Pediatric Section Newsletter

Fall 2016

Letter from the Pediatric Section Chair

Hello,
As cooler weather comes with pumpkin spice in the air, I am finally able to take a deep breath and relax a little. I hope you all can relax a little, too. Recently, I have had opportunities to present on malnutrition and nutrition focused physical examination. In speaking with other nutrition professionals (mostly dietitians) there are many questions about diagnosing malnutrition in pediatric patients. Complaints include that older doctors continue to use failure to thrive as a diagnosis instead of malnutrition and dietitians are not always comfortable with making/supporting the diagnosis. In my experience, I have given out countless copies of the "definition paper" (Mehta JPEN 2013;37:460-481) and the "consensus statement" (Becker NCP 2015;30:147-161). Now I have a new favorite reference. I encourage everyone to read Sandra Bouma's review: Diagnosing Pediatric Malnutrition: Paradigm Shifts of Etiology-Related Definitions and Appraisal of the Indicators. It is available through NCP's Online First (10/20/2016). This is a comprehensive review that describes the indicators of malnutrition, why it is important to diagnose malnutrition and what indicators may need a second look. Diagnosing malnutrition is still in its infancy, so we still need to nurture it and encourage development of the process.
Of course, Clinical Nutrition Week 2017 will be upon us before we know it. I know the leaders at A.S.P.E.N. are working to make sure the conference is a great professional experience for everyone. If you are attending CNW 17 in person, please try to attend the Pediatric Section Forum on Sunday, February 19th at 5:30 pm. Oscar Herrera, PharmD will be presenting his research on citrulline as a plasma marker in pediatric GI disease and intestinal failure. I work with Dr. Herrera and have heard him present in the past. I think everyone will find his presentation informative and be able to apply it to your practice. In addition to the CEU program, there will be dinner and networking opportunities. Steve Plogsted and I will be there.

Sincerely,

Kelly Green Corkins, MS, RD, LDN, CNSC

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Pediatric Section Microsite

Visit the Pediatric Section microsite to access past versions of the newsletter, the Hot Topic of the Quarter survey, current research updates, and much more!
Pediatric Section Microsite

Member Spotlight: M. Petrea Cober, PharmD, BCNSP, BCPPS

What is your current job title and work location?
Clinical Coordinator – Neonatal Intensive Care Unit, Akron Children's Hospital
Associate Professor – Pharmacy Practice & Section Lead – Specialty Care, Northeast Ohio Medical University, College of Pharmacy

What is your educational background?
I attended Lipscomb University in Nashville, Tennessee and received my BS in Biochemistry and the University of Tennessee Health Science Center, College of Pharmacy in Memphis, Tennessee and received my Doctor of Pharmacy.
I completed my PGY1 Pharmacy Residency at Penn State Milton S. Hershey Medical Center in Hershey, Pennsylvania and my PGY2 Pediatric Pharmacy Residency at the University of Michigan Hospitals and Health Systems.

How did you get involved in the field of clinical nutrition?
It started in pharmacy school. Attending the University of Tennessee, I had excellent mentors in nutrition both in the didactic education, as well as my clinical rotations. During my last year of pharmacy school, I was able to take a pediatric nutrition rotation at LeBonheur with Mike Christensen and loved it. When I went on to Penn State, the program did not have a pharmacist who specialized in nutrition so I requested an unique rotation in which I rounded with one of the dietitians for an entire month and monitored various PN patients throughout the institution. This was an excellent experience to understand the multidisciplinary team needed to provide great nutrition support. When I completed my pediatric pharmacy residency in Ann Arbor, I was able to have a pediatric nutrition support rotation with Imad Btaiche. All of my experiences prepared me for the initial job I took with the pediatric surgeons at U of M and my subsequent job with the NICU at Akron Children's.

