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OBESITOLOGIA HUNGARICA

8th CECON

8TH CENTRAL EUROPEAN CONGRESS ON OBESITY

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7–8 October, 2021 (VIRTUAL)

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8TH CENTRAL EUROPEAN CONGRESS ON OBRESITY

XXVIII. National Congress of the Hungarian Society for the Study of Obesity

„OBESITY CALLS FOR ACTIONS”

Multidisciplinary approach in prevention and treatment

7-8 October, 2021

Imprint

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WELCOME

Dear Colleagues, Ladies and Gentlemen,

It is a great honour for me and my co-chair Professor Tamás Forster to welcome you to the 8th Central European Congress on Obesity to be held online 7–8 October 2021.

The Central European region possesses a special geographical position in the largely inland countries of the continent with a number of unique and common cultural, social and economic needs. We believe that the regional congress is supportive in that line of necessities. At the same time, we hope that our participants also will arrive from all over the world as it happened in the past Budapest congresses.

The globally growing epidemic of overweight and obesity takes attention to the risk of obesity related co-morbidities, the excess risk of people living with obesity during the covid-19 pandemic, the significantly increased medical costs for the healthcare systems worldwide, and decrease the quality of life for the individuals. The increasing incidence and increasing degree of excess weight at the same time require multidisciplinary approach and global obesity management strategies.

The life-style, the physical, chemical, biological and socio-economic environmental factors are playing significant roles in the growing epidemic. The solution needs wide social collaboration above and beyond healthcare systems. The prevention of overweight and obesity is becoming more valuable on personal and on social levels too. The main focuses are the pre-obese conditions and especially the childhood.

Due to the scientific programme of 8th Central European Congress on Obesity we hope several new researches enrich our knowledge and professional opinions and good practices can also be exchanged in friendly conversations on the topic of obesity, which is one of the main, or even the greatest challenge for health care systems.

In the history of the CECONs the original idea leading to the foundation of the Central European Regional Congresses was initiated by Professor László Halmy at the 15th European Congress on Obesity in 2007 in Budapest and was supported by the Czech colleagues, who took the lead by organising the 1st Central European Congress on Obesity in Karlovy Vary in 2008.

Following the first event, Budapest gave home to the 2nd CECON entitled 'Quo Vadis, Obesitology?' in 2009. Continuing the tradition, the 3rd CECON took place in Olsztyn, Poland in 2011. The 4th CECON was organised by the Romanian colleagues in Cluj Napoca in 2013, the 5th was hosted again in Budapest in 2015, and followed by the Slovakian colleagues' activity in 2017 in Bratislava. The latest event was held by the Polish Society in Kliczkow, Poland 2019.

In light of the continuing worldwide situation, the CECON Organising Committee 2021 had to take a difficult decision to organise the 8th Central European Congress on Obesity Congress virtually.

We sincerely regret that we will not be able to meet in person in the beautiful city of Budapest. We believe that the online format will still provide an excellent forum to introduce and discuss the latest results of international research in order to encourage the development of regional scientific cooperation and draw the attention of decision-makers to form a consensus in the restraint of this global obesity epidemic.

It is my great honour and privilege to welcome you to this year's virtual congress. As we welcome our distinguished guests from all around the world, I'd like to personally thank you for your attendance during these unprecedented times. I'd also like to express my sincere appreciation to our patrons, collaborators, and sponsors, and last but not least to GUARANT International, who generously helped bring this event together to become realize

I wish you great scientific discussions in a friendly atmosphere!

Dr. Eszter Halmy (PhD)
Congress Chair

MAGYARORSZÁG KÖZTÁRSASÁGI ELNÖKE

Tisztelt Konferencia!
Tisztelt Hölgyeim és Uraim!

A Magyar Elhízástudományi Társaság konferenciái a legutóbbi időkig rendben követték egymást. A szakmai párbeszédnek megvolt a megszokott ritmusa. A témákat, célokat a többnyire sajnos romló statisztikák, valamint a tudományterület belső törvényszerűségei és a gyakorlati orvoslás tapasztalatai határozták meg.

A világjárvány során azonban minden egészségügyi eszmecsere és minden a gyógyítás területén végzett munka új értelmezési keretet kapott. Nemcsak a gyógyítás feltételei változtak meg a COVID-19 miatt, hanem a vírushelyzet vált az elhízástudomány egyik kiemelt témájává. Miközben eddig is számtalan betegségtípusról tudtuk, hogy túlsúllyal sokkal nehezebb gyógyulni belőlük, az elmúlt több mint másfél esztendő során kiderült: az elhízás a koronavírusból való felépülés esélyét is drámaian csökkenti.

