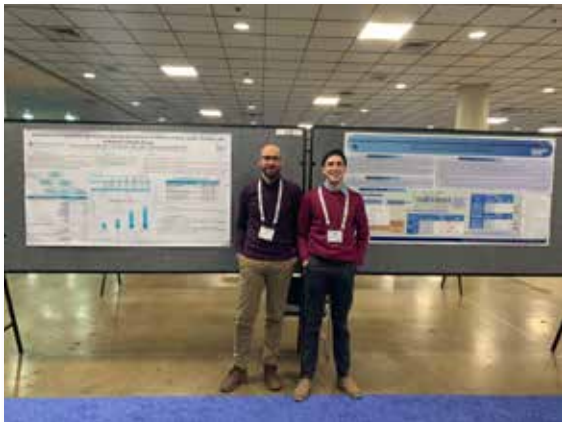
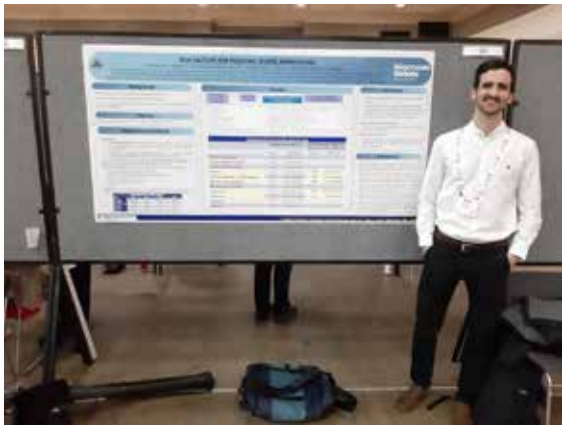


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RESUMEN PAS MEETING 2019



Pediatric Academic Societies Meeting

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SESIÓN POSTERS 1

PREDICTORS OF INTRAVENOUS REHYDRATION IN CHILDREN WITH ACUTE GASTROENTERITIS IN THE UNITED STATES AND CANADA

Interesante estudio multicéntrico de dos redes multicéntricas de investigación dirigido por Naveen Poonai (Western University) en el que identifica factores relacionados con mayor probabilidad de recibir sueroterapia IV en el contexto de una gastroenteritis aguda. Estos factores dependen tanto del contexto clínico (score de deshidratación, uso de antieméticos o visitas previas) como del lugar donde se trabaje, reforzando la importancia de la traslación de conocimientos a la práctica clínica.

Background: Although oral rehydration therapy is recommended for children with acute gastroenteritis (AGE) with none to some dehydration, intravenous (IV) rehydration is still commonly administered to these children in high-income countries. IV rehydration is associated with pain, anxiety, and emergency department (ED) revisits in children with AGE.

Objective: Our objective was to characterize the factors associated with IV rehydration to inform knowledge translation strategies.

Design/Methods: This was a planned secondary analysis of the Pediatric Emergency Research Canada (PERC) and Pediatric Emergency Care Applied Research Network (PECARN) randomized, controlled trials of oral probiotics in children with AGE-associated diarrhea. Eligible children were aged 3-48 months and reported \geq 3 watery stools in a 24-hour period. The primary outcome was administration of IV rehydration at the index ED visit. We used mixed-effects logistic regression model to explore univariable and multivariable relationships between IV rehydration and a priori risk factors.

Results: From the parent study sample of 1848 participants, 1846 had data available for analysis: mean (SD) age of 19.1 ± 11.4 months, 45.4% fema-

les. 70.2% (1292/1840) vomited within 24 hours of the index ED visit and 34.1% (629/1846) received ondansetron in the ED. 13.0% (240/1846) were administered IV rehydration at the index ED visit, and 3.6% (67/1842) were hospitalized. Multivariable predictors of IV rehydration were Clinical Dehydration Scale (CDS) score [compared to none: mild to moderate (OR: 8.1, CI: 5.5-11.8); severe (OR: 45.9, 95% CI: 20.1-104.7), $P < 0.001$], ondansetron in the ED (OR: 1.8, CI: 1.2-2.6, $P=0.003$), previous healthcare visit for the same illness [compared to no prior visit: prior visit with no IV (OR: 1.9, 95% CI: 1.3-2.9); prior visit with IV (OR: 10.5, 95% CI: 3.2-34.8), $P < 0.001$], and country [compared to Canada: US (OR: 4.1, CI: 2.3-7.4, $P < 0.001$)]. Significantly more participants returned to the ED with symptoms of AGE within 3 days if IV fluids were administered at the index visit [30/224 (13.4%) versus 88/1453 (6.1%), $P < 0.001$].

Conclusion(s): Higher CDS scores, antiemetic use, previous healthcare visits and country were independent predictors of IV rehydration which was also associated with increased ED revisits. Knowledge translation focused on optimizing the use of antiemetics (i.e. for those with dehydration) and reducing the geographic variation in IV rehydration use may improve the ED experience and reduce ED-revisits.

A NEW CLINICAL SCORE TO IDENTIFY CHILDREN AT LOW RISK FOR APPENDICITIS

Estudio dirigido por Javier Benito (Cruces University Hospital) en el que diseña un nuevo score para identificar niños con bajo riesgo de apendicitis aguda combinando signos clínicos y hallazgos de laboratorio.

Background: Besides the clinical signs and imaging, biomarkers have proven in recent years to be a viable diagnostic resource for acute appendicitis (AA). The objective of this study was to develop a clinical score including clinical signs and a combination of biomarkers to identify children with abdominal pain at low risk of AA.

Objective: The objective of this study was to develop a clinical score including clinical signs and a combination of biomarkers to identify children with abdominal pain at low risk of AA.

Design/Methods: Children 2-14 years of age with abdominal pain suggesting AA and presented to the emergency department between July 2016 and September 2017 were prospectively included. A clinical score including clinical signs, leucocyte (WBC) and neutrophil (ANC) counts and plasma C-reactive protein (CRP) and calprotectin CP levels was developed and validated through secondary analyses of 2 distinct cohorts. The validation sample included visits to a single pediatric emergency department from 2012 to 2013 and 2016 to 2017.

Results: The derivation sample included 278 children, 35.9% of whom had AA and the validation sample included 255 children, 49% of whom had AA. Using logistic regression, we created a 6-part score that consisted of nausea (3 points), history of focal right lower quadrant pain (4 points), ANC of $\geq 7500 / \mu\text{L}$ (7 points), WBC of $\geq 10000 / \mu\text{L}$ (4 points), CRP $\geq 10.0 \text{ mg/l}$ (2 points) and CP $\geq 0.50 \geq \text{ng/ml}$ (3 points). This score exhibited a high degree of discrimination (area under the curve: 0.88; 95% confidence interval: 0.84 to 0.92) and outperformed the PAS and Kharbanda scores (area under the curve: 0.76; 95% confidence interval: 0.71 to 0.82 and 0.82; 95% confidence interval: 0.77 to 0.87, respectively). A score ≤ 6 had a sensitivity of 99.2% [95% confidence interval (CI): 95.6 - 99.9], NPV of 97.6% [95% CI: 87.7 - 99.6], and negative likelihood ratio of 0.03 [95% CI: 0.00 - 0.18] in the validation set.

Conclusion(s): In our validation cohort of patients with acute abdominal pain, the new score can predict accurately which children are at low risk for appendicitis and could be treated safely with careful observation.

THE MOST COST-EFFECTIVE IMAGING PROTOCOL FOR SUSPECTED APPENDICITIS IN CHILDREN

Provocador título del estudio dirigido por Rebecca Jennings (Seattle Children's Hospital) que nos invita a su lectura. El rendimiento de las pruebas de imagen está en relación con la probabilidad pre-test de apendicitis. En los pacientes de bajo riesgo, el uso exclusivo de la ecografía abdominal es suficiente, incluso si el apéndice no es visualizado.

Background: Inaccurate diagnosis of appendicitis leads to increased cost and morbidity. Ultrasound (US) costs less than computed tomography (CT) or magnetic resonance imaging (MRI), but has lower sensitivity and may not visualize the appendix. We sought to examine health and economic trade-offs between various imaging strategies.

Objective: To identify the most cost-effective imaging strategy for suspected appendicitis

Design/Methods: We conducted a cost-effectiveness analysis using a decision-analytic model of 9 imaging strategies for suspected appendicitis in a hypothetical cohort of patients: no imaging with discharge or surgery, CT only, MRI only, or CT or MRI after all US that are either negative or do not visualize the appendix, after all US that do not visualize the appendix, or only after US that do not visualize the appendix when US has secondary signs of inflammation. Model inputs were derived from published literature and primary surveys. Sensitivity analyses varied appendicitis prevalence (i.e. pre-test probability) and proportion of visualized US between 0 and 100%. Outcomes were effectiveness (quality-adjusted life-years [QALYs]),

total direct medical costs, and cost-effectiveness (cost per QALY gained) of each strategy relative to the next least costly strategy.

Results: The least costly strategy is initially undergoing US, followed by CT only if the US does not visualize the appendix but has secondary signs of inflammation. The strategies of MRI after US that does not visualize the appendix when US has secondary signs of inflammation, MRI after all US that do not visualize the appendix, and MRI only were more effective, but more costly than the least costly strategy (Table). All other strategies were more costly and less effective than their comparators. Cost-effectiveness is dependent on the patient's pre-test probability of appendicitis, with minimal change based on proportion visualized appendices, as demonstrated in the two-way sensitivity analysis (Figure).

Conclusion(s): Tailored approaches to imaging based on patients' pre-test probability of appendicitis can be cost-effective relative to standard willingness to pay thresholds. For lower risk patients, US without secondary signs of inflammation can be sufficient imaging, even if the appendix is not visualized.

COMPLICATIONS DURING PNEUMATIC REDUCTION OF INTUSSUSCEPTION IN A TERTIARY PEDIATRIC HOSPITAL

Estudio retrospectivo dirigido por Esli Osmanllium (Sainte-Justine Hospital) que incluye 103 invaginaciones ileocólicas con una sola complicación en relación con la reducción neumática. La mediana de edad es un tanto elevada.

Background: Pneumatic reduction of intussusception has been suggested as the treatment method of choice for children. In our Hospital, this procedure includes up to 3 attempts lasting up to 60 seconds each, with increasing air pressure (up to 120 mmHg).

Objective: To determine the rate of complications associated with pneumatic reduction of ileo-colic intussusception in a tertiary pediatric hospital.

Design/Methods: This retrospective observational study included a consecutive sample of children diagnosed with intussusception in a single tertiary-care pediatric hospital during a 36-month period. All patients younger than 18 years old and having a pneumatic reduction for an ileo-colic intussusception were eligible. The primary outcome was complications recorded during pneumatic reductions as defined by perforation, desaturation, hemodynamic instability, or need for immediate surgery. The rate of surgical reduction was also recorded. All charts were manually evaluated using a standardized approach and 15% of eligible charts were evaluated in duplicate to assess reliability of data abstraction. The primary analysis was the proportion of complications.

Results: All items of the chart review demonstrated an excellent reliability with Kappa scores or intraclass correlation coefficients higher than 0.65. Among the 257,282 children evaluated in the emergency department during the study period, there were 103 cases of ileo-colic intussusception, with a median age of 18 months (10,29). Of these, 102 (99%) were treated by pneumatic reduction, while one patient directly underwent surgical treatment due to hemodynamic instability. Initial pneumatic reduction was successful in 93 (92%) children, who required between one (for 71 cases) to 4 (for two cases) attempts. Five children who were unsuccessfully reduced underwent a second pneumatic reduction after a variable period of time and this was successful in 4/5 children. There was one perforation (1%; 95%CI: 0.2-5%) identified at the beginning of a pneumatic reduction, without associated hemodynamic instability. No desaturation or hypotension was recorded. Six children (6%) underwent either open (n=4) or laparoscopic surgery (n=2) for reduction failure.

Conclusion(s): Complications during pneumatic reduction for intussusception are very uncommon and the only significant complication is reduction failure leading to surgical reduction (in 6% of procedures).

UTILIZATION OF RAPID MRI IN THE PEDIATRIC EMERGENCY DEPARTMENT

Estudio dirigido por Sriram Ramgopal (Division of Pediatric Emergency Medicine, Department of Pediatrics, University of Pittsburgh School of Medicine) analizando la implantación de la RNM rápida en pacientes con sospecha de disfunción de la derivación ventrículo-peritoneal. Excluyen pacientes con TCE.