What specifically do you do in your current position?
I really do a little bit of everything. I am the clinical pharmacist for the 75 bed Level IV NICU at Akron Children's. I provide parenteral nutrition support as well as drug dosing recommendations for patients from 23 weeks gestational age to full term and beyond. I also serve as the clinical supervisor for the PN ordering process at Akron Children's. Throughout my time in Akron, I have been able to move our PN ordering process closer to the ASPEN required process and am almost 100% there. In the last year, I have worked with our EPIC team to translate the previous paper forms into an electronic system that is integrated with the CAPS outsource pharmacy we used to compound our PN orders. It has definitely been a process but I am proud of how far we have been able to come especially without the resources of a formal nutrition support team in the hospital. Outside of my responsibilities at Akron Children's, I am shared faculty at the Northeast Ohio Medical University, College of Pharmacy. I serve as the pharmacist responsible for teaching nutrition support and pediatrics to our pharmacy students. It is great to know I have been able to pass on the education and many different experiences I have received to future generations of pharmacists.

Why did you become involved in A.S.P.E.N. and what are the benefits of being involved?
I would have never become so involved in ASPEN without the mentorship of Dr. Daniel Teitelbaum. When I started working with the pediatric surgeons at U of M, I was heavily involved with the day-to-day management of PN but he came back from a conference and immediately wanted to try out "ethanol lock therapy" on some of our intestinal rehabilitation kids. We were able to initiate a fairly robust protocol for the process. He knew that we had worked out a process that many others would be interested in and encouraged me to present it at CNW. After the first visit to CNW, I was hooked. It was great to go to a conference where I could share ideas and questions with others who were seeing a lot of the same things that I was seeing. I could never thank him

enough for everything his mentorship has meant to me. It was definitely a great loss to the nutrition community at his passing this summer.
The benefits of involvement are the sharing of ideas and experiences with others. This is a two way street. I feel I learn a lot from my interactions within ASPEN and strive to share as many of my experiences with the people I interact with in ASPEN. I see one of the greatest benefits as being the spreading of practical clinical knowledge to those with whom I interact. I love teaching others about PN.

What recommendations would you give to someone just starting out in your field?
1) Get involved. You will grow immensely from the experiences and will never regret it.
2) Pass on what you what learned. It is vital to the continued growth of nutrition support to share what we know with those around us.

Results from the Vitamin and Mineral Status in Long Term Nutrition Support Hot Topic of the Quarter Survey

The following questions apply to long term **enteral nutrition** patients

1. Does your institution routinely check vitamins and minerals in long term enteral nutrition patients?
    a. Yes 51.3%
    b. No 48.7%
2. If yes, how often
    a. Monthly 15%
    b. Every 3 months 30%
    c. Every 6 months 35%
    d. Yearly 40%
    e. Other 25%
        i. 1 month after stopping PN, patient specific, every 4 months
3. What vitamins and minerals do you check?
    a. Serum Zinc 65%
    b. Serum Copper 50%
    c. Serum Chromium 25%
    d. Serum Manganese 25%
    e. Serum Selenium 55%
    f. Iron panel 65%
    g. Serum Vitamin D 85%
    h. Serum Vitamin A 35%
    i. Serum Vitamin B12 50%
    j. Serum Folate 40%
    k. Other 35%
        i. Vitamin E, methylmalonic acid, PTH, urine sodium, carnitine, RBP, CRP, Alkaline Phosphatase, Ceruloplasmin
4. Are these labs tested fasting?
    a. Yes 20%
    b. No 80%
5. If yes, how long do you hold enteral nutrition prior to labs to constitute fasting?
    a. NPO after midnight, unknown, 12 hours, dependent upon if TPN was cycled
6. What recourse do you use for vitamin and mineral reference ranges when evaluating these vitamin and mineral results?
    a. Institution specific lab references, A.S.P.E.N. reference ranges, published literature, Phlexy-vits DRI calculator