Ráadásul a karantén, a korlátozások, az általános bezártság, a mozgáslehetőségek beszűkülése tovább növelte a veszélyeztetettek számát.

Csak Magyarországon hozzávetőleg 250 ezer ember él ma extrém túlsúllyal, és minden negyedik-ötödik magyar gyermeket érint az elhízás, amit a tudomány önmagában is krónikus betegségnek tekint. A túlevés, a mozgáshiányos életmód mellett a kutatás egyre több és árnyaltabb okot (például genetikait, környezeti hatásokat) azonosít az egyre rosszabb eredmények mögött. Így aztán a lehetséges kiutak is egyre szerteágazóbbak.

Jócskán akad tehát téma: idén bizonyosan még több, mint máskor. Bízom benne, hogy e gyorsan változó és rendkívüli összefogást igénylő területen a változtatni képes, jó stratégiák is mind gyorsabban megszületnek és gyakorlattá válnak. Ennek érdekében kívánok Önöknek hasznos párbeszédet, eredményes tanácskozást!

Budapest, 2021. október „06„

MAGYARORSZÁG KÖZTÁRSASÁGI ELNÖKE

Áder János

Official translation of the letter of the Main Patron, Dr. János Áder, the President of the Republic

President of Hungary

Esteemed Conference
Ladies and Gentlemen

Until quite recently, conferences of the Hungarian Society for the Study of Obesity followed a set pattern. Professional discourse had its own rhythm. Subjects and goals were determined by the generally downward trend in statistics, the internal principles of the scientific field and experiences of practical remedies.

However, in the course of the global pandemic, all healthcare forums and all work conducted in the field of healthcare were invested with a new interpretation. It was not only the conditions of treatment that changed due to COVID-19, but the virus situation became one of the leading topics of obesity studies. Whereas we were already aware of the fact that as regards many disease types, it is far harder to recover from them when the patient is obese, over the past more than a year and a half it has become evident that obesity dramatically reduces the chances of recovering from coronavirus, too.

Furthermore, quarantines, restrictions, general confinement, the narrowing of opportunities for exercise all contributed to further increasing the number of those in danger.

Today, in Hungary alone, there are approximately 250,000 people who are rated as extremely overweight, and every fourth or fifth Hungarian child is affected by obesity, which science looks on as a chronic disease in itself. Research is identifying – in addition to excessive consumption and a sedentary lifestyle – a growing number of, and ever more nuanced causes (for example, genetics, environmental factors) behind the increasingly poor outcomes. As a consequence, potential ways out of this situation are similarly ever more complex.

In other words, there is plenty to debate, and certainly more this year than usual. I am confident that in this rapidly changing field demanding a high degree of collaboration, flexible, good strategies will be developed and put into practice as quickly as possible. Thus, to achieve this objective, I wish you effective debates and fruitful discussions!

Budapest, 6 October 2021

János Áder

MESSAGES FROM THE STATE SECRETARY RESPONSE FOR THE PUBLIC HEALTH

First of all, please let me thank you for the opportunity to be here today and to welcome you on behalf of the Ministry of Human Capacities. As for a start I would like to convey the words of appreciation of Minister Prof. Dr. Miklós Kásler: your dedicated work is exemplary and of great significance for the future of Hungary and its Hungarian identity.

The pandemic has shown that obesity is not primarily an aesthetic issue, but rather a serious risk factor, even more dangerous than previously thought, leading to a wide range of other diseases: cardiovascular diseases, diabetes, musculoskeletal disorders, psychological problems. In fact, even in the case of infectious diseases, such as COVID-19, the risk of a serious outcome is greatly increased. It also makes the years of otherwise healthy life more difficult and limited.

This should not necessarily be the case though. Obesity is not some kind of fate, an inescapable curse, an inevitable epidemic, but a consequence of our inappropriate lifestyle, a kind of civilisation disease. We ourselves can both cause and prevent it by the way we live our daily lives, by the habits we develop.

This fact is also the key to our hope: with a healthier approach, more careful habits, some attention and a sense of responsibility obesity - and with it a range of serious diseases that follow - can be prevented. What I mean here: an active lifestyle, enough exercise, a modern diet, adequate rest and stress management, and regular self-monitoring and self-controlling.
These are precisely the objectives behind the Ministry's public health actions.

However, two important points need to be added to this idea.

The first point is that successful public health can only be feasible if we manage to bring it into people's everyday lives, if we manage to make it part of their lives, part of their habits. Today it is not yet a good practice to go to the doctor to stay healthy. To bring about this change of attitude doctors need to enter the patient circle's lives.