Background: Magnetic resonance imaging (MRI) has typically been limited in children by the exam duration and need for sedation. CT exposes children to radiation, which also carries risks. Newer imaging strategies such as “rapid” brain MRI (rMRI) continue to gain acceptance in pediatrics, with studies highlighting rMRI use in the evaluation for ventricular shunt (VPS) malfunction. Widespread emergency department (ED) use of rMRI has not been investigated

Objective: Our primary objective was to evaluate the relative frequencies of rMRI, standard protocol brain MRI, and brain CT before and after widespread implementation of rMRI protocols for VPS, stroke, and non-specific neurologic complaints in a pediatric ED. The secondary objectives were to compare rates of follow-up imaging and ED lengths of stay.

Design/Methods: Retrospective analysis of neuroimaging in a large, tertiary care, pediatric ED. Nov 2017-July 2018, our ED had widespread implementation of three rMRI protocols. Nov 2016-July 2017 was analyzed as a “control” period. We included patients assigned one of 14 chief complaints from a standardized list of 110 for which neuroimaging may have been considered. We excluded patients <1 year and ≥21 years of age, transferred patients, and those with chief

complaints related to acute trauma, as CT is the preferred imaging. We compared groups using chi squared and Wilcoxon rank-sum tests, considering $p < 0.05$ as statistically significant.

Results: 11,515 patients were included (5,719 in the control period, 5,802 in the rMRI period.) 39 patients (0.7%) in the control period and 267 (4.6%) in the rMRI period received an rMRI, a finding that was associated with a significant decrease in CT imaging (Table 1). Chief complaints for patients with neuroimaging are presented in Table 2. During the rMRI period, median time to neuroimaging was longer compared to the control period, though total length of stay was similar. There were no differences in the rates of follow-up neuroimaging (Table 3). Across both periods, there were positive findings in 15/306 (4.9%) of patients with rMRI, 13/239 (5.4%) of patients with standard protocol MRI, and 95/868 (10.9%) of patients with CT (Table 4).

Conclusion(s): Upon widespread implementation of three rMRI protocols, rMRI use in our ED significantly increased with a decline in CT use. This increase in rMRI did not result in an increase in follow-up imaging or increased ED length of stay; however, time to imaging was increased. rMRI may be a radiation-sparing alternative to CT in the pediatric ED setting for non-traumatic complaints.

QUICKBRAIN MRI IN THE PEDIATRIC ED: A RETROSPECTIVE ANALYSIS OF USE AND ACCURACY

Estudio dirigido por Monica Saladik (Oregon Health and Science University) acerca de la aplicabilidad de la RNM rápida en pacientes sin disfunción de una derivación ventrículo-peritoneal.

Background: There has been recent advancement in neuroimaging with the introduction of QuickBrain MRI (qbMRI), which can be obtained quickly in the emergency department. Previous retrospective studies have examined the use of qbMRI for VP shunt evaluation compared to CT scans. However, there is limited data about the use outside of this indication.

Objective: The primary objective was to describe the current indications for qbMRI within a single center pediatric ED. The secondary objective was to determine clinically significant positive findings on qbMRI compared to gold standard of CT or full brain MRI.

Design/Methods: The authors performed a retrospective chart review of pediatric patients seen at a single Pediatric ED between 1/2010 and 6/2017 who received a qbMRI for non-shunt indications. Information gathered included patient characteristics, presenting complaint, principle final diagnosis, and ED disposition. Results of qbMRI were compared to results of any gold standard neuroimaging completed within that same encounter or during close follow-up for the same complaint.

Results: A total of 867 patients met inclusion criteria. The mean patient age was 6.45 years, 59% were male, and 41% were female. 180 patients received gold standard neuroimaging.

The most common presenting complaints and final diagnoses were headache, seizure, vomiting, trauma and head injury, and other. 54% of qbMRIs obtained were normal, 12% had stable known findings. The remaining qbMRI findings (34%) were significantly variable. Within those who had gold standard neuroimaging, 28% had normal qbMRIs, 23% intracranial bleeds, and 9% had stable known findings. QbMRI had a sensitivity of 91% and specificity of 97% for detecting these findings when compared to gold standard neuroimaging. Within this study, the positive predictive value was 99% and negative predictive value was 73%. Of those with initial negative qbMRIs, the most common missed finding for trauma was non-depressed skull fractures. Those with small bleeds seen only on CT were observed in the hospital without further intervention or follow-up imaging.

Conclusion(s): Use of qbMRI for non-hydrocephalus indications is rapidly expanding. Within this study, a positive finding on qbMRI was strongly indicative of true abnormalities on gold standard neuroimaging. The clinical usefulness of a negative qbMRI was not well elucidated, though it does show promise in both the trauma setting and monitoring known abnormalities. Overall, more information is needed regarding use of qbMRI outside the VP shunt population.

INTRANASAL DEXMEDETOMIDINE FOR PROCEDURAL DISTRESS IN CHILDREN: A SYSTEMATIC REVIEW AND META-ANALYSIS

Revisión y meta-análisis que incluye globalmente 2128 pacientes de 1 mes-14 años de edad realizado por Naveen Poonai (Western University) sobre el uso de dexmetomidina para procedimientos que generan distress en niños.

Background: Intranasal dexmedetomidine (IND) is an emerging agent for procedural distress in children. However, studies to date have been limited by small samples and imprecise estimates of effect size.

Objective: We sought to summarize the evidence on the effectiveness of IND for procedures associated with distress in children.

Design/Methods: We performed electronic searches of MEDLINE (1946-2018), EMBASE (1980-2018), Google Scholar (2018), CINAHL (1981-2018), Cochrane Central Register of Controlled Trials (2018), 6 clinical trials registries and conference proceedings (2010-2018). Title searches, data abstraction, and risk of bias assessments were performed in duplicate. We included all published and unpublished, randomized and quasi-randomized trials of IND for procedures in children younger than 19 years of age without language restriction. The methodological quality of studies was evaluated using the Cochrane Collaboration's Risk of Bias tool. The primary outcome was the proportion of participants that were deemed to be adequately sedated for the procedure.

Results: Of 661 studies, 18 met inclusion criteria. Trials involved 2128 participants, age 1 month - 14 years (836, 39.3% females), who received

IND 1 - 4 mcg/kg either by drops (n=12), atomizer (n=4), or both (n=2). 12 trials were eligible for meta-analysis. 13 trials used validated instruments to assess sedation. All studies except one were associated with low or moderate risk of bias. For painful procedures (IV insertion; laceration repair; dental extraction), the pooled OR (95% CI) for adequate sedation and need for additional analgesia was non-significant [1.19 (0.53, 2.65)] and [2.16 (0.62, 7.49)], respectively (n=5). For non-painful procedures (diagnostic imaging), the corresponding pooled OR (95% CI) favored IND [3.04 (1.58, 5.82)] and [4.44 (2.11, 9.35)], respectively (n=7). Time to onset and duration of sedation ranged from 13-31 minutes and 41-91.5 minutes, respectively. For adverse effects, the pooled OR (95% CI) was not significantly different between IND and comparators [0.58 (0.22, 1.55)] and there were no serious adverse events.

Conclusion(s): IND at doses 1 to 4 mcg/kg are safe and adequately sedate children undergoing non-painful procedures, although the ease of administration must be weighed against the risk of prolonged sedation. Additional trials with larger sample sizes and greater methodologic rigor are needed for painful emergency department procedures such as laceration repair and IV insertion.

PREDICTING SURVIVAL IN CHILDREN PRESENTING TO A PEDIATRIC EMERGENCY DEPARTMENT WITH OUT-OF-HOSPITAL CARDIAC ARREST

Estudio dirigido por Maureen Saint Georges (Vanderbilt University Medical Center) analizando factores que se pueden relacionar con mayor o menor supervivencia en niños con paro cardíaco extrahospitalario, con una supervivencia global menor del 2%.

Background: Pediatric out-of-hospital cardiac arrest (POHCA) outcomes have not improved over the last decade. Identifying characteristics associated with outcomes might inform care and expert guidelines.

Objective: To identify characteristics associated with survival to Pediatric Intensive Care Unit (PICU) admission and hospital discharge in children with POHCA.

Design/Methods: We used ICD codes to identify children aged 0 to 18 years who presented in cardiac arrest to an urban, tertiary children's teaching hospital during an 8 year period (10/31/09 -10/31/17). We reviewed hospital and Emergency Medical Services (EMS) records as well as autopsies. We used multivariable logistic models to examine adjusted associations between the outcomes survival to (1) PICU admission and (2) Hospital discharge and the covariates age, gender, race, time and day of arrest, cause of arrest, whether arrest was witnessed, duration of cardio-pulmonary resuscitation (CPR) by EMS and Emergency Department (ED) personnel, and types of vascular access and IV fluids.

Results: Among 170 children median age was 8 months [IQR, 3 months, 5 years; range 4 days-

18 years] and female sex comprised 72 (42.4%). Among 166 in whom race was recorded, 94 (56.6%) were black, and 58 (34.9%) white. ROSC was achieved in the ED in 47 (27.7%), 42 (24.7%) survived to PICU admission, and 3 (1.8%) were discharged from the PICU alive, 2 of whom were neurologically normal. Witnessed POHCA occurred in 55 (32.4%) and was associated with 2.4 (95% CI 1.2-5.0) adjusted odds (aOR) of survival to PICU admission. POHCA due to suffocation in an unsafe sleep environment had a 0.4 aOR (95% CI 0.2-0.9) of survival to PICU admission whereas POHCA due to non-accidental trauma (NAT) and drowning had an 8.3 aOR (95% CI 2.0-33.9) and 6.9 aOR (95% CI 1.7-29.1) of survival to PICU admission.

Conclusion(s): Survival of children presenting to the ER after POHCA was rare (1.8%) in our study. Characteristics of childhood POHCA with higher adjusted odds of survival include witnessed POHCA and drowning or NAT as the cause of POHCA. However, most interventions in the field were not associated with survival, suggesting that education of out-of-hospital witnesses and EMS providers and other measures to increase pre-hospital ROSC might improve survival rates for these children.

PRO/CON DEBATE: CONTROVERSIES IN PEDIATRIC SEPSIS

En esta interesantísima mesa de controversias se debatió, en primer lugar, la conveniencia del uso del suero salino en la fluidoterapia en sepsis. Frances Balamuth defendió las ventajas de esta terapia, mientras que Scott Weiss recomendó uso de otros fluidos con menor concentración de cloro, como el Plasmalyte, que provocan menor acidosis. Ambos aportaron la Evidencia Científica más reciente, firmando tablas al final de la partida.

Posteriormente Halden Scott nos mostró una cantidad de estudios que muestran la conveniencia de la administración de los antibióticos en la primera hora de la sepsis, a lo que Joshua Wolf respondió con una atrevida argumentación, basada en numerosos estudios que no conseguían demostrar una mayor supervivencia en la administración de antibiótico en la primera hora que en las dos horas siguientes, siendo en cambio, los aportes adecuados de líquidos lo que sí mostraba una clara asociación con un mejor pronóstico.

Un formato, el de estas mesas de controversia, realmente atractivo, especialmente con ponentes de tanto nivel.

SESIÓN DE COMUNICACIONES ORALES 1

A MULTICENTER RANDOMIZED CONTROLLED TRIAL OF LEVETIRACETAM VERSUS PHENYTOIN FOR CONVULSIVE STATUS EPILEPTICUS IN CHILDREN: CONVULSIVE STATUS EPILEPTICUS PAEDIATRIC TRIAL (CONSEPT) - A PREDICT STUDY

Estudio multicéntrico de la red PREDICT (Australia, Nueva Zelanda) presentado por Stuart Dalziel (Children's Emergency Department, Starship Children's Hospital). El objetivo fue identificar si levetiracetam 40 mg/kg IV o fenitoína 20 mg/kg IV constituyen la mejor segunda línea de tratamiento para el estatus epiléptico. Incluyeron 233 pacientes de edades comprendidas entre 3 meses y 16 años con un status que no cedió con benzodiazepinas. Los autores no encontraron que el levetiracetam fuera superior a la fenitoína.

Background: Convulsive status epilepticus (CSE) is the most common, life-threatening, childhood neurological emergency. Despite this, there is a lack of high-quality evidence supporting medication use after first line benzodiazepines. The current standard of care second line medication, phenytoin, is only 60% effective, and associated with considerable adverse effects. A newer anti-convulsant, levetiracetam, can be given faster, is potentially more efficacious, with a more tolerable side effect profile.

Objective: The primary aim of this study is to determine whether intravenous (IV) phenytoin or IV levetiracetam is the better second line treatment for the emergency management of CSE in children.

