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WILEY ISPAD

ANNOUNCEMENT

ISPAD Annual Conference 2017 Highlights

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1 | PEDIATRIC DIABETES: RHETORIC OR REALITY

Despite robust studies including the Diabetes Control and Complications Trial (DCCT) study and subsequent Epidemiology of Diabetes Interventions and Complications (EDIC) studies that show clearly the importance of achieving good glycemic control, the evidence to date is that the majority of children around the world have poor diabetes control. Currently, many units are unable to provide the amount of resources and intensive care that those in the intensive arm of the DCCT received many years ago. We need to find ways of learning from centers that are achieving good outcomes.

2 | PLENARY: PREVENTION AND TREATMENT OF DKA

A long-standing question has been whether there is an association between the rate of fluid or sodium administration used in the treatment of diabetic ketoacidosis and the development of cerebral edema. A prospective randomized controlled trial (Pediatric Emergency Care Applied Research Network (PECARN) Diabetic ketoacidosis (DKA) study) compared the impact of slower vs more rapid fluid administration on acute and long-term neurological outcomes in 1389 children with DKA and found no significant differences in the frequency of either altered mental status (Glasgow coma scale (GCS) <14) or clinical diagnoses of cerebral edema in any of the treatment arms. Neurocognitive outcomes were similar in all groups (IQ, memory capacity etc. at 3 months). This confirms that a reasonable range of fluid infusion rates and fluid sodium content may be safely used to treat DKA in children.

Prevention of DKA at diagnosis of type 1 diabetes requires engagement with primary care providers. An interventional approach in West Australia has been shown to be effective in reducing newly diagnosed children with diabetes presenting in DKA. To achieve this requires direct engagement with primary care providers rather than just posting cards or posters to them. Prevention of DKA in children with established diabetes requires interventions that promote adherence. In addition to traditional strategies, new educational apps on smartphone may help.

3 | NUTRITION DEBATE – PRO AND CON ON CARBOHYDRATE COUNTING

Perhaps an unexpected topic to debate, is the outcome not already clear? A lively debate discussed the pros and con, both speakers had clear arguments for and against carbohydrate counting.

Arguments for carbohydrate counting included how it allows flexibility with mealtimes, food types and amounts that can be eaten, it avoids the need to restrict foods and allows the child to be included in family meals and that with support and the right tools can be implemented easily.

Arguments against carbohydrate counting included the lack of evidence to support its effectiveness, its complexity, requiring good

The 43rd annual ISPAD meeting took place from 18 to 21 October in Innsbruck, Austria. The roving reporters present an overview of the scientific highlights of the meeting. Please also see the ISPAD Conference Resource Platform (http://medialibrary.ispad.cyim.com/) for online content including abstracts and video presentations.

literacy and numeracy skills and its inconvenience. There is a potential risk of encouraging high fat, low carbohydrate diets or opting for more convenience foods, due to their ease of counting.

Overall, all were in agreement that carbohydrate counting alone is too simplistic, simply matching insulin dose to carbohydrate quantity is insufficient to manage postprandial blood glucose levels. Families also require education about the other factors that impact post-meal blood glucose levels such as the glycemic index and meal composition (fat and protein content) and ensuring suitable insulin: carbohydrate ratios and basal insulin doses are in place. Timing of insulin is also important, ensuring boluses are given in advance of eating. Education about the importance of a regular meal pattern, with meals and snacks containing appropriate carbohydrate quantities is also vital.

4 | SYMPOSIUM: PROGRESS TOWARD CURE

Different strategies tackle the sustained proliferation and expansion of beta cells for future therapeutic use. Antagonizing Glucagon-like peptide-1 (GLP-1) receptor signaling with exendin-4 in human islets stimulates human beta cell proliferation in a murine, immunocompromised engraftment model. Only juvenile, not adult, beta cells continue to proliferate under expression of calcineurin/Nuclear factor of activated T cells (NFAT) signaling: a new candidate to control beta call expansion?