The other key issue is timing. Obviously, there are greater health-gains to be made if we start developing these good habits in children. It is much more effective and easier to preserve good health this way than by a person whose habits change for the better at the age of 50, after the first heart attack. Effects of 50 years of an unhealthy lifestyle cannot be erased overnight.

It is therefore very important, indeed a core issue, that health education is provided from birth, through nursery school, public education and higher education, right up to adulthood. Only then will we have a chance of raising the healthiest possible generations and ultimately establish a truly healthy and health-conscious nation.

Health promotion can only be truly effective within a complex public health programme.

I know that this alone is not enough. It is also important to offer a solution to those for whom some regular exercise and a conscious diet are no longer enough. For those who mean more than 50% of the more severe cases of obesity. It is very important to find a way back to health for them too. But that is a medical issue, your area of expertise.

Thank you for participating in this important work, for working to solve this serious social problem in the ongoing challenges of everyday life.

I wish you all good work and success and please be assured that you can always count on our support.

Prof. Dr. Ildikó Horváth
Patron of the Congress


8th CECON
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Welcome to the 8th Central European Congress on Obesity virtual platform by the host of the Hungarian Society for the Study of Obesity!

ABOUT THE HUNGARIAN SOCIETY FOR THE STUDY OF OBESITY

The Hungarian Society for the Study of Obesity (HSSO) was founded by Professor László Halmy in 1992 as one of the first societies in this field in Europe. HSSO became a member of the European and the International Associations in 1999 when the Milan Declaration was signed. Members of the Board of HSSO are a wide range of experts in the field of experimental and clinical studies.

Internationally Renowned Experts and Members of the Presidential and Advisory Board of the Hungarian Society for the Study of Obesity:

Members of the Presidential Board of HSSO:
- Managing President: Eszter Halmy PhD (member of LOC of 15th ECO, Chair of LOC of 2nd CECON, President of 5th and 8th CECON)
- Honorary President: Péter Jákó MD (Co-Chair of 15th ECO, former President of the Hungarian Society for Sports Medicine)
- Co-President: Tamás Forster MD PhD DSc (former President of Hungarian Society for Cardiovascular Diseases)
- Vice-President: Imre Rurik MD PhD DSc (President of Hungarian Society for Nutritional Science and former

President of Scientific Society of Hungarian General Practitioners)
- Vice-President: Zoltán Karádi MD PhD (former President of Hungarian Society for Pathophysiology)
- Member of the Board: Ferenc Kovács MD (former Co-President of HSSO)
- Honorary member of the Board: József Pucsok MD PhD DSc
- Secretary: Tamás Tóth MD

Members with large activities from the Advisory Board of HSSO:
- András Falus MD PhD DSc (member of the Hungarian and European Academy of Sciences, Semmelweis University, Fac.Med. Dept. of Genetics, Cell- and Immunobiology)
- Éva Martos MD PhD (former Director of National Institute for Food and Nutritional Science)
- Dénes Molnár MD PhD DMSc (Pediatric Clinic, University Pécs)
- Elemér Mohos MD PhD (Bariatric surgery, Veszprém County Hospital)

Purpose of the Association: The main goals of the HSSO:
- Monitoring both national and international research on obesity.
- Analysing the epidemiological situation, social and social insurance implementations of obesity-related diseases, extensively presenting results, organizing national and international congresses, conferences, and literary activities, as well as forms of graduate and postgraduate education.
- To raise awareness of the dangers of obesity for the public health, medical community, and non-governmental organizations (NGOs). Develop cooperation with professional associations, forums, and NGOs.
- Contribution to the implementation of government health programs in science and its professional foundation and their control.
- Contributing to the development and rehabilitation of health programs for society as a whole.

In order to achieve our goals, the HSSO performs the following activities:
- Health care, disease prevention, healing, health rehabilitation activities, with particular attention to the implementation of optimal medical and individualized treatment for overweight and obese patients, as well as familiarization with society.
- Supporting scientific activities and research. It is primarily about organizing representative studies on the incidence of obesity and obesity-related diseases in Hungary.
- In addition, research into the possibilities of diagnostic and therapeutic treatment of obesity (dietotherapy, exercise programs, behavioural therapy, medication and surgery) and the presentation of research results.
- Providing assistance for the organization of professional forums (conferences).
- Education and training, skills development, and dissemination. Participation in the graduate and postgraduate training of doctors, dieteticians, physical educators, physiotherapists, psychologists, other healthcare professionals, and in the dissemination of information through the media.