7. If your institution does not check them, what are the barriers to doing so or the rationale for not checking?
    a. The assays are too expensive 25%
    b. The assays require too much blood 21%
    c. The assays are not reliable measures or trace element status 8.3%
    d. I am unsure how to interpret the results 5.2%
    e. Other 66.7%
        i. Providers not agreeable to checking, Inconsistent follow up, assumption that needs are met with the nutrition support

The following questions apply to long term **parenteral nutrition** patients

8. Do you routinely check vitamins and minerals in long term parenteral nutrition patients?
    a. Yes 88.2%
    b. No 11.8%
9. If yes, how often
    a. Monthly 33.3%
    b. Every 3 months 50%
    c. Every 6 months 36.7%
    d. Yearly 20%
    e. Other 33.3%
        i. Varies based on age of the child, weekly, every 2 months, sometimes not at all
10. What vitamins and minerals do you check?
    a. Serum Zinc 90%
    b. Serum Copper 86.7%
    c. Serum Chromium 56.7%
    d. Serum Manganese 56.7%
    e. Serum Selenium 83.3%
    f. Iron panel 83.3%
    g. Serum Vitamin D 86.7%
    h. Serum Vitamin A 70%
    i. Serum Vitamin B12 66.7%
    j. Serum Folate 53.3%
    k. Other 26.7%
        i. Vitamin E, Vitamin K, homocysteine, methylmalonic acid, PTH, urine sodium, carnitine, essential fatty acids, triene: tetrane ratio
11. Are these labs tested fasting?
    a. Yes 3.5%
    b. No 96.6%
12. If yes, how long do you hold enteral nutrition prior to labs to constitute fasting?
    a. Unknown or not at all
13. What recourse do you use for vitamin and mineral reference ranges when evaluating these vitamin and mineral results?
    a. RDI, Institution specific lab references, A.S.P.E.N. reference ranges, Tsang reference table, published literature
14. If your institution does not check them, what are the barriers to doing so or the rationale for not checking?
    a. The assays are too expensive 20%
    b. The assays require too much blood 20%
    c. The assays are not reliable measures or trace element status 0%
    d. I am unsure how to interpret the results 0%
    e. Other 60%
        i. Provider is not agreeable to ordering

Clinical Nutrition Week 2017: Orlando, Florida

Registration is open! Don't miss out on the opportunity to learn from the many valuable sessions as well as network at this great conference. If you are unable to travel and attend you can still participate via the Virtual Conference. Mark your calendars, the Pediatric Section's Forum will be held on Monday February 19th at 5:45 pm. For additional information see the Clinical Nutrition Week webpage on A.S.P.E.N.'s site using the link below.
Clinical Nutrition Week 2017 Information

New Opportunities for Enteral tube Location (NOVEL) project Update from Beth Lyman, MSN, RN, CNSC

An end of the year newsletter will be coming in the next few months. Keep an eye out for that and further NOVEL project updates in the upcoming Pediatric Section newsletters.

Research Updates-Call for Volunteers!

If you are interested in providing research updates for any pediatric specialty area, such as oncology, nephrology, etc., to be included in the quarterly newsletters please contact Celina Scala at Celina_M_Scala@rush.edu.

Pediatric GI Research Updates

Provided by Marisa Dzarnoski Riley, RD, CNSC

Predictors of failure of fish-oil therapy for intestinal failure-associated liver disease in children
Study Design: Retrospective Review

This study aimed to identify predictors of treatment failure of parenterally provided fish oil (FO) in children with intestinal failure-associated liver disease (IFALD). Failure of FO therapy was defined as cholestasis that did not resolve (direct bilirubin <2 mg/dL) with treatment. A total of 188 patients who initiated FO therapy were included and identified as either having achieved resolution of cholestasis or failed therapy. Multiple factors were evaluated, including anthropometrics, medical history, laboratory values, and demographics. Of these factors, five were found to be significantly associated with treatment failure: a (pediatric end-stage liver disease) PELD score ≥ 15 at FO initiation, history of GI bleed, start of FO therapy at ≥ 16 weeks of age, mechanical ventilation at time of therapy initiation, and presence of non-gastrointestinal comorbidities at FO initiation. Overall, patients who had more advanced liver disease at time of FO initiation were more likely to fail treatment. However, 86% of patients achieved resolution of cholestasis with some patients showing resolution despite elevated direct bilirubin. The authors suggest the reversibility of IFALD is difficult to predict and early initiation of FO therapy should be offered to every child with IFALD, regardless of bilirubin levels.
Nandivada P, Baker MA, Mitchell PD, et al. Predictors of failure of fish-oil therapy for intestinal failure-associated liver disease in children. Am J Clin Nutr. 2016; 104:663-670.