Design/Methods: 233 children aged between 3 months and 16 years, presenting to 13 emergency departments in Australia and New Zealand with CSE that failed to stop with first line benzodiazepines, were randomized to 20 mg/kg IV phenytoin infusion (n=114) over 20 min vs. 40 mg/kg IV levetiracetam infusion (n=119) over 5 min. The primary outcome was clinical cessation of seizure activity

5 minutes following the completion of the infusion of the study medication. Secondary outcomes included: Clinical cessation of seizure activity at 2 hours; Time to clinical seizure cessation; Need for intubation; Intensive care unit (ICU) admission; Serious adverse events; Length of Hospital/ICU stay; Seizure status/death at one-month post discharge. Analysis was by intention-to-treat.

Results: Participants were balanced at baseline. Clinical cessation of seizure activity 5 minutes following the completion of the infusion of the study medication occurred in 68 (59.6%) phenytoin and 60 (50.4%) levetiracetam participants, risk difference=-9.2% (95%CI=-21.0-3.5%), p=0.16. At 2 hours 89 (78.1%) phenytoin participants had terminated with phenytoin alone or phenytoin+levetiracetam and 86 (72.3%) levetiracetam participants had terminated with levetiracetam alone or levetiracetam+phenytoin, p>0.05. There was no difference between treatment groups for secondary outcomes, p>0.05.

Conclusion(s): Levetiracetam is not superior to phenytoin for the second line management of pediatric CSE.

PHARMACOTHERAPY IN BRONCHIOLITIS AT EMERGENCY DEPARTMENT DISCHARGE: A PEDIATRIC EMERGENCY RESEARCH CANADA STUDY: A PEDIATRIC EMERGENCY RESEARCH NETWORKS (PERN) STUDY

Estudio multicéntrico internacional dirigido por Alisha Jamal (The Hospital for Sick Children, Toronto) con participación de investigadores de RISEuP-SPERG en el que se demuestra una gran variabilidad en la prescripción de medicamentos al alta en pacientes diagnosticados de bronquiolitis, sin que la tasa de prescripción altere el pronóstico de los pacientes.

Background: Little is known about global variability in prescribing practices for infants with bronchiolitis at emergency department (ED) discharge.

Objective: The primary objective was to evaluate the inter-network variation in the proportion of infants discharged from the ED and prescribed either inhaled albuterol or oral/inhaled corticosteroids for home use. We hypothesized there would be significant global variation in this outcome after adjustment for patient-level characteristics. We also examined the association between discharge pharmacotherapy and re-visits to the ED and hospitalizations for bronchiolitis.

Design/Methods: We conducted this planned secondary analysis of a multi-national, retrospective cohort study of previously healthy infants <12 months old discharged from 38 EDs in Canada, the United States, Australia/New Zealand, United Kingdom/Ireland, and Spain/Portugal in the PERN network with bronchiolitis. The primary outcome was discharge pharmacotherapy, i.e. inhaled albuterol or oral/inhaled corticosteroids, at ED discharge. Secondary outcomes were ED re-visits and hospitalizations for bronchiolitis within 21 days of discharge.

Results: 317/1,566 (20.2%) infants were pres-

cribed discharge pharmacotherapy. While the use of corticosteroids was low (0% Europe, 5.5% U.S.), the use of albuterol varied from 5.1% in the U.K./Ireland to 32.3% in the U.S. 307/351 infants (87.5%) who received albuterol in the ED were discharged with albuterol.

Compared to the U.K./Ireland, odds ratios (ORs) for discharge pharmacotherapy were: 9.22 (95%CI 1.70-50.0) Spain/Portugal, 8.20 (2.79-24.10) U.S., 5.17 (1.61-16.70) Canada, and 1.21 (0.36-4.10) Australia/New Zealand. After adjustment for clustering by site, discharge pharmacotherapy was associated with older age (OR 1.23, 1.16-1.30), lower oxygen saturation (OR 0.92, 0.85-0.99), chest retractions (OR 1.88, 1.26-2.79), network ($p<0.001$) and site ($p<0.001$).

303/1,566 (19.2%) infants returned to the EDs and 129/303 (42.6%) were hospitalized. Discharge pharmacotherapy was not associated with either re-visits ($p=0.41$) or hospitalizations ($p=0.37$).

Conclusion(s): Independent of clinical characteristics, we found substantial variation between global regions and between individual EDs in use of discharge pharmacotherapy in infants presenting to EDs with bronchiolitis. Discharge pharmacotherapy was not associated with ED re-visits or hospitalizations.

IMPACT OF AGE, NUTRITIONAL STATUS AND DOSE ON THE RESPONSE TO PROBIOTICS IN PEDIATRIC GASTROENTERITIS

Comunicación en la que prosigue su investigación con probióticos David Schnadower (Cincinnati Children's Hospital Medical Center - University of Cincinnati College of Medicine). En este estudio demuestra que la falta de efectividad de los probióticos en niños con gastroenteritis aguda no está en relación con la edad de los niños, su estado nutricional o la dosis de probiótico administrada.

Background: Probiotics are increasingly used in the treatment of gastroenteritis. However, recent large multicenter randomized placebo-controlled trials found no beneficial effects associated with the administration of probiotics in children with acute gastroenteritis.

Objective: Our objective was to determine whether the lack of beneficial effect in one of these trials was related to population characteristics as reflected by age and nutritional status (weight z-score adjusted for sex and age) or dose employed (colony forming units (CFU)/kg received).

Design/Methods: This was a planned secondary analysis of the PECARN probiotic trial. Children ages 3-48 months of age with acute gastroenteritis were enrolled in 10 academic pediatric Emergency Departments in the US. All participants received *Lactobacillus rhamnosus* (LGG) 1x10¹⁰ CFU twice daily x 5 days or identically appearing and tasting placebo. This sub-analysis included children who were adherent with study treatment (received $\geq 7/10$ doses). The primary outcome was moderate to severe gastroenteritis defined by a post-randomization Modified Vesikari Scale score ≥ 9 (range: 0 to 20, with higher scores indicating more severe disease). Secondary outcomes included diarrhea and vomiting frequency

and duration, chronic diarrhea (lasting ≥ 7 days post randomization) and side effects. We analyzed outcomes by age, nutritional status, and dose received in CFU/kg using multivariable linear and non-linear models and interaction effects.

Results: 971 children were randomized, and 813 (84%) were adherent to study treatment; 413 were allocated to placebo and 400 to LGG. Baseline characteristics were similar between treatment groups. LGG dose ranged from 0.46 to 2.13 billion CFU/kg. There were no differential effects by age ($p=0.35$), nutritional status ($p=0.39$), or dose received ($p=0.26$) as it related to the outcome of moderate to severe gastroenteritis, as well as diarrhea and vomiting duration, diarrhea frequency, chronic diarrhea and side effects (all $p>0.05$). We found evidence of a differential effect of treatment favoring placebo at the extremes of standardized weight z-scores for the number of vomiting episodes ($p=0.02$ from a quadratic model), there was no clear benefit associated with LGG administration for any value across the range of weight z-scores.

Conclusion(s): The lack of benefit of LGG in children with acute gastroenteritis is not explained by study population age, nutritional status or dose of LGG administered.

DOMINGO 28

MANAGEMENT OF THE FEBRILE YOUNG INFANT IN 2019: WHAT'S NEW AND WHAT SHOULD WE DO?

Una interesantísima mesa redonda moderada por Paul Aronson, que contó como ponentes con Tara Greenhow, Mark Neuman, Samir Shah y Nate Kuppermann, en la que, con un formato interactivo, en el que el público votaba las respuestas y lanzaba preguntas, se debatieron los avances más recientes en el manejo del lactante febril, con especial hincapié en el Step-by-Step que tan bien conocemos, así como en la nueva propuesta publicada este mismo año por PECARN (Kuppermann et al, JAMA Pediatr. 2019). Otros temas controvertidos que se trataron fue la edad de corte para la realización sistemática de punción lumbar o la búsqueda de infección invasiva por Herpes.

SESIÓN COMUNICACIONES ORALES MEDICINA HOSPITALARIA: CRITICAL CARE

TRENDS IN IV MAGNESIUM USE FOR STATUS ASTHMATICUS AND ASTHMA OUTCOMES IN CHILDREN'S HOSPITALS FROM 2010 TO 2017**

Estudio retrospectivo multicéntrico en el que se analiza la evolución en el uso de sulfato de magnesio en el manejo de las crisis asmáticas en 35 hospitales estadounidenses. Se observa un incremento en la utilización de esta medicación, que parece relacionarse con un descenso en la duración de ingreso de estos pacientes, aunque sin impacto en otras variables como la tasa de ingreso hospitalario o en UCIP.

***En el resumen se citan varias tablas no disponibles en la versión on-line*

Background: NIH asthma guidelines recommend intravenous (IV) magnesium sulfate for moderate to severe asthma exacerbations to avoid mechanical ventilation. Studies suggest benefits beyond this narrow indication, however, and IV magnesium use may be increasing as a result.

Objective: Our objective was to assess the prevailing trends in IV magnesium use over 8 years in US children's hospitals and the association with trends in asthma hospital outcomes over that time period.

Design/Methods: This was a retrospective cohort analysis of children ≤ 18 years old treated for asthma (APR-DRG 141) from January 1st, 2010- December 31st, 2017 at 35 US children's hospitals from the Pediatric Health Information System (PHIS; Children's Hospital Association, Lenexa, KS). The main outcome was exposure to IV magnesium as determined by billing information available in PHIS. Covariates included age, sex, race/ethnicity, insurance, prior ED use, and hospital. Associated asthma outcomes included inpatient and ICU admission, geometric mean length of stay (LOS), and the 7-day all cause readmission. Hospitals were categorized by asthma inpatient volume. Our analysis was performed with SAS version 9.4 to assess trends over time

in hospital IV magnesium use and its association with trends in asthma outcomes.

Results: IV magnesium was administered to 65,558 of 878,188 patients (7.5%) treated for asthma in the ED or inpatient setting; 90.1% of those receiving IV magnesium were hospitalized. (Table 1) Of children hospitalized for asthma, IV magnesium use increased significantly from 17% of all asthma admissions in 2010 to 36% by 2017. When stratified by hospital volume, low volume hospitals had lower frequency of IV magnesium use versus moderate and high-volume hospitals. (Fig1) A statistically significant inverse association was noted between proportion of hospitalized children receiving IV magnesium and average hospital LOS over time ($p < 0.001$). Yearly trends in IV magnesium use were not associated with trends in asthma hospital admission, ICU admission, or 7-day all cause readmission rate (Fig 2)

Conclusion(s): IV magnesium use in management of asthma exacerbation has significantly increased in the past 8 years, with greater increases in higher volume hospitals. Increasing IV magnesium use was associated with decreases in mean LOS, but not in asthma admission rate, ICU admission rate, or 7-day readmission rate.

AZITHROMYCIN FOR CHILDREN HOSPITALIZED WITH ASTHMA EXACERBATION: A RANDOMIZED PLACEBO-CONTROLLED TRIAL**

Ensayo clínico llevado a cabo en el Children's Hospital at Montefiori (Nueva York) que demuestra la no utilidad de la adición de azitromicina al tratamiento habitual en pacientes asmáticos ingresados.

***En el resumen se citan varias tablas no disponibles en la versión on-line*

Background: Azithromycin, a macrolide antibiotic, improves asthma-like symptoms in children in the outpatient setting.

Objective: We sought to determine if adding azithromycin to standard therapy would shorten length of stay (LOS) for children hospitalized with asthma exacerbations. Our hypothesis was that azithromycin would reduce a 3-day LOS by 16 hours (0.67 days).

Design/Methods: We conducted a randomized, placebo-controlled trial of azithromycin vs. placebo in children 4-12 years old with persistent asthma hospitalized with asthma exacerbation as the primary diagnosis at a single, urban, quaternary care center between October 2013 and May 2018. Subjects received a three-day, high dose (10mg/kg/day) course of oral azithromycin or placebo within 12 hours of admission. The primary outcome was hospital LOS analyzed with Mann-Whitney U-test due non-parametric distribution. Chi-square analysis was performed on secondary clinical outcomes: persistence of asthma symptoms, asthma readmission rates, and missed days of school/work at one week and one month telephone follow-up. Secondary adverse outcomes included: gastrointestinal side effects, intensive care unit transfer, and study exit.

Results: A total of 159 patients were enrolled, 79 in the placebo group and 80 in the intervention group. Randomization created well-matched groups. (Table 1) Intention-to-treat analysis found no difference in LOS between groups: 1.86 days (Interquartile Range[IQR]: 1.33-2.63) in placebo vs. 1.69 days (IQR: 1.33-2.48) in treatment group (p=0.23). There was also no difference in secondary clinical or adverse outcomes, although the rates of both were low. (Table 2) The study was discontinued after 55 months, prior to reaching the target 214 patients due to feasibility of achieving the enrollment goal. The most common reason for non-enrollment was pre-treatment with antibiotics, including azithromycin. Although terminated early, the study was well powered to detect a difference in LOS when accounting for sample size, effect size, and actual overall LOS. (Table 3)

Conclusion(s): Azithromycin as an add-on therapy for children hospitalized with asthma did not decrease LOS, nor did it improve other clinical outcomes, including persistence of asthma symptoms, readmission for asthma, or missed days of school/work. Although azithromycin is commonly prescribed for children with asthma, our study did not find that this practice improves clinical outcomes in the inpatient setting.