The “needle in the haystack” approach to search for small molecules promoting a molecular switch from alpha to beta cell characteristics with the use of fully automated library screens was discussed. We are still a long way from being able to offer human stem cell derived beta cell implants to humans.

5 | PLENARY: E-LEARNING—NOVEL TOOLS FOR DIABETES EDUCATION OF HEALTHCARE PROFESSIONALS AND PATIENTS

Using electronic technologies to access educational curriculum and facilitate learning should be used in addition to traditional approaches. A collaboration between International Society for Pediatric and Adolescent Diabetes (ISPAD) and European Society of Paediatric Endocrinology (ESPE) e-learning aims to reach as many less experienced healthcare professionals and resource limited countries using cases with questions and answers to ensure understanding of ISPAD guidelines. The e-learning platform www.espe-elearning.org is freely available and can be used as a forum for discussion to allow for uncertainties and differences in opinions.

Over 70% of youths are connected to the internet. Mobile health apps for diabetes education are currently widely available such as apps for carb counting and exercise management. Systematic reviews have shown variable results on whether apps significantly reduced glycated hemoglobin (HbA1c) in type 1 and 2 diabetes and there were issues with quality of studies. A patient review survey in Europe found that the majority of people with diabetes wanted practical support, ability to communicate with healthcare professionals and ability to track their data. Apps should be kept relevant, easy to understand and use, and should be regularly updated and reviewed.

6 | SYMPOSIUM: TRANSITION: BRIDGING THE GAP

The optimal goal of a Transition process is to provide care that is uninterrupted, coordinated, developmentally appropriate, psychosocially sound, and comprehensive. Self-management skills should be assessed across adolescence and responsibility gradually shifted to the teenager. The timing of transfer should be based on readiness to transfer, self-management skills, and a young person's cognitive ability. Institutional issues including pediatric and adult providers' capabilities also play a part in deciding the timing of transition. Recommendations include: initiate discussion about transfer early, set goals to monitor the process, and evaluate readiness for transfer. Providers should also explain cultural differences between adult and pediatric services and offer opportunities for the young person to meet with the adult team prior to transfer. Perhaps instead of using the term Transition, we should use the term developmentally appropriate health care. We need to acknowledge young adults as a distinct group (they are neither children nor adults). Empower young adults by embedding health education and health promotion in their care, adjust care as the young person develops.

7 | SYMPOSIUM: PHYSICAL ACTIVITY

Insulin dosing strategies and flexibility are important to stimulate regular and safe physical activity. Healthcare professionals should address this issue with their patients regularly. Children and young people should be encouraged to conduct physical activity every day; there is a positive effect of physical activity on metabolic control only if it is performed more than three times per week. Current nutritional recommendations for physical activity of youth with type 1 diabetes should focus on appropriate fuelling. Young people need sufficient protein intake, which should be about 20% of total energy intake per day, the amount of carbohydrates consumed should be about 50% of all energy intakes. Meals and snack should be timed suitably.

8 | SYMPOSIUM: BEYOND A1C—OTHER MARKERS FOR PATIENT WELL-BEING

Atherosclerosis can start early in life. The risk factors include obesity, nutrition, smoking, lack of exercise, hypertension, dyslipidemia, and genetic predisposition. Evidence suggests that advanced atherosclerosis in childhood is potentially reversible, if cardiovascular risk factors are controlled. Childhood obesity does not increase adult cardiovascular risk if there is a return to normal weight in adulthood, the same is true for the presence of metabolic syndrome. It is also observed that despite the high frequency of these risk factors in children and

adolescents with type 1 diabetes, they are rarely treated. Treatment of dyslipidemia in patients with type 1 diabetes has to be optimized, already in childhood, and new algorithms are being developed to guide these decisions.

Albuminuria is well-known as a marker of diabetic nephropathy, as a predictor of end stage renal disease and mortality. The prevalence of microalbuminuria in adolescents with T1D varies depending on diabetes duration and population. There are transient or intermittent cases, when regression to normoalbuminuria occurs without treatment. Partial results of the Adolescent Type 1 Diabetes Intervention Trial (AdDIT) were shown. The conclusion was that a higher than average albumin: creatinine ratio during adolescence is associated with worse renal, retinal and cardiovascular profiles, independent of glycemic control.