Timing of allergenic food introduction to the infant diet and risk of allergic or autoimmune disease
Study Design: Systematic Review

This is a systematic review of interventional and observational trials (also including other systematic reviews) evaluating age of introduction of allergenic foods in the first year of life and association to development of allergic and/or autoimmune disease or allergic sensitization. Data was extracted from 146 studies. There was moderate certainty evidence in five trials that egg introduction between 4-6 months of age is associated with reduced incidence of egg allergy. In two trials there was moderate certainty evidence that introduction of peanuts between 4-11 months of age is associated with reduced incidence of peanut allergy. Evidence does not appear to suggest any relation between timing of food introduction and development of autoimmune disease. Due to the small number of studies showing evidence of relationship between allergenic food introduction and development of allergic disease, and the significant heterogeneity of these studies, the authors conclude more research is necessary before new recommendations for the introduction of allergenic foods are made.

Lerodiakonoou D, Garcia-Larsen V, Logan A, et al. Timing of allergenic food introduction to the infant diet and risk of allergic or autoimmune disease. JAMA. 2016; 316:1181-1192.

Duodenal disaccharidase activities during and after weaning off parenteral nutrition in pediatric intestinal failure
Study Design: Retrospetive Review

This study sought to identify the association of duodenal dissacharidase activity and inflammation on parenteral nutrition (PN) and intestinal resection in pediatric onset intestinal failure (IF). Fifty-eight IF patient charts and 43 matched control charts were reviewed, including duodenal biopsies. For IF patients, they were either on full enteral nutrition (EN) or PN-dependent at time of biopsy. The number of patients with low maltase and sucrase activity was significantly higher in PN-dependent patients compared to full EN patients. Compared to controls, duodenal mucosal inflammation was higher only in PN-dependent patients studied late after last resection and whose median PN duration was 50 months. There was an overall positive association of time after intestinal resection to disaccharidase activity, while there was a negative association with shorter remaining small bowel. There was also a negative association between length of remaining small bowel and discaccharidase activity in patients on full EN.
Sanaksenaho G, Mutanen A, Koivusalo A, Merras-Salmio L, and Pakarinen MP. Duodenal disaccharidase activities during and after weaning off parenteral nutrition in pediatric intestinal failure. JPGN. 2016 Jul 30. epub ahead of print.

Neonatal Research Updates

Provided by Jackie Wessel, Med, RDN, CNSC, CSP, CLE

Two-Year Neurodevelopment and Growth Outcomes for Preterm Neonates Who Received Low-Dose Intravenous Soybean Oil
Study Design: Prospective Clinical Trial

The advent of alternative lipid strategies changed the care of surgical neonates. Prior to these strategies we saw an unacceptable mortality from cholestasis or need for liver transplant in many of these long term patients. While not a perfect strategy, lipid restriction has been helpful for many infants. (Sanchez SE, et al. The Effect of lipid restriction on the prevention of parenteral nutrition related cholestasis in surgical infants. J Pediatr Surg 48:573-578) However, the neurodevelopmental impact of a soybean oil lipid restriction such as 1 g/kg/day has been unknown. This paper by Ong et al has some evidence from a single center 30 infant study. The mean gestational ages were 28 for the low and 27 for the conventional lipid group. There was no significant difference in the 2 groups when assessed at 12, 18 and 24 months for either growth or Bayley III score, except that the low group (lipid restricted group) performed better at 12 months (p=.02). This needs to be repeated in a larger group with the same attention to both growth and development, but is encouraging for those that have found this to be helpful in decreasing mortality and were concerned for causing greater morbidity with the lipid restricted practice.