PREVALENCE AND EPIDEMIOLOGY OF BACTEREMIA AND MENINGITIS IN WELL-APPEARING FEBRILE INFANTS IN THE U.S.**

Estudio multicéntrico que analiza la prevalencia de infección bacteriana invasiva en lactantes <60 días de vida en 133 centros estadounidenses. Además de coincidir con otros estudios recientes en que la principal causa de bacteriemia en la actualidad es la E. coli, muestra una baja prevalencia actual de meningitis bacteriana, incluso en neonatos, manteniéndose en esta entidad el S. agalactiae como el principal causante.

***En el resumen se citan varias tablas no disponibles en la versión on-line*

Background: Febrile infants ≤ 60 days of age commonly undergo evaluation for suspected invasive bacterial infection (IBI, defined as the presence of bacteremia and/or meningitis). However, data on the prevalence and epidemiology of IBI in well-appearing febrile infants is limited to circumscribed populations. Current data across broader populations are needed to improve risk prediction.

Objective: To determine the prevalence and epidemiology of IBI from a nationally representative cohort of well-appearing febrile infants.

Design/Methods: Retrospective review of all febrile infant evaluations performed across 133 medical centers 9/2015-12/2017. Participating centers included a diverse sample of general hospitals and tertiary pediatric centers that participated in the Value in Inpatient Pediatrics Network's Reducing Excessive Variation in the Infant Sepsis Evaluation (REVISE) practice improvement project. 75 REVISE sites participated in a secondary collection of data on blood and cerebrospinal fluid (CSF) culture results. Microbiological test results were reviewed using a priori criteria and categorized as negative, contaminant, or growth of a pathogenic organism. Supplemental data including laboratory testing and clinical history suggestive of higher risk IBI were also collected.

Prevalence estimates were made using descriptive statistics; subgroup comparisons were made based on patient age group, sex, and geographic region.

Results: A total of 10,618 febrile infants met inclusion criteria; 10,581 underwent blood culture; 6,747 underwent CSF culture. The overall prevalence for bacteremia was 2.38% [95% CI: 2.10-2.69] and for meningitis was 0.36% [95% CI: 0.23-0.54]. Prevalence for bacteremia was significantly higher among infants 7-30 days of age (3.64% vs 1.61%, $p < 0.001$). Prevalence of meningitis did not differ between age groups [Table 1]. The most commonly detected organism among infants with bacteremia was Escherichia coli (48%) and among infants with bacterial meningitis was Group B streptococci (54%) [Table 2].

Conclusion(s): This nationally representative study of IBI epidemiology across a geographically and institutionally diverse cohort of well-appearing febrile infants highlights the fact that febrile infants 7-30 days of age are roughly two times as likely to have an IBI compared to infants in the second month of life. However the absolute risk for IBI (particularly for bacterial meningitis) remains very low. These results can aid future clinical guidelines and risk stratification/prediction tool development.

PEDIATRIC EMERGENCY TELEMEDICINE: CAN WE TALK?

Excelente sesión de tres horas de duración (domingo de 8:00 a 11:00) del Special Interest Group de Telemedicina dirigida brillantemente por Elizabeth Alpern (Ann & Robert H. Lurie Children's Hospital of Chicago) y Jennifer Marin (UPMC Children's Hospital). Se abordaron diferentes aspectos como las guías clínica ya establecidas, barreras y obstáculos, investigación realizada, iniciativas de mejora de la calidad e impacto económico. Finalizó con veinte minutos de magnífica exposición de Hezi Waisman con la experiencia de más de 1 millón de pacientes que utilizaron este servicio en Israel, consiguiendo incluso integrar la exploración física en el sistema desarrollado.

SESIÓN COMUNICACIONES ORALES 2

VALIDATION OF THE PEDIATRIC SEQUENTIAL ORGAN FAILURE ASSESSMENT SCORE AND EVALUATION OF SEPSIS-3 DEFINITIONS IN THE PEDIATRIC EMERGENCY DEPARTMENT

Una comunicación que muestra la progresión de la investigación acerca de la aplicabilidad del score Sequential Organ Failure Assessment (SOFA) dirigida por Frances Balamuth (University of Pennsylvania, Perelman School of Medicine and Children's Hospital of Philadelphia). pSOFA ≥ 2 es infrecuente pero se asocia con aumento de la mortalidad, siendo más aplicable a los pacientes con sospecha de infección.

Background: In adult Sepsis-3, sepsis is defined as a Sequential Organ Failure Assessment (SOFA) score ≥ 2 plus suspected infection. A pediatric version (pSOFA) was derived among PICU patients.

Objective: Our aims were to validate the pSOFA score in the emergency department (ED) setting as a predictor of mortality in 1) all patients; and 2) patients with suspected infection.

Design/Methods: Retrospective observational study in 7 US children's hospitals using the Pediatric Emergency Care Applied Research Network (PECARN) Registry from 1/1/12-3/31/18. We included all ED visits for patients < 18 years. Using only ED data, pSOFA components (cardiovascular, respiratory, hematologic, hepatic, renal, neurologic) were assigned a score from 0 to 4. We compared hospital length of stay (LOS) and mortality for visits with ED pSOFA ≥ 2 and < 2 and calculated discrimination for mortality using area under the ROC curve (AUROC). Within the subset with suspected infection, defined by any infectious testing during the ED visit, we determined the LOS and mortality for sepsis (suspected infection + pSOFA ≥ 2) and septic shock (suspected infection + vasoactive infusion + serum lactate > 2 mg/dL).

Results: There were 3,076,500 ED visits during the study period. pSOFA scores ranged 0 to 14, with median (IQR) of 0 (0, 0). There were 88,986 (2.9%) visits with pSOFA ≥ 2 . Visits with pSOFA ≥ 2 had increased risk of death (RR 31.8 [95% CI 28.5, 35.7] and longer median LOS [54 [IQR] vs 39 [IQR] hours, $p < 0.001$) compared to those with pSOFA < 2 . Increasing pSOFA scores were associated with increased hospital mortality (Figure 1). pSOFA had fair discrimination for hospital mortality with AUROC 0.77 [95% CI 0.75, 0.78]; test characteristics in Table 1. There were 490,388 patients with suspected infection, of which 30,366 (6.2%) had sepsis, and 154 (0.03%) had septic shock. In these categories, hospital mortality was 0%, 0.9%, and 5.8% respectively; and median hospital LOS was 45, 83, and 164 hours, respectively (Table 2). pSOFA had increased discrimination for hospital mortality among patients with suspected infection (AUROC 0.86 [95% CI 0.84, 0.88]).

Conclusion(s): We evaluated the pSOFA score in a large, multicenter sample of pediatric ED visits. pSOFA ≥ 2 was uncommon but associated with increased mortality. pSOFA had fair discrimination for in-hospital mortality among all ED visits; and improved discrimination among patients with suspected infection.

PREDICTING CLINICAL DETERIORATION AMONG PEDIATRIC EMERGENCY DEPARTMENT PATIENTS WITH SUSPECTED INFECTION USING THE PERSEVERE BIOMARKERS

Este estudio dirigido por Michelle Eckerle (Cincinnati Children's Hospital Medical Center) identifica un nuevo conjunto de biomarcadores útiles para identificar en Urgencias aquellos pacientes con sospecha de infección y mayor riesgo de deterioro clínico en las siguientes horas.

Background: Predicting the trajectory of febrile illness in the pediatric emergency department (PED) is challenging. The pediatric sepsis biomarker risk model (PERSEVERE) accurately estimates baseline mortality risk among critically ill children with septic shock at the time of admission to an intensive care unit (ICU). It is unknown whether PERSEVERE predicts clinical deterioration among a lower acuity, undifferentiated PED population with suspected infection.

Objective: To determine the utility of mortality risk estimated by PERSEVERE for predicting clinical deterioration among PED patients with suspected infection. To determine whether an improved model could be constructed using the same biomarkers calibrated to this cohort, given the overall low acuity and low mortality in undifferentiated febrile PED patients.

Design/Methods: This prospective cohort study consecutively enrolled children ages 0-18 years in a tertiary care PED. Patients were eligible if they received a blood culture, intravenous antibiotics and at least one fluid bolus and chart review confirmed clinician suspicion for infection. PERSEVERE biomarkers were measured at presentation and corresponding mortality risk calculated. We defined the primary outcome of

clinical deterioration as at least one of: death, intubation, vasoactive medication administered >1 hour, initiation of/increase from baseline CPAP/BiPAP >1 hour, and/or intensive care unit (ICU) admission >24 hours. Diagnostic test statistics were used to evaluate predictive accuracy. Classification and regression tree (CART) analysis was used for model construction.

Results: 138 children were enrolled. 19.6% met the definition of clinical deterioration. Table 1 shows clinical characteristics. Mortality risk estimates from the original PERSEVERE model did not correspond to clinical deterioration. A new model using PERSEVERE biomarkers had sensitivity of 93% and negative predictive value (NPV) of 97% for predicting clinical deterioration. Figure 1 shows the CART model and characteristics.

Conclusion(s): A new model using PERSEVERE biomarkers has high sensitivity and NPV and a low negative likelihood ratio for predicting clinical deterioration in PED patients with suspected infection. In the PED, biomarkers may be most helpful not in identifying febrile children with signs of organ dysfunction, but in identifying those with low risk of progression. The test characteristics of this model suggest utility for ruling out likely clinical deterioration.

SESIÓN POSTERS 2

TIME TO POSITIVITY OF NEONATAL BLOOD CULTURES: IS IT TIME TO QUESTION THE 48-HOUR EMPIRIC ANTIBIOTIC RULE?

Estudio llevado a cabo en la Dalhousie University (Canada) en el que el tiempo medio de positividad del hemocultivo en pacientes con sepsis neonatal fue de 12 horas y en solo un 13% de los casos se positivizaron pasadas 24 horas. Los autores concluyen que probablemente se pueda acortar el tiempo de antibioterapia en aquellos neonatos en que este se inicia de forma empírica.

Background: Empiric antibiotic therapy for suspected sepsis is common practice in neonatal intensive care units (NICU). While standard practice is to discontinue antibiotics when blood cultures remain negative after 48 hours, the true time to positivity across gestational ages remains unclear.

Objective: To determine the time required for blood cultures to become positive, to determine the differences between time to positivity for early versus late onset sepsis and to determine factors related to time to positivity.

Design/Methods: A retrospective observational study of blood cultures drawn in neonates within 30 days of life with initiation of empiric antibiotic therapy between January 2013 to December 2017 at a level III Canadian NICU was performed. Data was analyzed using descriptive statistics, chi-square and student t-tests, and multivariable linear regression to examine the relationship between perinatal and neonatal variables on time to positivity.

Results: 2213 blood cultures were drawn

during the study period. 125 positive blood cultures (5.6%) were identified, of which 49 were excluded [contaminants (n=24); repeat positive cultures during the same sepsis event (n=25)]. The median time to positivity of blood cultures was 12.4 hours (IQR 9-19 h). 13.2% of positive cultures and 0.5% of all cultures drawn became positive after 24 hours. Time to positivity did not differ significantly between suspected early onset sepsis versus late onset sepsis (p=0.69). In the linear regression analysis that included gestational age, timing of sepsis onset, pre-treatment platelet count, white blood cell count, and bacterial gram stain, it was found that gram negative cultures were associated with significantly lower time to positivity (B=9.8; p=0.019).

Conclusion(s): With a median time to culture positivity of 12.4 h, many neonates potentially receive unnecessary antibiotic doses with the 48-hour antibiotic rule. A shorter duration of empiric antibiotic therapy may be considered to reduce unnecessary antibiotic exposure in the NICU.

TABLE 1. Multivariable linear regressions results

Variable	B	SEB	β	p
Gestational Age	-.333	.381	-.109	.386
Pre-Treatment platelet Count	-.013	.015	-.101	.412
White Blood Cell Count	.231	.134	.224	.088
Bacterial Gram Stain (Negative)	9.768	4.061	.291	.019
Timing of Sepsis Onset (Late Onset)	-3.975	4.975	-.097	.427

THE INFLUENCE OF A RAPID MENINGITIS/ENCEPHALITIS PANEL ON PEDIATRIC MENINGITIS CLINICAL PRACTICE**

Estudio llevado a cabo en la Universidad de Nebraska que concluye que la introducción de una prueba de identificación rápida de patógenos tanto virales como bacterianos en LCR en el manejo de pacientes con sospecha clínica de meningitis o encefalitis reduce el tiempo de hospitalización y permite ajustar más precozmente tratamientos antibacterianos o antivirales.