9 | SYMPOSIUM: CHALLENGES AND SOLUTIONS TO ACHIEVING BETTER CONTROL IN NEW UNITS

Type 1 diabetes is an emerging problem in the developing world and places an enormous burden on the family and society. With the limited resources, management of type 1 diabetes is a challenge. The majority of patients are from poor socioeconomic backgrounds, patients are managed in adult clinics, often travel long distances which can make attendance to clinics irregular. Other challenges include erratic supply of insulins and blood glucose monitoring devices, poor storage of insulins, low literacy levels, poor knowledge and understanding. False beliefs and myths, social stigma, and marital discord affect understanding and acceptance of the diagnosis. Lack of laboratory support is a diagnostic challenge. Better control could be achieved by engaging government in the provision of care, improving availability of insulins and blood glucose monitoring devices, creation of appropriately trained multidisciplinary teams within a reasonable distance, promotion of lifestyle changes, emphasis on awareness programs, and creation of pediatric diabetes clinics.

10 | SYMPOSIUM: WE ARE WHAT WE EAT

Childhood obesity affects cognitive function and school performance. Obesity is a cause of hypertension, asthma and type 2 diabetes in the young individual. The cause of obesity is multifactorial: early programming, parental weight, feeding practices, birth weight, genetics, epigenetics, sleeping patterns, gut microbiota, physical activities, socioeconomic status, and drugs. Overall, we eat too much and have low physical activity. Early findings of the "studies to treat or prevent pediatric type 2 diabetes (STOPP-T2D)" on 1 to 6 year olds found physical activity alone was not associated with weight change. Physical activity with dietary modification is more effective in addition to regulatory changes, such as the sugar tax and fat tax. In some areas where regulatory changes have been implemented, physical activities made compulsory in schools, junk food and sweets banned in schools and healthy school lunches promoted have shown weight loss in the pupils over time. Canadian Public Policy 2017, banned junk food in 6 participating schools and 4 schools did not take part. A dose-dependent effect for each year of junk food ban resulted in a reduction of 0.05 body mass index (BMI) units. The 5 year ban resulted in 1 kg weight reduction in adolescents.

11 | SYMPOSIUM: SOCIAL MEDIA BOON AND BANE

Digital revolution is transforming our everyday lives with more than 3 billion people now accessing the internet. People with diabetes are also drivers for innovation to improve their diabetes management. International networks, academia and industry now have access to big diabetes data. However, ethical issues arise such as to whom does the data belong to and how is patient data protected? Patient empowerment has reached a new dimension through digital media, technology, and global connectivity. We need academically driven initiatives to evaluate diabetes data to prevent them from being used primarily commercially. Advances in access to diabetes data with high levels of mobile phone use have also given unprecedented opportunities to support and improve self-management of diabetes. However, challenges exist in using mobile technologies such as maintaining engagement, and difficulties in integrating meaningful human relationships. Communities on the internet can provide peer support in a positive manner through sharing and helping behaviors.

12 | PLENARY: DO WE NEED A WORLDWIDE REGISTRY?

Since the first concrete undertakings to collect data on children with diabetes on a national level back in the 1980s in Scotland, several countries have now initiated similar and more sophisticated registries. The benefits outnumber the pitfalls: better outcome monitoring, benchmarking with improving care packages, and ultimately improving the individual patient's diabetes care. With more longitudinal data being available and published, it is possible to determine at a national level compliance with implementation of guidelines, whether new guidelines are required and which centers are outliers and need more focus.

The journey to develop a registry can be a rocky path, as exemplified by The Australasian Diabetes Data Network (ADDN) project. The key ingredients are: get lots of advice, look at the big picture, embrace opportunities, communication, collaboration, consultation and most importantly be an optimist.