Ong ML, Purdy IB, Levit OL, et al Two-Year Neurodevelopment and Growth Outcomes for Preterm Neonates Who Received Low-Dose Intravenous Soybean Oil. J Parenter Enteral Nutr. 2016 Oct 21. pii: 0148607116674482. [Epub ahead of print]

Implementation of Feeding Guidelines Hastens the Time to Initiation of Enteral Feeds and Improves Growth Velocity in Very Low Birth-Weight Infants
Study Design: Prospective Quality Improvement Project with Retrospective Controls

Feeding guidelines for very low birth weight infants were implemented in this NICU. They analyzed two years of data pre-guideline as compared to 6 months of data post-guideline. Data points studied included days to initiation of enteral feeds, days on total parenteral nutrition (TPN), and weight gain over the first month. Their aim was to improve weight gain in the first month, initiate feeds and achieve full enteral feedings sooner. The data points were stratified according to birth weights 750, 750-1000, and 1000-1500 g). After trophic

feedings, enteral feedings were advanced by 20 to 30 mL/kg/d. Potential concomitant factors that could affect feeding tolerance were examined including indomethacin or dopamine treatment, delivery room cardiopulmonary resuscitation, and growth restriction. There were 95 infants with a birth weight of less than 1500 g that were included (59 pre-guideline and 36 post-guideline). In the post-guideline group days to start enteral feeds decreased by 47% (P < .01), days on TPN decreased by 25% (16 days vs 11 days; p < .01), and weight gain over the first month of life increased by 15% (p < .05). Small for gestational age infants were overrepresented in the post-guideline group. Study conclusions were that using a feeding protocol reduced the days to start feeds and days on TPN while increasing weight gain over the first month. As with most studies of feeding protocols, this again shows a positive effect of a feeding protocol.

Culpepper C, Hendrickson K, Marshall S, et al. Implementation of Feeding Guidelines Hastens the Time to Initiation of Enteral Feeds and Improves Growth Velocity in Very Low Birth-Weight Infants. Adv Neonatal Care. 2016 Oct 7.

Aggressive nutrition in extremely low birth weight infants: impact on parenteral nutrition associated cholestasis and growth
Study Design: Retrospective Observational

This paper describes a more aggressive approach to increasing parenteral nutrition and its relationship to cholestasis and growth. There was less cholestasis and an improvement in growth. The control group used a slow ramp up of parenteral nutrition that delayed enteral feeding.

Repa A, Lochmann R, Unterasinger L, et al. Aggressive nutrition in extremely low birth weight infants: impact on parenteral nutrition associated cholestasis and growth. Peer J 2016 Sep 20 4:e2483.

Post Discharge Formula Fortification of Maternal Human Milk of Very Low Birth Weight Preterm Infants: An Introduction of a Feeding Protocol in a University Hospital
Study Design: Prospective Randomized Controlled Study