***En el resumen se citan varias tablas no disponibles en la versión on-line*

Background: The introduction of the Biofire FilmArray Meningitis/Encephalitis Panel (ME panel) allowed for rapid pathogen identification when evaluating pediatric meningitis or encephalitis. However, there have been limited studies examining the impact of this test on length of stay (LOS) and antimicrobial use.

Objective: The objective of this study was to determine if the use of the ME panel was associated with a change in clinical management as measured by LOS and antimicrobial use.

Design/Methods: A cross-sectional study was conducted in children 0-18 years who had a lumbar puncture within 48 hours of admission for an infectious work-up from 2015 to 2017. Demographic data, presenting symptoms, laboratory studies, and antimicrobials administered were collected. Primary outcome measure was LOS, with secondary measures of time on to narrowing of antibiotics, and doses of acyclovir.

A cumulative logit model was used to analyze antibiotic time. Age group, prior antibiotic use, cerebrospinal fluid (CSF) white blood cells (WBC), admission location, abnormal serum WBC, neurological symptoms, and positive cultures were evaluated as possible confounders. Negative bi-

nomial regression was selected to model acyclovir dose using the same confounders except HSV concern instead of prior antibiotics. $P < 0.05$ was considered statistically significant.

Results: Initial clinical presentation data can be found in table 1 with detected pathogens in table 2. ME panel use was associated with a decrease in LOS ($p=0.04$, OR 1.7, 95% CI 1.0-2.9), time to narrowing antibiotics ($p=0.006$, OR 1.9, 95% CI 1.2-3.0), and doses of acyclovir ($p < 0.001$, IRR 0.36, 95% CI 0.3-0.5). While there was a trend towards shorter total time on antibiotics, it did not reach significance ($p=0.053$) (Table 3). Eight patients had ME panel results that were discordant with the CSF culture results, primarily with positive ME panel and negative culture (Table 4). There was no mortality difference between the two groups.

Conclusion(s): ME panel is associated with a decreased LOS, time to narrowing of antibiotics, and acyclovir doses likely due to the rapid availability of results when compared to previous testing methods. While there were some discordant ME panel results, these are likely due to an increased sensitivity for detection after antibiotic exposure; further studies are required to the safety of basing clinical decisions on the ME panel.

TABLE 1. Demographic and presenting characteristics of patients in the ME panel and Non-ME panel groups

	ME panel (%) n=223	Non-ME panel (%) n=348	p-value
Age^			
< 30 days	67 (30%)	121 (34.8%)	0.19
30-90 days	100 (44.8%)	129 (37.1%)	
>90 days	57 (25.6%)	98 (28.2%)	
Premature (if <91 days) n= 166, 250	22 (13.3%)	34 (13.6%)	0.10
Not noted	1 (0.6%)	10 (4.0%)	

	ME panel (%) n=223	Non-ME panel (%) n=348	p-value
Female	110 (49.3%)	157 (45.1%)	0.33
Male	113 (50.7%)	191 (54.9%)	
Admission location [^]			0.0009*
Medical floor	169 (75.8%)	241 (69.3%)	
PICU	32 (14.3%)	33 (9.5%)	
NICU	22 (9.9%)	74 (21.3%)	
GBS status (if <91 days) n= 166, 250			0.49
Negative	56 (34%)	101 (40.4%)	
Positive (adequate antibiotics)	30 (18%)	39 (15.6%)	
Positive (inadequate antibiotics)	9 (5%)	9 (3.6%)	
Unknown	71 (43%)	101 (40.4%)	
Herpes simplex virus concern [^]	17 (7.6%)	37 (10.6%)	0.23
Neurologic symptoms [^]	57 (25.6%)	85 (24.4%)	0.77
Focal symptoms	114 (51.1%)	161 (46.2%)	0.26
Immunosuppression [^]	4 (1.8%)	10 (2.9%)	0.58
Acute Kidney injury	8 (3.5%)	18 (5.2%)	0.42
Antibiotics prior to lumbar puncture [^]	66 (29.6%)	100 (28.7%)	0.83
Abnormal serum WBCs	44 (19.7%)	84 (24.1%)	0.26
CRP (mg/L)			0.02*
< 0.7	32 (14.3%)	40 (11.5%)	
> 0.7	44 (19.7%)	105 (30.2%)	
Not done	147 (65.9%)	203 (58.3%)	
Bloody lumbar puncture (>1000 RBCs)	93 (41.7%)	127 (36.5%)	0.53
No cell count	7 (3.1%)	31 (8.9%)	
Abnormal imaging [^]	23 (10.3%)	26 (7.4%)	0.09
Positive cultures			1.00
Urine	21 (9.4%)	33 (9.5%)	
Blood	9 (4.0%)	17 (4.9%)	
Respiratory	11 (4.9%)	7 (2.0%)	
CSF	5 (2.2%)	5 (1.4%)	
PICC line in place	31 (13.9%)	38 (10.9%)	0.30
Infectious disease consult	53 (23.8%)	61 (17.5%)	0.09
	ME panel median (range)	Non-ME panel median (range)	p-value
WBC (CSF) (leukocytes/mm ³)	8 [0-11976]	7.5 [0-4715]	
PRISM III (PICU only)	3.5	2.5	0.44
* denotes statistically significant at $P < 0.05$. [^] denotes variables included in multivariate model. WBC- white blood cell, CSF- cerebrospinal fluid, PRISM- pediatric risk of mortality, GBS- group B streptococcus, PICU- pediatric intensive care unit, NICU- neonatal intensive care unit. CRP- C-reactive protein			

PREVALENCE OF URINARY TRACT INFECTION IN INFANTS WITH UPPER AIRWAY INFECTIONS AND FEVER $>39^{\circ}\text{C}$

Estudio presentado por Roberto Velasco (Hospital Universitario Río Hortega), que analiza la prevalencia de ITU en lactantes con fiebre $>39^{\circ}\text{C}$ y síntomas respiratorios de vías altas. Concluye que la prevalencia en los varones <12 meses y las mujeres <24 meses es superior al 4%, por lo que estaría indicado descartar la presencia de una ITU concomitante. Además, plantea que todos los positivos se encontraron en varones <3 meses y en niñas <18 meses de edad, por lo que apunta a que quizá estos deberían ser los puntos de corte, pero es necesario un mayor tamaño muestral para asegurar ese punto

Background: Guidelines recommend ruling out urinary tract infections (UTI) in infants with fever without source if temperature is higher than 39°C . Some authors had described a high prevalence also in infants with bronchiolitis and fever $\geq 39^{\circ}\text{C}$. Nevertheless, to our knowledge, no study has analyzed specifically the prevalence of UTI in infants with upper respiratory tract infections (URTI) and fever.

Objective: To analyze the prevalence of UTI in infants with symptoms of URTI and a temperature $\geq 39^{\circ}\text{C}$.

Design/Methods: Prospective unicenter study, including male infants up to 12 months old and female infants up to 24 months old with symptoms or signs of URTI (cough, rhinorrhea, hyperemic or vesiculous oropharynx) and a temperature $\geq 39^{\circ}\text{C}$ at home or the ED. Patients with symptoms of lower tract respiratory infections (wheezing, crackling or hypoventilation at pulmonary auscultation), patients with diarrhea or those who had received antibiotic treatment in the prior seven days were excluded. A first urine sample was obtained by any method, under physician decision, but all positive urine dipstick of a non-sterile sample was confirmed in a second

sample obtained by a sterile method (urethral catheterization, suprapubic aspiration or clean-catch method). Only samples by a sterile method were used for urine culture. UTI was defined as the combination of a positive urine dipstick (positive leukocyte-esterase or nitrite test) and a urine culture growing more than 10,000 cfu/ml, both in sterile samples.

Results: A total of 287 infants were included. Of these, 83 (28.9%) were males and 204 (71.1%) females.

In 269 (93.7%) a urine sample was obtained by perineal bag, being 57 (21.2%) positive. In 80 (27.9%) infants a sterile urine sample was obtained (including those 57 with a non-sterile positive urine dipstick), being the urine dipstick positive in 24 (30%). A final diagnosis of UTI was made in 14 (4.9%; CI 95% 2.9% - 8.0%) patients. All urine cultures were positive to *Escherichia coli*.

There were no differences between male (4.8%) and female (4.9%) patients in the prevalence of UTI.

Conclusion(s): Prevalence of UTI in infants with upper respiratory tract infections and temperature $\geq 39^{\circ}\text{C}$ is higher than 2%. According to that, UTI should be ruled out in these patients.

NITRITURIA IS A RISK FACTOR FOR INVASIVE BACTERIAL INFECTION IN FEBRILE INFANTS UNDER 90 DAYS OLD. A RISEUP-SPERG STUDY

Estudio presentado por Roberto Velasco (Hospital Universitario Río Hortega), que identifica a la nitrituria como un factor de riesgo independiente de presentar una bacteriemia en lactantes < 90 días con fiebre sin foco.

Background: Combination of leukocyturia and/or nitrituria has been proven to be an independent risk factor for bacteremia in febrile infants under 90 days old. Nevertheless, to our knowledge, no study has analyzed specifically the value of nitrituria to identify young febrile infants at risk for invasive bacterial infections (IBI) when evaluated in the emergency department (ED).

Objective: To analyze the association between a positive nitrite test in the urine dipstick and a positive bacterial blood or cerebrospinal fluid (CSF) culture in febrile infants under 90 days old.

Design/Methods: Secondary analysis of a prospective multicenter sample of febrile infants less than 90 days old attended in 19 Spanish paediatric ED included in RISEUP-SPERG (Spanish Pediatric Emergency Research Group), between

October-2011 and September-2013. IBI was defined as a positive bacterial blood or CSF culture.

Results: A total of 3401 infants were included. Of these, urine dipstick was altered (leukocyturia and/or nitrituria) in 766 (22.5%) and 107 were diagnosed with an IBI (3.1%) In table 1, prevalence of bacteremia and a positive bacterial CSF culture according to urine dipstick result is shown.

After adjusting by the presence of leukocyturia and other potential confounders, as age, sex, previous genitourinary malformations, maximum temperature and appearance, a positive nitrite test in the urine dipstick resulted as a risk factor for developing an IBI (OR 2.6, CI 95% 1.47 – 4.61).

Conclusion(s): In febrile infants under 90 days old, a positive nitrite test in the urine dipstick is an independent risk factor for IBI.

TABLE 1.

Urine dipstick	Bacteremia (%; CI95%)	Positive CSF culture (%; CI95%)
Negative (n=2635)	53 (2.0%; 1.5%-2.6%)	15 (0.6%; 0.3%-0.9%)
LE + (n=496)	21 (4.2%; 2.8%-6.4%)	1 (0.2%; 0%-1.1%)
NT + (n=24)	2 (8.3%; 2.3%-25.8%)	0 (0%; 0%-13.8%)
LE+ and NT + (n=246)	24 (9.8%; 6.6%-14.1%)	2 (0.8%; 0.2%-2.9%)

Prevalence of bacteremia and a positive bacterial CSF culture according to urine dipstick result.

PERFORMANCE OF THE BLOOD ENTEROVIRAL POLYMERASE CHAIN REACTION TEST IN THE MANAGEMENT OF INFANTS UNDER 90 DAYS OF AGE WITH FEVER WITHOUT SOURCE

Estudio presentado por Borja Gómez (Hospital Universitario Cruces), que analiza el impacto de la introducción de la PCR para enterovirus en sangre en el manejo del lactante < 90 días con fiebre sin foco. Muestra que aquellos con un resultado positivo tienen un bajo riesgo de presentar una infección bacteriana invasiva y aquellos que ingresan una menor estancia hospitalaria y duración de tratamiento antibiótico

Background: Young febrile infants with microbiologically confirmed viral infections, such as influenza, present a low risk of a concomitant invasive bacterial infection (IBI). Little is known about the value of the blood enteroviral polymerase chain reaction (be-PCR) test in the emergency department (ED) management of these patients.

Objective: 1) To analyze the prevalence of IBI (bacterial pathogen in blood or cerebrospinal fluid) and non-IBI (urinary tract infections [UTIs] and bacterial gastroenteritis) in infants with fever without source (FWS) and a positive or negative be-PCR. 2) To compare the length of stay and the length of antibiotic treatment in hospitalized infants.

