



Department of Pediatrics Research Day

ABSTRACTS FOR POSTERS AND PRESENTATIONS

May 8, 2015

****PAS Poster Presentation**

NATIONAL TRENDS IN HOSPITAL DISCHARGE RATES FOR LOWER RESPIRATORY TRACT INFECTION IN NATIVE AMERICAN CHILDREN

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Background: Children enrolled in the Indian Health Service (IHS) are known to have higher rates of hospitalization for lower respiratory tract infection (LRTI) than other children in the U.S. Many Native American (NA) children receive some or all of their medical care outside the IHS, and there is little information available about LRTI hospitalization rates in NA children in the general population.

Objective: To describe and compare rates of LRTI discharges from non-Federal hospitals in NA and white children.

Design/Methods: We used Kid's Inpatient Database samples from 1997 to 2012 to identify discharges in children ages <5 years who had a principal or secondary diagnosis code for LRTI. To address systematic underreporting and misclassification of race/ethnicity in administrative databases, we estimated population rates by using hospital births to derive race-specific denominators.

Results: Among children with a hospital discharge diagnosis of LRTI in 2012, Native American children were more likely than white children to be covered by Medicaid insurance (76% vs. 49%) and to live in a western state (55% vs. 17%), in a rural county (52% vs. 28%), or in a zip code area with mean household income in the lowest quartile (52% vs. 30%) with $P < 0.001$ for each comparison. LRTI rates in 2012 were higher for NA children (22.5/1000, 95% CI: 17.5/1000-27.6/1000) than for white children (11.0, 95% CI: 10.2-11.8). For NA infants, rates were particularly high in western states (72.8, 95% CI: 45.8-99.8) and these rates were much higher than for white infants (22.2, 95% CI: 18.1-26.4). From 1997 to 2012, national rates declined for white children (from 14.8 to 10.9, $p < 0.001$ for trend) but not for NA children (19.7 to 22.5, $p = 0.45$).

Conclusions: Based on information in hospital discharge databases that exclude IHS hospitals, hospital discharges for LRTI occur in Native American children nationally at rates that are high and comparable to rates reported for children enrolled in the IHS. Further, while LRTI hospitalization rates have been declining for other ethnic groups, this has not occurred for Native American children.

OUTCOMES THAT MATTER TO TEENS WITH TYPE 1 DIABETES

Clara Yanglei Ye; Thor Jeppson; JM Schopp; Ellen Kleinmaus; Elizabeth Cox

Background: The teenage years are a critical period in which teens with type 1 diabetes take on more disease management responsibilities in preparation for adulthood. Diabetes control is often sub-optimal for teenagers. Understanding the outcomes that matter to teens could support successful interventions to improve diabetes care. This study examined outcomes that mattered to teens with diabetes who posted on two public forums for type 1 diabetes.

Objective: To gain an understanding about the outcomes that matter to teens with type 1 diabetes using posts from online communities.

Design/Methods: 72 publicly-available posts from 2011-2013 were randomly selected from the "teen" sections of two major diabetes online forums. Twenty-two posts were eliminated from the initial sample due to 1) although posted in the "teen" section, the poster was not 13-17 years of age ($n=13$) or 2) lack of relevant content ($n=9$). From each selected post, the content and descriptive data (e.g., duration of diabetes and age) were collected. Standard open coding techniques were used to analyze content and identify outcomes found in the posts. An outcome was defined as impacts or consequences as a result of type 1 diabetes. Researchers independently examined and recorded their interpretation of each post and then met to discuss the coding. A codebook was jointly developed to facilitate the identification of meaningful outcomes from the posts.

Results: 50 posts written by 36 unique teens were examined for outcomes. The average age of teens was 15.7 years old (16 specified their age). From the 18 teens who specified how long they have had type 1 diabetes, the average duration was 6.3 years, with a median of 5 years. The three most common outcomes mentioned in forum posts were 1) control of blood glucose, 2) emotional wellbeing, and 3) positive interactions with peers. Other outcomes mentioned included 4) physical wellbeing, 5) family interactions, 6) education and motivation of others, 7) interactions with others such as school personnel and 8) academics.

Conclusions: Results suggest that teens who post within online diabetes forums convey many outcomes that matter beyond the control of their blood sugar. Healthcare providers and family members may want to consider these outcomes when motivating teens with type 1 diabetes to improve blood glucose control.

****PAS Poster Presentation**

OXYTOCIN INHIBITS THE FUNCTION OF KIR7.1 ION CHANNELS

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Background: Kir7.1 is an inwardly rectifying K⁺ channel expressed in the retina, heart, brain, and uterus. Inhibition of Kir7.1 results in increased organization and force of uterine contractions. Reduced expression of Kir7.1 occurs towards the end of gestation resulting in greater membrane depolarization. Thus, Kir7.1 is important for uterine contraction. Oxytocin (OXT) is a hormone well known for its role during the initiation of myometrial contractions via the activation of the oxytocin receptor (OXTR), a G-protein coupled receptor. Our primary interest is in the retina, where Kir7.1 channels are regulated by PIP₂, which is a substrate of the OXTR signaling cascade. In this study, we explored the fundamental question of whether Kir7.1 is inhibited in vitro by OXT-mediated stimulation of the OXTR.

Objective: Determine whether OXT activation of OXTR can inhibit Kir7.1 current via the GPCR mechanism.

Design/Methods: Both human embryonic kidney (HEK-293), and Chinese Hamster Ovary (CHO) cell lines are commonly used in electrophysiological studies, due to the lack of endogenous ion channel expression. We created a HEK cell line with stable OXTR expression (HEK-OXTR). EGFP fused Kir7.1 was transiently expressed by transfection. Kir7.1 current was measured by the whole-cell patch clamp technique during treatment with HEPES Ringer (HR) solution supplemented with either 100nM OXT or Ba²⁺, a Kir channel inhibitor. We used the cholinergic GPCR M1 (CHO-M1, ATCC) cell line as an experimental control. These cells also transiently expressed EGFP-Kir7.1 and were stimulated by carbachol. We used paired T-test for comparison.

Results: Current recording revealed a Ba²⁺ sensitive inwardly rectifying Kir7.1 channel in transfected cells. In the HEK-OXTR cells treatment of OXT resulted in the decrease in Kir7.1 current amplitude by 67% (n=9; P< 8.34x10⁻⁷). While Ba²⁺ treatment resulted in the depolarization of the cells from -70mV as part of complete Kir7.1 channel inhibition, OXT had no effect on membrane potential. In our control CHO-M1 cells Ba²⁺ blocked Kir7.1 completely and carbachol inhibited 66% of current.

Conclusions: We have shown that oxytocin inhibits Kir7.1 current via activation of the OXTR. This observation could have significant implications for our understanding of the events related to labor and for potential interventions to prevent premature birth. We propose that reduced Kir7.1 expression in late gestation allows for OXT mediated depolarization and the initiation of contractions.