This is a study using post discharge formula (PDF) as a human milk fortifier compared to no fortification. This study was designed for areas without more sophisticated methods of fortification. The objective of this study is to determine growth, nutritional biochemical markers, and complications of fortification of human milk using PDF of preterm VLBW infants. Fifty VLBW preterm infants were enrolled in the study. Nutritional care including parental nutrition and enteral feedings were administered according to their protocol. When enteral feeding reached 100 ml/kg/day, infants were randomized into two groups: PDF fortification or no fortification. Infants of both groups were given 50% of required enteral feeding as premature formula. This protocol was used until infants' weight reached 1800 g. Hemoglobin, albumin (Alb), electrolytes, blood urea nitrogen (BUN) and clinical complications were documented. Human milk fortification with PDF resulted in better growth with an increase in weight 16.8 and 13.8 g/kg/day (p=0.0430), length 0.76 and 0.58 cm/week (p=0.0027), and head circumference of 0.59 and 0.5 cm/week (p=0.0217), respectively. Duration of hospital stay was less in the PDF fortified group (22.76 *vs.* 28.52 days in controls), p=0.02. No significant changes were found in lab values. Hemoglobin was significantly higher in PDF group, p=0.04. There were no significant clinical complications. The use of PDF fortification could be an alternative option for fortification of mothers' milk for preterm VLBW infants in developing countries with low resources.
(Reviewer note: The mention of this study is not a recommendation for this method of fortification- but interesting for those of us looking at different methods of fortification. These infants were also fortified with premature formula as well with 50% of the enteral feeds being formula. The PDF was used as the additional fortifier and it showed it was superior to no fortification. This paper has little relevance in the US where human milk fortifiers are available, but is interesting to see how others have managed in a resource limited situation. Inadequate milk supply evidently is a huge problem and that is why the additional premature infant formula is used. Of note, at the time of the study donor milk banks were not permitted in Egypt where the study took place.)

El Sakka A, El Shimi MS, Salama K, et al. Post Discharge Formula Fortification of Maternal Human Milk of Very

Low Birth Weight Preterm Infants: An Introduction of a Feeding Protocol in a University Hospital. Pediatr Rep. 2016 Oct 3;8(3):6632. eCollection 2016.

Non-nutritive sucking for increasing physiologic stability and nutrition in preterm infants
Study Design: Systematic Review

This review looked at 12 eligible trials with a total of 746 preterm infants enrolled. The quality of the evidence on outcomes assessed according to GRADE was low to very low, which limits the validity of the meta-analysis. The results showed decreased transition time to full oral feeds and decreased length of stay. The meta-analysis revealed no significant effect of NNS on weight gain. Of interest one study found that the NNS group had a significantly shorter intestinal transit time during gavage feeding compared to the control group (MD -10.50 h, 95% CI -13.74 to -7.26; n=30). Other individual studies demonstrated no clear positive effect of NNS on age of infant at full oral feeds, days from birth to full breastfeeding, rates and proportion of infants fully breastfeeding at discharge, episodes of bradycardia, or episodes of oxygen desaturation. No study reported any negative outcomes. Larger, well designed studies are needed.

Foster JP, Psaila K, Patterson T, et al. Non-nutritive sucking for increasing physiologic stability and nutrition in preterm infants. Cochrane Database Syst Rev. 2016 Oct 4;10:CD001071. Epub before print.

Improving fortification with weekly analysis of human milk for VLBW infants
Study Design: Prospective Observational Study

This study tracked the nutrient content of 20 women's human milk through mid-infrared spectroscopy. The mothers all had VLBW infants. Random human milk samples were analyzed weekly for six weeks. Fat, protein and energy content varied widely among mothers and by week of lactation. Energy content ranged from 9.5 to 30.4 kcal/oz across the study period. Twenty-five percent of all samples had an energy content <17 kcal/oz. Protein content ranged from 1.1 to 2.8 g/dL. Fat and energy showed trends of increasing concentrations over time and protein showed a decline over time. Their conclusions were that human milk protein and fat varied widely by an individual woman over time and that this week-to-week variability in fat and protein can impact growth. The ability to analyze human milk is helpful to improve fortification. While I agree with their conclusions, until the FDA releases these analyzers for clinical use, we have been told that we cannot use them for clinical decision making. They can however be used for a research study.
Arnold M, Adamkin D, Radmacher P. Improving fortification with weekly analysis of human milk for VLBW infants. J Perinatol. 2016 Sep 29. doi: 10.1038/jp.2016.170. [Epub ahead of print]

Neurodevelopmental outcomes and nutritional strategies in very low birthweight infants
Study Design: Review