Design/Methods: Secondary analysis of a prospective registry that includes all the infants ≤ 90 days of age with FWS attended in a pediatric ED. We analyzed those infants attended between September 2015 and August 2018 with at least blood and urine cultures and a urine dipstick performed.

Results: A be-CRP was performed in 545 of the 638 infants (85.4%). Infants with and without this test performed were similar in relation to their general appearance and age. A positive result was obtained in 153 (28.0%), with seasonal

variations (42.1% in May-July vs 20.1% during the rest of the year, $p < 0.01$).

Global prevalence of IBI and non-IBI was 1.1% [95% CI: 0.3-1.9%] and 16.9% [95% CI: 14.0-19.8%]. No patient with a positive be-PCR was diagnosed with an IBI (vs 1.5% [95% CI: 0.3-2.7%] of those with a negative be-PCR; $p = 0.19$). Prevalence of IBNI was higher in infants with a negative be-PCR (16.8% [95% CI: 13.1-20.5%] vs 2.0% [95% CI: 0-4.2%] in those with a positive test [$p < 0.01$]). Two other infants were diagnosed with a clinical sepsis with no microbiological confirmation; both had a negative be-PCR.

Among the 245 hospitalized infants (38.4%), 178 received antibiotic treatment (72.6%). Length of hospitalization and length of antibiotic treatment were higher in those with a negative be-CRP (4.90 vs 3.23 days and 4.74 vs 2.17 days, respectively [$p < 0.01$]). Differences were also observed among infants without leukocyturia (UTI non suspected): 4.56 vs 3.18 days and 4.15 vs 1.97 days, respectively [$p < 0.01$].

Conclusion(s): The be-PCR identifies a group of infants ≤ 90 days old with FWS and a very low risk of IBI. Its inclusion in the management of these patients can also reduce the length of hospitalization and of antibiotic treatment in hospitalized infants.

THE UTILITY OF PROCALCITONIN IN CHILDREN WITH SUSPECTED SEPSIS PRESENTING TO THE EMERGENCY DEPARTMENT

Estudio llevado a cabo en el Phoenix Children's Hospital en el que en pacientes en los que se activa en Triage la "alerta sepsis" identifican una relación directa entre el valor de la procalcitonina y un diagnóstico final de bacteriemia, sepsis grave, shock séptico y éxitus.

Background: Sepsis continues to be one of the leading causes of morbidity and mortality in children. Early recognition and treatment has been proven to have a significant impact on patient survival. Procalcitonin (PCT) is an amino acid peptide that rises in the presence of a bacterial infection and has been shown to be useful in diagnosing sepsis in certain environments. However, there is a lack of strong evidence regarding its utility in the pediatric emergency department setting.

Objective: The primary goal of this study was to determine the association between procalcitonin and the presence of bacteremia, severe sepsis, septic shock, and mortality. A secondary goal was to establish a PCT threshold that is predictive of more severe outcomes in patients with suspected sepsis.

Design/Methods: This is a retrospective observational cohort study conducted in a tertiary pediatric emergency department from May 2015 through December 2016. Patients 2 months to 18 years of age who triggered an electronic sepsis trigger alert and who had both a blood culture and procalcitonin sent from the ED were included.

Results: 486 patients were included in the study. In patients with bacteremia without septic shock (n=35, 7.2%), the mean PCT level was

4.68 ng/ml compared to 2.10 ng/mL for patients without bacteremia ($p < 0.0001$). For patients with severe sepsis (n=16, 3.3%), the mean PCT level was 3.88 ng/mL as compared to 1.60 ng/mL in patients without severe sepsis ($p=0.0185$). Patients with septic shock (n=31, 6.4%) had a mean PCT level of 11.09 ng/mL as compared to 1.68 ng/mL for patients without septic shock ($p < 0.0001$). The mean PCT level for patients who died (n=4, 0.8%) was 65.3 ng/mL as compared to 1.76 ng/mL for patients without mortality ($p=0.0054$). Higher PCT levels were also observed with ICU admissions as compared to patients admitted to the hospital floor or discharged from the emergency department. PCT levels greater than 1 ng/ml were significantly associated with all outcomes, particularly septic shock.

Conclusion(s): In children presenting to the emergency department with clinical concern for sepsis, elevated procalcitonin levels were significantly associated with bacteremia, severe sepsis, septic shock, and mortality. PCT levels greater than 1 were associated with worse outcomes. Using procalcitonin may improve clinicians' ability to more accurately detect severe sepsis outcomes in pediatric patients and intervene in a timelier manner.

SESIÓN COMUNICACIONES ORALES 3

MEDICATION EDUCATION FOR DOSING SAFETY: A RANDOMIZED CONTROLLED TRIAL

Estudio desarrollado en el Massachusetts General Hospital, en el que presentan una sencilla iniciativa de seguridad llevada a cabo al alta del paciente para asegurar que los pacientes reciban en domicilio la dosis correcta de medicación. Aunque el estudio lo dirigen a la administración de ibuprofeno y paracetamol, se podría extrapolar a otras medicaciones administradas en forma de suspensión y enfocarlo a los pacientes que puedan ser más vulnerables, como aquellos con barrera idiomática

Background: Approximately 30% of parents are at risk for error dosing medications for their children after discharge from the emergency department (ED), even when using common medications, such as acetaminophen. Although plain-language, pictogram-based instructions have shown promise in primary care, the best strategies for ED medication teaching are not known.

Objective: To determine whether a brief intervention at time of ED discharge improves correct dosing

Design/Methods: We performed a randomized controlled trial of parents/guardians of children (aged 90 days to 11.9 years) who spoke English or Spanish and were being discharged from an urban academic ED with acetaminophen and/or ibuprofen. Families were randomized to standard care (routine discharge) or a teaching intervention that combined lay language, simplified handouts, provision of a syringe, and read-back, teach-back to reinforce correct dosing. Participants were called at 48-72 hours after ED discharge to assess their understanding of the correct dose (primary

outcome). We examined bivariate associations using Chi2 testing, and then used unadjusted and multivariable logistic regression to examine the association between intervention status and correct dosing.

Results: 144 subjects were enrolled; 86 (60%) were reached at 48-72 hours after ED discharge. There were no significant differences between intervention and control groups regarding parental gender, language, or health literacy, or child race/ethnicity. At follow-up, 22 (76%) of parents who received the intervention were able to identify a safe dose for their child compared to 27 (47%) who received the control (P=0.01). The unadjusted odds of implementing correct dosing were significantly higher in the intervention compared to control group (OR 3.49, 95%CI 1.29-9.46). This benefit was unaffected by adjustment for parental language and health literacy (aOR 3.44; 95%CI 1.22-9.69).

Conclusion(s): A brief intervention at ED discharge – consisting of a simplified dosing handout, a teaching session, and teach-back – improved correct dosing of liquid medications for children.

RACIAL AND LANGUAGE DISPARITIES IN PEDIATRIC EMERGENCY DEPARTMENT TRIAGE

Estudio desarrollado en el Seattle Children's Hospital en el que muestran la relación entre la raza de los pacientes y el nivel de gravedad otorgado en Triage (mayor probabilidad de nivel de gravedad bajo para aquellos pacientes de no raza blanca), sin poder establecer si esto es debido a diferencias reales en la gravedad o a un sesgo de Triage.

Background: Past studies have shown that non-white pediatric patients receive lower acuity triage scores compared to white patients, but these reports did not control for patient illness severity.

Objective: We sought to assess the impact of race and language on Emergency Department (ED) triage scores while accounting for illness severity. We hypothesized that non-white and non-English speaking patients receive lower acuity triage scores compared to white and English-speaking patients respectively.

Design/Methods: We designed a cross-sectional study that compared Emergency Severity Index (ESI) scores during visits for patients aged 0 to 17 years old at our pediatric ED from July 2015 through June 2016. Data was compiled from patient charts. Illness severity was measured using a truncated Modified Pediatric Early Warning Score (MPEWS) calculated from patient vital signs. The association between race and ESI score was assessed using multivariate multinomial logistic regression. We evaluated several secondary outcomes and their interactions with the ESI score to understand the clinical impact of the initial ESI on a patient's ED visit. Time to provider and ED length of stay were assessed using Kaplan-Meier survival curves and Cox Proportional Hazards model. Pa-

tient disposition was assessed using multivariate binary logistic regression.

Results: Our final dataset consisted of 10,815 visits from 8,928 patients. White, non-Hispanic (WNH) patients accounted for (34.6%) of patients. The frequency of abnormal vital signs was balanced between WNH and non-white groups. In the adjusted analyses, non-white patients have significantly reduced odds of receiving a score of 2 (Emergency) (OR 0.40, 95% CI: 0.33-0.49) or 3 (Urgent) (OR 0.50, 95% CI: 0.45-0.56), and significantly higher odds of receiving a score of 5 (Minor) (OR 1.34, 95% CI: 1.07-1.69) compared to a score of 4. We did not find a consistent disparity in ESI scores when comparing English and non-English speaking patients. Time to provider was significantly shorter (HR 1.98, 95% CI: 1.76-2.22) and ED length of stay was significantly longer for ESI 2 compared to ESI 4 (HR 0.36, 95% CI 0.34-0.39). Non-white patients stayed in the ED slightly longer than WNH patients (HR 1.08, 95% CI 1.03-1.14) while language did not significantly affect these secondary outcomes.

Conclusion(s): Even when accounting for illness severity, race has a strong influence on triage scoring which results in a clinically significant health care disparity. ESI scores predict time to see a provider, ED length of stay, and disposition.

AN INJURY PLAUSIBILITY MODEL TO DIFFERENTIATE ABUSIVE FROM ACCIDENTAL FRACTURES IN YOUNG CHILDREN

Estudio presentado por Mary Pierce (Ann & Robert H. Lurie Children's Hospital of Chicago). Se trata de un análisis secundario de un estudio multicéntrico en el que reclutaron pacientes < 4 años de edad con fracturas no craneales. Presentan un score que incluye cuatro ítems (historia referida el traumatismo, consistencia de la historia con el tipo de fractura, retraso en la consulta médica y presencia de determinadas lesiones cutáneas) con una sensibilidad y especificidad > 95% para identificar aquellas secundarias a maltrato.

Background: Fractures are common in children, and those resulting from child abuse are often initially misdiagnosed as accidental. Differentiating abusive from accidental fractures in young children can be challenging and accuracy is essential to prevent missed abuse as well as over-diagnosis. Tools to improve diagnostic accuracy are lacking.

Objective: To test our fracture injury plausibility model (FxIPm) for differentiating abusive from accidental fractures in young children.

Design/Methods: We conducted a secondary analysis of an existing dataset of 2165 children < 4 years of age with bruising, prospectively enrolled from emergency departments of 5 children's hospitals. In this analysis, children were included if they had at least one non-skull fracture. Children were excluded if they had only a skull fracture, known bone disease, bleeding disorders, or were involved in a motor vehicle crash. A 9-member expert panel, blinded to FxIPm scoring, independently categorized cases as abuse, accident, or indeterminate. The panel's decisions were compared with the FxIPm scores to evaluate the ability of the FxIPm score to discriminate abusive and accidental fractures and determine predictive accuracy. The FxIPm is comprised of 4 "red flag" domains each with a score of 0 or 1,

which are summed to obtain a total FxIPm score ranging from 0 (no red flags) to 4 (maximum red flags) (Table 1).

Results: 201 patients met inclusion criteria. The expert panel categorized 84 patients as having abusive injuries and 115 with accidental injuries. Two patients categorized with indeterminate injuries were excluded from analysis. Children with abusive injuries were significantly younger than those with accidental injuries (median age = 0.75 vs. 2.43, $p < .001$). The FxIPm differentiated abuse from accident with 98% sensitivity and 97% specificity (Table 2). Almost all children with accidental injuries (97%) had FxIPm scores of 0 or 1. Conversely, almost all abused children (98%) had FxIPm scores of 3 or 4. A small number of children in both groups scored 2s (Table 2). The model established categories of low risk for abuse (plausible), intermediate risk, and high risk for abuse (not plausible).

Conclusion(s): The FxIPm had excellent model performance and 4 domains correctly identified both low and high risk patients for abuse. The FxIPm has the potential to improve clinical decision-making in young children with fractures. Findings warrant the evaluation of the model's reliability and accuracy in different clinical settings.

SESIÓN POSTERS 3

A QUALITY IMPROVEMENT INITIATIVE TO REDUCE TREATMENTS IN BRONCHIOLITIS IN A PEDIATRIC EMERGENCY DEPARTMENT AND PRIMARY CARE

Estudio presentado por Javier Benito (Hospital Universitario Cruces) que presenta una iniciativa de mejora de la calidad en la atención de los pacientes con bronquiolitis desarrollada conjuntamente entre pediatras de atención primaria y pediatras de su Servicio de Urgencias de Pediatría de referencia. Dicha iniciativa redujo el uso de tratamientos farmacológicos innecesarios en los dos ámbitos.