13 | SYMPOSIUM: WHICH TARGETS SHOULD WE AIM FOR? DEBATE ON HBA1C

ISPAD guideline currently advocates aiming for a target HbA1c of less than 7.5% (58 mmol/mol) whereas the UK National Institute for Clinical Excellence (NICE) guideline advocates encouraging patients to aim

for HbA1c of less than 6.5% (48 mmol/mol). Arguments in favor of the lower target include: Health Economics study by NICE which showed a clear benefit in terms of life expectancy and direct healthcare costs with the lower target of 48 mmol/mol compared to 58 mmol/mol. There is evidence of a lower risk of hypoglycemia and DKA as well as improved quality of life in those with better glycemic control. The German experience has shown no increase in risk of severe hypoglycemia or death in bed in those with the lowest HbA1c. Arguments against reducing the target include the fact that the DCCT risk line for microalbuminuria and neuropathy is almost horizontal at HbA1c of 8% (64 mmol/mol). This suggests that the added benefit from aiming for a much lower target may be miniscule and it may be better to divert resources to those patients with the highest HbA1c. A target of <48 mmol/mol may be difficult for families to achieve and we may be setting them up for failure. There is also the concern about increased risk of hypoglycemia though more recent studies have shown this not to be the case. At the end of the debate, majority of those in attendance voted for ISPAD to reduce its target HbA1c to less than 7% (53 mmol/mol).

14 | SYMPOSIUM: REPRODUCTIVE HEALTH COUNSELING IN DIABETES

Diabetes can cause reproductive complications. Up to 9% of women with unplanned pregnancy can develop complications. This can be reduced to 2% with prepregnancy counseling. Prepregnancy counseling should start at puberty before the young person is sexually active in order to prevent unplanned pregnancy. Off-springs of mothers with diabetes have increased neonatal mortality due to shoulder dystocia and severe cardiac abnormalities, increased neonatal morbidity due to hypoglycemia and reduced lung function. During childhood, they have slightly lower IQ, higher prevalence of prediabetes and overweight.

15 | PLENARY: LOOKING FOR A NEEDLE IN A HAYSTACK

One of the challenges of the changing landscape of type 1 diabetes is the need to be able to predict the variability in decline in beta cell function. The search is on to find new biomarkers that can predict who is going to have a fast or slow decline in beta cell function at disease onset. The question that arises is how we can get the right samples to produce reproducible results. For reproducible biomarker studies, we need at the biomarker discovery phase, access to samples annotated with correct clinical and preanalytical data. At the biomarker validation stage, we need in addition samples qualified with appropriate quality control analysis. We also need reference material samples that can be used as certified reference samples. There are now new norms and standards being developed for biobanks to improve validity. It may be that despite all these improvements researchers will still struggle to find appropriate samples due to legacy issues.

The work of the consortia INNODIA which is an "Innovative approach towards understanding and arresting type 1 diabetes" was described. It is a European Union project whose components include the development of clinical cohorts across Europe with the aim of looking for biomarkers particularly of declines of beta cell failure. The project includes a central biobank, a central data warehouse as well as multidimensional analysis and modeling. The aim is to be able to eventually undertake clinical trials. Currently, clinical trial networks are being formed.

16 | SYMPOSIUM: CLOSING THE LOOP

The hybrid closed loop consists of a linked insulin pump, continuous glucose sensor and an algorithm that automatically increases or decreases insulin delivery depending on blood glucose readings and predicted trends. Boluses for food are administered by the user as insulin action is not fast enough to match the rate of blood glucose increase following a meal. The first hybrid closed loop system has been approved for use by the Food and Drug Administration (FDA) in the United States. Pivotal and real-world studies have proven the hybrid closed loop systems to be safe and effective in increasing time in target range, particularly overnight. Long duration randomized controlled trials are now underway in various age groups, including young children and children newly diagnosed with diabetes. Psychological outcome measures are also being measured, along with clinical outcomes. It is important for healthcare professionals to provide realistic expectations of the closed loop systems and provide education to enable families to understand and interpret the large volumes of data produced by pump and Continuous Glucose monitoring (CGM) downloads, without causing "information overload." Access to continuous glucose monitoring remains low due to their cost, however, demand is high and families are turning to "DIY" (do it yourself) alternatives.