Main scientific congresses and educational activities of the Hungarian Society for the Study of Obesity:

- Organizer of the 8th Central European Congress on Obesity in 2021.
- Between 1992-2019 HSSO organized 72 national or international congresses and conferences or postgraduate courses on the field of obesity. Amongst them
- the 15th European Congress on Obesity in 2007,
- the 2nd Central European Congress on Obesity in 2009, and
- the 5th Central European Congress on Obesity in 2015.
- Budapest hosted the Stock Conference in 2011.
- Between 2005-2009 HSSO took part in the SCOPE education and during this period it has organized 5 international SCOPE courses.

During the large scale of scientific activity, HSSO had a good collaboration with the relevant Scientific and Civil Societies, Ministry of Human Resources, the Public Health State Secretary, National Institutes, and Medical Universities, such as:

- National Institute of Pharmacy and Nutrition
- Hungarian Society of Medical Associations
- Semmelweis University Faculty of Health Sciences
- Semmelweis University Institute of Behavioral Sciences
- Semmelweis University Institute of Clinical Psychology
- Semmelweis University Department of Public Health
- University of Debrecen, Faculty of Public Health
- University of Szeged, Faculty of Medicine
- University of Pécs, Medical School, Paediatric Clinic
- Hungarian Society of Nutrition Sciences
- Hungarian Dietetic Association
- Hungarian Association for People Living with Obesity
- Hungarian Screening and Public Health Prevention Program 2010-2020-2030
- Hungarian Society for Sports Medicine
- Hungarian Society of Sport Sciences
- Association of Hungarian Physiotherapists
- Hungarian Psychiatric Association, Working Group on Eating Disorders
- Hungarian Physiological Society
- Hungarian Diabetes Association
- Hungarian Society of Hypertension
- Hungarian Society of Nephrology
- Hungarian Atherosclerosis Society
- Hungarian Society for Cardiovascular Diseases

Since 2016, the President of the Hungarian Republic was the main patron of the yearly organized Hungarian National Congresses on Obesity.

Since 2017, HSSO collaborated with the State Secretary of Public Health and National Institute of Pharmacy and Nutrition became significantly stronger in the field of prevention and treatment strategies in obesity management.

The official scientific journal of the HSSO is ‚Obesitologia Hungarica'.
Our Congresses can be reached here
http://elhizastudomany.hu/category/obesitologia-hungarica/

Through collaborative efforts, HSSO works together with the Hungarian Association for People Living with Obesity since its foundation in 2014.

Since 2018, HSSO has greatly improved its media conferences and communications, appearing in over 100 annual interviews in national TV, radio, and online news outlets.

Eszter Halmy, *President of HSSO 06/10/2021*

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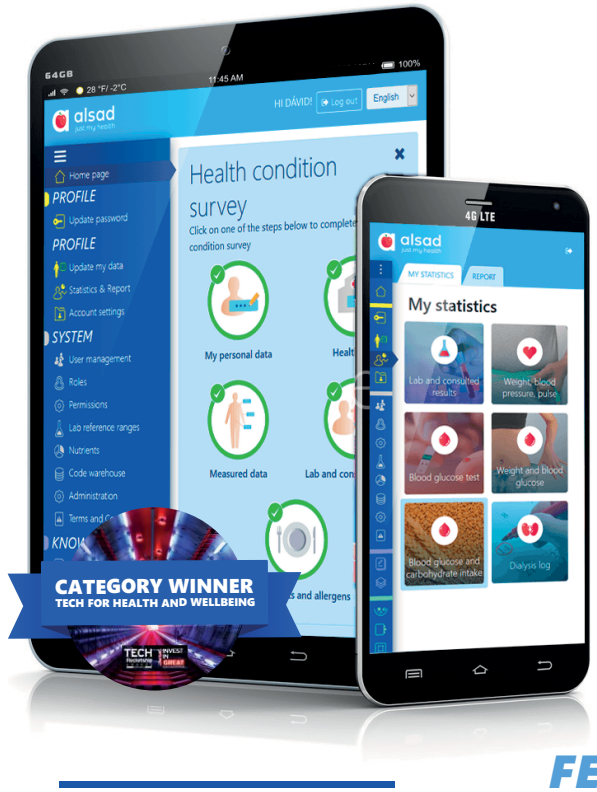

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SCIENTIFIC PROGRAMME

7 October 2021

09:00-10:30 **Opening session**
Chair: Eszter Halmy

09:00-09:05 **WELCOME**
Eszter Halmy (Hungary)

09:05-09:20 **MESSAGES FROM THE STATE SECRETARY RESPONSE FOR THE PUBLIC HEALTH**
Ildikó Horváth (Hungary)