Background: Acute bronchiolitis (AB) represents one of the most frustrating care conundrums in pediatrics. Although evidence-based guidelines recommend primarily supportive care, many unnecessary treatments persist, contributing to a quality problem of overtreatment. However, standardizing treatment requires multifaceted approach, which is still a challenge.

Objective: To implement and assess a quality improvement (QI) initiative to reduce the overuse of unnecessary treatments in infants with AB in Primary Care (PC) settings and the referral Pediatric Emergency Department (ED).

Design/Methods: We designed and executed this QI during two bronchiolitis seasons [October-Mars of 2016-2017 (pre-intervention period) and 2017-2018 (post-intervention period)].

Between those seasons we distributed an evidence-based management protocol, informative posters and badges for uniforms with the slogan "Bronchiolitis, less is more". Furthermore, we developed interactive sessions with on-line data collection and feed-back. Pediatricians received a weekly report with personal and global data on the prescription of bronchodilators.

The main outcome was the rate of infants receiving salbutamol. Secondary outcomes were the rate of infants receiving epinephrine, antibiotics and corticosteroids.

The control measures were the rate of ED visits and hospitalization due to AB in infants from the two PC areas included in the study, triage level, length of stay (LOS) in the ED, Pediatric Intensive Care Unit (PICU) admission and unscheduled returns with admission within 72 hours.

Results: During the study period we reviewed 1876 episodes in the ED (1021 in the pre-intervention period and 855 in the post-intervention period) and 1129 in PC settings (658 and 471, respectively).

In the ED, salbutamol was reduced from 13.8% (95% CI, 11.8-16) to 9.1% (95% CI, 7.3-11.2) ($p < 0.01$) and epinephrine from 10.4% (95% CI, 8.6-12.4) to 9% (95% CI, 7.2-11.1) (not significant [n.s.]).

In PC setting salbutamol was reduced from 38.3% (95% CI, 34.6-42.0) to 15.9% (95% CI, 12.9-19.5) ($p < 0.01$), corticosteroids from 12.9% (95% CI, 10.5-15.7) to 3.6% (95% CI, 2.2-5.7) ($p < 0.01$), and antibiotics from 29.6% (95% CI; 26.2 - 33.2) to 9.5% (95% CI; 7.2- 12.5) ($p < 0.01$).

No significant variations were noted related to control measures.

Conclusion(s): Using a QI initiative, we safely decreased the use of unnecessary treatments in infants with AB. Collaboration between PC units and ED appears as an important context factor for successful improvement.

DEXAMETHASONE AS TREATMENT FOR STATUS ASTHMATICUS IN THE PEDIATRIC EMERGENCY DEPARTMENT

Estudio retrospectivo llevado a cabo en el Akron Childrens Hospital (Ohio) en el que se compararon los pacientes con crisis de asma que recibieron una dosis de dexametasona con aquellos que recibieron una pauta de 5 días de prednisolona. Ambos grupos presentaron el mismo porcentaje de pacientes que recibieron en los siete días siguientes alguna otra dosis de corticoide, por lo que concluyen que ambos tratamientos presentan la misma utilidad. Como limitación, no analizan otras posibles diferencias (persistencia o duración de síntomas...).

Background: Asthma is the most common chronic disease in children. It is a chronic condition that causes inflammation of the bronchioles leading to bronchoconstriction. Reversal of airflow obstruction is achieved through inhaled bronchodilators and systemic glucocorticoids. Current mainstay steroid treatment typically consists of a 5-day course of prednisone. Recent studies have looked at the potential benefit of utilizing dexamethasone. The longer half-life of dexamethasone allows for only one or two doses to treat an acute exacerbation.

Objective: The goal of this study was to determine if a single dose of dexamethasone in emergency department is adequate steroid coverage for patients with asthma exacerbation discharged home.

Design/Methods: This is a retrospective study of patients discharged from the ED with the diagnosis of asthma exacerbation between August 2016-August 2017. Patients included were 18 years old or younger with the diagnosis of asthma, who received a steroid and were discharged home. Patients were excluded if they did not follow with an Akron Children's pediatrician or asthma specialist. Return ED or outpatient visits were looked at within a 7 day time frame from discharge to determine if further steroids were prescribed.

Statistical analysis variables were examined via ANOVA and ANCOVA. The Breslow-Day Test, Cochran-Mantel-Haenszel Test and Chi2 Test were used to assess potential dependent relationships.

Results: A total of 1311 patients were evaluated. Patients were excluded due to being prescribed both steroids (8 patients) or not prescribed a steroid (360 patients). We analyzed 233 in the dexamethasone group and 710 in the prednisone group. The pediatric asthma score (PAS) for dexamethasone was mean of 7.8 and 7.4 for prednisone. In the dexamethasone group, all 233 patients were given the one-time dose in the ED, 13 received a second dose for home. Only 12.5 % of patients in the dexamethasone group required additional steroids within the one-week time frame. In the prednisone group 9.2% required additional medication. There was no statistical difference between these groups (p value 0.146).

Conclusion(s): In our study there was no statistical difference between patients who received a one-time dose of dexamethasone or receiving a 5-day course of prednisone in need for additional steroids. These patients were classified as mild asthma exacerbations based on pediatric asthma score in the ED. We conclude that for patients with mild asthma exacerbations one dose of dexamethasone is adequate steroid coverage.

SESIÓN POSTERS 4

BREATHING EASIER: AN AIRWAY SAFETY BUNDLE TO DECREASE INTUBATION ASSOCIATED ADVERSE EVENTS

Estudio presentado por Tara Neubrand (Universidad de Colorado), que muestra como la creación de un paquete de medidas para la intubación endotraqueal supuso en los tres años siguientes una disminución de los eventos adversos asociados a esta técnica. El paquete de medidas consistió en 1) identificación de los equipos por códigos de colores según peso, 2) esquema visual del material de vía aérea, 3) cards de medicación de secuencia rápida de intubación con dosis, 4) check-list de seguridad y 5) documentación del procedimiento estandarizada en la historia clínica electrónica.

Background: Endotracheal intubation (ETI) is a low frequency, high risk procedure in the pediatric emergency department (PED) and pediatric urgent care (PUC) setting. Critically ill children requiring intubation have decreased physiologic reserves and are at risk for tracheal intubation associated adverse events (TIAAE). Adult and pediatric literature suggests that increased process variability, increased time to intubation, and increased number of intubation attempts are all associated with poor patient outcomes.

Objective: This study aims to implement a 5-part airway safety bundle with the goal of decreasing intubation-associated adverse events and improving patient safety.

Design/Methods: This is a quasi-experimental study conducted across a single, academic, tertiary PED and 5 satellite community PUCs/ PEDs staffed by pediatric emergency medicine physicians and general pediatricians. Primary outcome was number of TIAAE and were calculated using χ^2 . Secondary outcomes included: time to intubation (TTI) and first pass intubation success rate (FPISR). TTI was defined as time from first medication given for rapid sequence intubation (RSI) to time of successful intubation and p-value was calculated with Wilcoxon 2-sample test. Pro-

cess measures included rate of compliance with recommended medication doses. After reviewing charts to obtain baseline data, we launched an airway bundle that included: (1) color-coded weight based equipment chart, (2) visual schematic of airway equipment, (3) RSI medication ordering/dosing sheet, (4) RSI safety checklist, and (5) standardized procedure documentation in the electronic health record.

Results: From December 2015-November 2018, there were 181 intubations: 135 at the tertiary site and 46 at the community sites, with 42 occurring prior to bundle rollout, and 139 post-bundle. The number of severe TIAAE decreased at the tertiary PED (22.7% vs 5.3%, $p = 0.02$) and the community sites (25.0% vs 0.0%, $p = 0.01$) (Table 1). Provider level outcomes are described in Table 2 and include decrease in TTI in the tertiary site and increase in recommended medication dosing compliance in the community site ($p < 0.05$). FPISR remained unchanged in either site.

Conclusion(s): After initiation of an airway bundle across a network of tertiary and community PED/PUCs we saw a decrease in intubation-associated adverse events. Further study is required to investigate whether achievements are sustainable or associated with improved patient outcomes.

EFFICACY OF THE BATIC SCORE IN CHILDREN WITH BLUNT ABDOMINAL TRAUMA

Este estudio, presentado por Michael Sorto-Velazquez (St. Barnabas Hospital) validó retrospectivamente un score para predecir la presencia de una lesión intraabdominal en pacientes menores de 21 años. Con un punto de corte de 7, el score (ver tabla), mostró unos valores predictivos positivo y negativo del 90% y 98%. Aunque es un estudio retrospectivo, sobre una muestra seleccionada, en la que se había realizado TAC abdominal, los resultados son prometedores.

RISK FACTORS FOR PEDIATRIC SEVERE ANAPHYLAXIS

Mikel Olabarri (Hospital de Cruces) presentó este estudio multicéntrico realizado en SEUP que nos muestra cómo los pacientes con antecedentes de asma, aquellos en los que la sintomatología comenzó antes de 5 minutos tras la exposición al alérgeno, o presentaron mal aspecto, taquicardia o hipotensión a su llegada a urgencias, tuvieron un riesgo superior de un episodio de anafilaxia grave.

Background: Anaphylaxis is an acute, potentially life-threatening syndrome. Overall, the prognosis is good if anaphylaxis is treated early. Nevertheless, some patients show more severe reactions with incomplete response to first line treatment.

Objective: To identify risk factors associated with severe anaphylaxis in children

Design/Methods: We carried out a multicenter prospective observational study including those children less than 14 years old diagnosed with anaphylaxis in 7 Spanish pediatric emergency departments (ED) between May 2016 and May 2018. Severe anaphylaxis was defined when fulfilling one or more of the following: two or more doses of epinephrine required, biphasic reaction, endotracheal intubation required, admission to intensive care unit and death.

Results: We included 453 episodes of anaphylaxis. Of these, 428 [[94.5%, CI 95% (92.0-96.2)] received epinephrine and 61 were classified as severe anaphylaxis [13.5%, CI 95% (10.6-16.9)]: 53

(11.7%) required more than one dose of epinephrine, 14 (3.1%) had a biphasic reaction, 2 (0.4%) were intubated in the ED and 6 (1.3%) were admitted to the intensive care unit. No patient died.

In the multivariate analysis including data of the history, circumstances of the episode and findings of the physical exam upon arrival to the ED, we identified five independent risk factors for severe anaphylaxis: history of asthma [p=0.002; OR 2.705, IC 95% (1.431-5.113)], onset of the symptoms less than five minutes after the allergen exposure [p=0.002; OR 2.619, IC95% (1.410-4.866)], non-well appearance [p= 0.005; OR 2.973, IC95% (1.380-6.405)], tachycardia [p=0.014; OR 2.339, IC95%(1.191-4.959)] and hypotension [p=0.036; OR 3.725, IC95% (1.087-12.762)]

Conclusion(s): Childhood anaphylaxis is usually well controlled in the ED. Those children with a previous history of asthma, rapid onset of the symptoms, non-well appearing or with tachycardia or hypotension upon arrival to the ED are more prone to have severe episodes.

EFFICACY OF THE BATIC SCORE IN CHILDREN WITH BLUNT ABDOMINAL TRAUMA

Este estudio validó retrospectivamente un score para predecir la presencia de una lesión intraabdominal en pacientes menores de 21 años. Con un punto de corte de 7, el score (ver tabla), mostró unos valores predictivos positivo y negativo del 90% y 98%. Aunque es un estudio retrospectivo, sobre una muestra seleccionada, en la que se había realizado TAC abdominal, los resultados son prometedores.

Background: Children present a diagnostic challenge regarding severe intra-abdominal injury secondary to blunt abdominal trauma (BAT). Early diagnosis is imperative to reduce potentially significant morbidity and mortality. Computed tomography (CT) is considered the gold-standard diagnostic tool for the detection of clinically significant injuries but recent studies have shown its frequent use in hemodynamically stable patients with low risk of intra-abdominal injury. Blunt Abdominal Trauma in Children (BATiC) score was devised to aid in the identification of stable children who are at risk for serious intraabdominal injury, which can be calculated using readily available parameters.

Objective: To validate the BATiC score in children with BAT in an inner city community hospital

Design/Methods: Retrospective study; patients <21 years diagnosed with BAT evaluated in the Emergency Department at a university affiliated community hospital between 2014 and 2018 were reviewed and analyzed. BAT was defined as any injury to the abdomen sustained from blunt force without penetration to the abdominal cavity. Patients were included only if all BATiC score parameters were available and abdominal CT performed. Sensitivity, specificity, NPV, PPV, and Area under the curve were computed. The calculated BATiC score was correlated with CT scan results to determine the association with intra-abdominal injuries.