This article discussed the relationship between nutrition, growth, and neurodevelopment. The main points of the article include: 1. Providing a nutrient-enriched diet during the NICU hospitalization is effective in improving early growth and long-term neurodevelopmental outcomes, 2.Feeding human milk rather than formula has health advantages, though fortification during the NICU hospitalization is required to ensure that nutrient requirements specific to the VLBW infant are met, and 3.The neurodevelopmental benefits of continuing a nutrient-enriched diet after NICU discharge are less certain, but may be of benefit, especially for human milk-fed infants and those who have accumulated substantial nutrition deficits during the NICU hospitalization.

Belfort MB,Ehrenkranz RA. Neurodevelopmental outcomes and nutritional strategies in very low birthweight infants. Semin Fetal Neonatal Med. 2016 Sep 29. pii: S1744-165X(16)30063-4. doi: 10.1016/j.siny.2016.09.001. [Epub ahead of print]

High mortality among children with gastroschisis after the neonatal period: A long-term follow-up study
Study Design: Retrospective Review

This is a follow-up of infants born with gastroschisis from 1997-2009 at a hospital in Denmark. Follow-up included neonatal chart review for neonatal background factors, including whether a GORE® DUALMESH was

used for staged closure, electronic questionnaires, interview and laboratory investigations. Cases were divided into complex and simple cases. A total of 71 infants (7 complex and 64 simple) were included. Overall seven out of the 71 children (9.9%, median age: 52 days) had died at the time of follow-up. Three died during the neonatal period and four died after the neonatal period. Parenteral nutrition (PN) induced liver failure and suspected adhesive small bowel obstruction were the causes of deaths after the neonatal period. Overall mortality was higher in the "complex" group compared to the simple group (3/7 (42.9%) vs 4/64 (6.3%), p = 0.04). A total of 12 children had had suspected adhesive small bowel obstruction. Prevalence of small bowel obstruction was not related to the number of operations needed for neonatal closure of the defect. A GORE®DUALMESH was used in 16 children (22.5%). Of these 2 were complex and 14 were simple cases. Prevalence of recurrent abdominal pain was 22.5% (9/40) among children with gastroschisis compared to 12% in a study on Danish school children. Gastrointestinal symptoms had led to hospital admission after primary discharge in significantly more children with gastroschisis 16 (40.0%) than children younger than 16 years old in the general Danish population, 129.4/1.081.5 (12.0%), p=0.000. Fecal calprotectin level was above the reference level (>50mg/kg) in 6/16 (37.5%) children >8 years old with gastroschisis compared to 1/7 (14.3%) healthy children (Fisher's exact=0.366). Mortality among children with gastroschisis is still significant with the highest risk among complicated cases. Whether or not this would be true in a larger multicenter study is not known.

Dsby K, Husby S, Qvist N, et al. High mortality among children with gastroschisis after the neonatal period: A long-term follow-up study. J Pediatr Surg. 2016 Sep 2. pii: S0022-3468(16)30298-6. doi: 10.1016/j.jpedsurg.2016.08.022. [Epub ahead of print]

The management of neonatal acute and chronic renal failure: A review
Study Design: Review

This is review article is about renal failure management. It provides details on changes in recent management strategies.
Coulthard, MG.The management of neonatal acute and chronic renal failure: A review. Early Hum Dev. 2016 Nov;102:25-29. doi: 10.1016/j.earlhumdev.2016.09.004. Epub 2016 Sep 25.e

Neurology Research Updates

Provided by Lauren Kronisch, RDN

Ketogenic diet guidelines for infants with refractory epilepsy
Study Design: Review