Results: 334 charts from the trauma list were reviewed, 214 did not meet inclusion criteria and 38 were excluded due to incomplete BATiC score measurements. Out of remaining 82 patients, 46 (56%) were males. Median BATiC scores of patients with and without intra-abdominal injury were 14 and 3 points respectively. When the BATiC score was used with a cutoff point of 7, the

test showed a sensitivity of 96% and a specificity of 94%. Negative and positive predictive values were 98% and 90% respectively. The most common mechanism of injury was physical assault (34 patients, 46.6%) and motor vehicle accident (34 patients, 46.6%), followed by fall (14 patients, 6.8%).

Conclusion(s): The BATiC score can be a useful tool in the assessment of intra-abdominal injury in children with blunt abdominal trauma. In hemodynamically stable patients with a normal abdominal ultrasound and a BATiC score of ≤ 7 , intra-abdominal lesions were unlikely, and systematic CT scan or hospital admission may not be necessary. The use of a standardized scoring system would be helpful in the rapid assessment of pediatric patients presenting with BAT by decreasing the use of unnecessary imaging.

TABLE 1. BATiC Cut off Points

Variables	Study Value	Points
Ultrasound	Yes/No	4
Abdominal Pain	Yes/No	2
Peritoneal Irritation	Yes/No	2
Hemodynamic Instability	Yes/No	2
ASAT	ASAT > 60 IU/L	2
ALAT	ALAT > 25 IU/L	2
WBC	WBC > 10x 10 ⁹ /L	1
LDH	LDH > 330 IU/L	1
Lipase (amylase)	Amylase >10 IU/L	1
Creatinine	Creatinine	1

The total BATiC score is calculated by summing the points of each item

THE PREVALENCE OF BACTEREMIA IN FEBRILE SICKLE CELL PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF OBSERVATIONAL STUDIES

Natasha Bala (Hospital Kings County) ha realizado una revisión sistemática con metaanálisis para evaluar la prevalencia de bacteremia en los pacientes con enfermedad de células falciformes y fiebre sin foco. La prevalencia global fue del 1'76%, con una prevalencia de bacteremia por S. pneumoniae del 0'26%, por lo que concluyen que no estaría indicado realizar hemocultivo de manera sistemática salvo que tengan una vía central.

Background: *Streptococcal pneumoniae* bacteremia is a significant cause of morbidity and mortality in Sickle Cell Disease (SCD) patients. *Pneumococcal vaccination* has decreased the bacteremia rate in both the general pediatric and SCD populations. Despite this decrease, and an increasing concern for antibiotic resistance, it remains standard practice to obtain blood cultures and administer antibiotics in all febrile (>38.50C) SCD patients. We conducted a systematic review and meta-analysis of the available studies of the prevalence of bacteremia in febrile SCD patients.

Design/Methods: We searched the medical literature up to November 2018 in PUBMED, EMBASE and Web of Science using the search terms "epidemiology, prevalence, bacteremia, sickle cell anemia." We only included studies with patients after 2000, when the pneumococcal 7-valent conjugate vaccine became widely available. Data were reported as means with 95% confidence intervals (95%, CI). We calculated the prevalence of bacteremia (95% CI) by dividing the number of

positive blood cultures by the number of febrile episodes. The I2 statistic measured heterogeneity between prevalence estimates. Bias in our studies was quantified by the Newcastle-Ottawa quality assessment scale.

Results: Our search identified 228 citations with 9 studies meeting our inclusion/exclusion criteria encompassing 1,680 patients with 3,974 febrile episodes. The weighted prevalence of bacteremia across all studies was 1.76% (95% CI, 1.06%-2.67%) which showed moderate heterogeneity (Cochrane Q=19.7, p=0.01, I2=58%). For *S. pneumoniae* the weighted prevalence with very low heterogeneity (Cochrane Q=3.57, p=0.83, I2=0%) was 0.26% (95% CI, 0.14%-0.48%). Risks for bacteremia except central lines could not be determined because of the low prevalence of the outcome.

Conclusion(s): Obtaining blood cultures on all febrile SCD children should be reconsidered in the face of the low prevalence of bacteremia, unless an obvious source is identified or if a central line is present.

IMPACT OF EARLY INSULIN ADMINISTRATION ON CRITICALLY ILL PATIENTS IN DIABETIC KETOACIDOSIS

Kelvin Fong (Hospital duPont) nos presenta este estudio retrospectivo que comparaba, dentro de los pacientes con cetoacidosis diabética grave, la evolución de aquellos que recibían insulina en las primeras dos horas frente a los que no, sin hallar diferencias significativas en el tiempo de desaparición de la cetonuria, la acidosis o de estancia en el hospital.

Background: Diabetic ketoacidosis (DKA) is a leading cause of morbidity and mortality in diabetic patients with an incidence from 1-10% per year in known diabetics. Currently, the International Society for Pediatric and Adolescent Diabetes (ISPAD) recommends insulin administration within 1-2 hours after starting fluid resuscitation in patients presenting with DKA.

Objective: To examine the impact of early insulin administration on urine ketone clearance in critically ill patients in DKA.

Design/Methods: We performed a retrospective cohort study of children presenting to a tertiary care emergency department (ED) in severe DKA from January 1st, 2017 to September 30th, 2018. Using a power of 80 percent, a calculated sample size of 86 patients was required to show a 10 percent difference in urine ketone clearance. Severe DKA was defined as patients with new or existing diabetes that met the following criteria: blood glucose ≥ 200 mg/dL, urine ketones ≥ 40 , serum bicarbonate < 13 mmol/L, and requiring admission to the pediatric intensive care unit. All patients were treated with intravenous insulin and fluids as per standard DKA protocols. We compared patients that received insulin within 120 minutes

of arrival to the ED with patients that received insulin after 120 minutes of arrival. Our primary outcome was time to clearance of urine ketones. Secondary outcomes included resolution of acidosis as measured by achieving a bicarbonate level of ≥ 13 and hospital length of stay.

Results: We identified 105 patients in severe DKA from January 2017 through September 2018. The majority of patients were female (n=67, 64%) with a median age of 15 years (interquartile range [IQR] 10 to 18 years). Of the 105 patients identified in severe DKA, 45 (43%) received insulin administration within 120 minutes of arrival to the ED and 60 (57%) received insulin after 120 minutes of arrival with a mean difference of 92 minutes (95% CI, 76-107, $P < 0.001$). There was no significant difference in time to urine ketone clearance (1476 min vs 1407 min, $P=0.57$). There was no significant difference in time to resolution of acidosis as measured by bicarbonate (921 min vs 739 min, $p=0.12$) or hospital length of stay (66 hr vs 63 hr, $p=0.69$).

Conclusion(s): Timely initiation of insulin for patients in severe DKA as per current guidelines does not significantly impact time to urine ketone clearance, recovery from acidosis, or hospital length of stay.

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HYOSCINE BUTYLBROMIDE (BUSCOPAN) FOR ABDOMINAL PAIN IN CHILDREN: A RANDOMIZED CONTROLLED TRIAL

Naveen Poonai, de la Western University (Londres) presentó un ensayo clínico aleatorizado, doble ciego, que evalúa la eficacia del butilbromuro de hioscina (la popular Buscapina) combinado con paracetamol frente al paracetamol sólo para el dolor abdominal funcional. Pese a que no hubo diferencias entre los grupos, sí que es cierto que en ambos se objetivó una reducción clínicamente significativa del dolor abdominal, con lo que, como resultado secundario del estudio, podemos sugerir que el paracetamol podría ser más eficaz para el tratamiento del dolor abdominal de lo que habitualmente se considera.

Background: Abdominal pain is one of the most frequent reasons for an emergency department (ED) visit. Most cases are functional and no therapy has proven effective.

Objective: We sought to determine if hyoscine butylbromide (HBB) (BuscopanTM) is effective for children who present to the ED with functional abdominal pain.

Design/Methods: We conducted a randomized, blinded, superiority trial comparing HBB 10 mg plus acetaminophen placebo to oral acetaminophen 15 mg/kg (max 975 mg) plus HBB placebo using a double-dummy approach. We included children 8-17 years presenting to the ED at London Health Sciences Centre with colicky abdominal pain rated >40 mm on a 100 mm visual analog scale (VAS). The primary outcome was VAS pain score at 80 minutes post-administration. Secondary outcomes included adverse effects; caregiver satisfaction with pain management using a five-item Likert scale; recidivism and missed surgical diagnoses within 24-hours of discharge. Analysis was based on intention to treat.

Results: 236 participants were randomized (116 acetaminophen; 120 HBB). The mean (SD) age was 12.4 (3.0) years and 153/236 (64.8%) were female. The median (IQR) duration of pain prior to enrollment was 2 (4.5) hours and analgesia was

provided to 129/236 (54.7%) of participants. The mean (SD) pre-intervention pain scores in the acetaminophen and HBB groups were 62.3 (16.5) mm and 60.3 (17.9) mm, respectively. At 80 minutes, the mean (SD) pain scores in the acetaminophen and HBB groups were 30.1 (28.8) mm and 29.4 (26.4) mm, respectively and there were no significant differences adjusting for pre-intervention scores ($p=0.96$). The median (IQR) caregiver satisfaction was high in the acetaminophen [5 (2)] and HBB [5 (1)] groups ($p=0.79$). The median (IQR) length of stay between acetaminophen [236 (99.75)] and HBB [230.5 (102.5)] was not significantly different ($p=0.91$). In the acetaminophen and HBB groups, 6 and 8 participants returned to a health provider, of which 4/6 and 6/8 returned with abdominal pain, respectively. There were no missed surgical diagnoses. The most common adverse effect was nausea (9% per group) and there were no significant differences in adverse effects between acetaminophen (28/116, 24.1%) and HBB (32/120, 26.7%) ($p=0.57$).

Conclusion(s): For children with presumed functional abdominal pain who present to the ED, both acetaminophen and HBB produce a clinically important (VAS <30 mm) reduction in pain and should be routinely considered in this clinical setting.

ORAL AMOXICILLIN CHALLENGES IN LOW-RISK CHILDREN DURING A PEDIATRIC EMERGENCY DEPARTMENT VISIT

Este trabajo de David Vyles, de Wisconsin, seleccionaba dentro de un grupo de pacientes etiquetados de alérgicos a la penicilina, un subgrupo con baja probabilidad de serlo en realidad, a los que se les realizaba una prueba oral en Urgencias, con buen resultado, pudiendo descatalogar de alérgicos a la penicilina a la gran mayoría, con el único inconveniente de alargar la estancia en Urgencias.

Background: Penicillin (PCN) allergy is the most commonly reported medication allergy. Our previous studies have shown that the majority of children who report PCN allergy have low-risk symptoms and tolerate the medication using a 3-tier process without an allergic reaction. Within the past year there has been a shift by the American Academy of Allergy Asthma and Immunology towards recommending direct oral amoxicillin challenges in place of 3-tier testing in low-risk patients.

Objective: to evaluate whether providers would administer, and families would be willing to receive, an oral penicillin challenge during a pediatric emergency department (PED) visit. Secondary objectives were to report oral challenge results and compare triage acuity level, and PED length of stay (LOS) between groups.

Design/Methods: We conducted a randomized controlled trial of children aged 2-16 years presenting to the PED with reported PCN allergy. Research staff administered a PCN allergy questionnaire; patients with low-risk symptoms who indicated an interest to be tested for allergy were consented and then randomized to "Oral Challenge" versus "No Oral Challenge". The "Oral Cha-

llenge" group received 500 mg of oral amoxicillin in liquid or tablet form. Descriptive characteristics, along with parametric and non-parametric tests were used to summarize and compare oral challenge results, triage acuity level (dichotomized and 1-2 vs 3-5) and PED length of stay.

Results: 331 parents completed the questionnaire, 204 (62%) children had low-risk symptoms of allergy and 101 (49.5%) parents were interested in receiving an oral challenge. After applying exclusion criteria 92 (91%) were eligible and 73 (80%) consented to proceed. 37 children were randomized to the oral challenge group and 36 to "No Oral Challenge". 34 (92%) of the 37 children received the oral challenge; 33 (97%) children tolerated the challenge and were de-labeled as PCN allergic. Triage level showed no difference between groups. Those who received the oral challenge had a statistically significant increased LOS (216 min vs 151 min, $p < 0.01$).

Conclusion(s): Oral challenge for PCN allergy in the PED is an effective means to de-label children with reported PCN allergy. Steps to minimize the increased LOS need to be explored to make this intervention more effective in an acute care setting.