Fifteen KD (ketogenic diet) experts created an international consensus statement for safe treatment of infants and children under two years of age with refractory epilepsy, GLUT-1 deficiency, PDHC deficiency and other mitochondrial diseases. Hospital admission for initiation of the KD is recommended in infants under 12 months of age regardless of goal carbohydrate ratio. In some cases, breast milk can be incorporated into the KD plan. In a distinct difference from typical US guidelines, recommended energy needs are based on ideal body weight (IBW) and protein needs on a range based from WHO and RDA guidelines. If catch-up growth is required a protein-to-energy ratio of minimum 1.5 g protein:100 kcal is recommended as compared to the DRI which is used in US hospitals and clinics where catch-up growth requirements remain the same. Fluid needs are based on the RDA. Recommended labs before and during initiation of the KD and for continuous monitoring are the same as in older children and are analogous to US KD guidelines. This is the first international consensus statement for KD treatment in Europe, but is similar in all recommendations except energy calculation guidelines to common US treatment plans.

Van der Louw E, van den Hurk D, Neal E, et al. Ketogenic diet guidelines for infants with refractory epilepsy. European Journal of Paediatric Neurology. 2016; 20 (6); 798-809.

Use of modified Atkins diet in glucose transporter type 1 deficiency
Study Design: Retrospective observational study

Efficacy of the MAD (modified Atkins diet) in treating glucose transporter type 1 deficiency syndrome (GLUT1-DS) was evaluated in eight patients (from six months to six years of age) as an alternative to typical GLUT1-DS ketogenic diet treatment. Carbohydrates were initially restricted to 10 g/day, then liberalized by adding 5 g/day more each month with a maximum of 10% calories from carbohydrates/day. Mean carbohydrate intake was 21.7g/day one month post-initiation, and 38.6 g/day both three and six months post-initiation. Seizures improved in all participants who had experienced them (5/7 patient at month three and 3/6 patient at months three and six). Two participants who switched from a classic ketogenic diet to MAD maintained seizure control and showed improved growth. The reduction in seizures for GLUT1-DS patients matches response to the ketogenic diet; but further study is required to regarding appropriate alternate treatment options for GLUT1-DS patients.

Amalou S, Gras D, Greneche MO, et al. Use of modified Atkins diet in glucose transporter type 1 deficiency syndrome. Developmental Medicine and Child Neurology. Nov. 2016; 58(11); 1193-99.

Cognitive and behavioral impact of the ketogenic diet in children and adolescents with refractory epilepsy: A randomized controlled trial
Study Design: Randomized controlled trial

Cognition and behavior of 28 children on the ketogenic diet (KD) was compared to that of 22 children with refractory epilepsy in the care as usual group (CAU) as measured by questionnaires and psychological tests. All participants remained on their regimen of anti-epileptic medications. Results indicate the KD children showed greater energy and productivity as well as increased seizure reduction than the CAU group; but both groups exhibited similar anxiety levels. After four months on the KD, participants had less anxiety and mood disturbances than did the CAU group. The KD group also showed increased word comprehension scores. The results suggest potential positive impacts of the KD on cognitive behavioral functioning in children with intractable epilepsy. Further investigation is needed.

Ijff DM, Posulart D, Lambrechts DAJE, et al. Cognitive and behavioral impact of the ketogenic diet in children and adolescents with refractory epilepsy: A randomized controlled trial. Epilepsy and Behavior. July 2016; 60; 153-57.

A.S.P.E.N. Mentoring Program

Are you interested in sharing your experience and expertise with another A.S.P.E.N. member? Would you like to learn from a fellow A.S.P.E.N. clinician? If so A.S.P.E.N.'s new mentoring program is right for you! Set up a profile as either a mentor or mentee at the link below to be paired with another A.S.P.E.N. clinician. Don't miss this great opportunity to network and grow both personally and professionally.
A.S.P.E.N. Mentoring Program

Member Updates and Spotlight

We want to hear from you! The A.S.P.E.N. Pediatric Section group is proud of the many accomplishments of our members and we'd like to highlight what you're doing. If you have any feedback or ideas, noteworthy awards, presentations, published research, or projects that you'd like to share with our members please let us know by contacting the section group newsletter editor Celina Scala at Celina_M_Scala@rush.edu.