09:20-09:40 **COVID-19 AND LIVING WITH OBESITY: THE EUROPEANS STUDY**
Jason Halford (England)

09:40-10:00 **OBESITY AND CHRONIC INFLAMMATION IN POST-COVID SYNDROME** *CANCELLED*
András Falus (Hungary)

10:00-10:15 **OBESITY IN CENTRAL EUROPE REGION, HISTORY AND FUTURE VISION**
Dana Müllerová (Czech Republic)

10:15-10:20 **Awards Ceremony of Hungarian Society for the Study of Obesity**

10:20-10:15 **Greetings from the European Coalition for People Living with Obesity**

09:25-09:30 Break

10:30-11:35 **Session 1: Obesity and public health**
Chair: Tamás Forster

10:35-10:50 **NATIONWIDE COMPREHENSIVE HEALTH SCREENING PROGRAM IN HUNGARY (NACOHESP-HU9) 2010-2020-2030 (MAESZ)**
István Barna (Hungary)

10:50-11:05 **MULTIDISCIPLINARY APPROACH TO OBESITY MANAGEMENT IN ROMANIA**
Lidia Arhire (Romania)

11:05-11:20 **10-YEAR RESULTS (2010–2019) ON OBESITY IN HUNGARIAN NATIONWIDE COMPREHENSIVE HEALTH SCREENING PROGRAM 2010–2020–2030**
Eszter Halmy (Hungary)

11:20-11:35 **NUTRITION SCIENCE AND THE SOCIETY**
Diána Bánáti (Hungary)

11:35-11:55 **Industry Lecture 1**

RESULTS OF 4–10 YEAR OLD CHILDREN DIETARY AND PHYSICAL ACTIVITY SURVEY AND THE COMPARISON OF THE MAIN RESULTS WITH THE SURVEY CONDUCTED AMONG THIS AGE GROUP IN 214
Diána Sárga (Nestlé Hungary)

11:55-12:15 **Industry Lecture 2**

DIGITAL HEALTH TO TACKLE OBESITY AND CHRONIC CONDITIONS: A PERSONALISED APPROACH FOR BETTER CARE
Éva Lajkó (ALSAD Hungary)

12:15-13:00 Lunch

13:00-14:30 **Session 2: From basic to clinical sciences**
Chair: Lubomira Fabryova

13:00-13:15 **MUSCLE NONSHIVERING THERMOGENESIS**
Jan Kopecky (Czech Republic)

13:15-13:30 **EFFECT OF ORLISTAT ON GHRELIN LEVELS IN OBESE RATS** *CANCELLED*
Teodora Handjieva-Darlenska (Bulgaria)

13:30-13:45 **MELANOCORTIN PATHWAY: PATHOPHYSIOLOGICAL AND CLINICAL IMPLICATIONS**
Irena Aldhorn Hainerová (Czech Republic)

13:45-14:00 **DIABESITY MANAGEMENT - GLUCOCENTRIC VS OBESITOCENTRIC POINT OF VIEW OR BOTH?**
Lubomira Fabryova (Slovakia)

14:00-14:15 **TREATMENT OF SARCOPENIC OBESITY IN ONCOLOGY**
Magdolna Dank (Hungary)

14:15-14:30 **TARGETING THE GASTROINTESTINAL TRACT TO TREAT OBESITY AND DIABETES**
Martin Haluzik (Czech Republic)

14:30-14:35 Break

14:35-15:50 **Session 3: Connections of risk reduction in obesity related diseases**
Chair: Edward Franek

14:35-14:55 **CARDIOVASCULAR RISK AND HARM REDUCTION IN LIFESTYLE RELATED DISEASES**
Edward Franek (Poland)

14:55-15:15 **HOW DOES DIET AND EXCERCISE AFFECT CORONARY PLAQUES? INSIGHTS FROM THE DISCO-CT STUDY**
Jan Henzel (Poland)

15:15-15:35 **OBESITY AND CANCER**
David Khayat (France)

15:35-15:50 Discussion

15:50-15:55 Break

15:55-17:10 **Session 4: Multidisciplinary obesity management**
Chair: Imre Rurik

15:55-16:10 **CLINICAL EVALUATION OF THE OBESE PATIENT**
Constantine Tsigos (Greece)

16:10-16:25 **PRIMARY CARE OBESITY MANAGEMENT IN HUNGARY**
Imre Rurik (Hungary)

16:25-16:40 **GENERAL PRACTITIONERS IN SLOVAKIA AND CANCER PREVENTION ABOUT OBESITY AND OTHER LIFESTYLE FACTORS**
Daniela Mináriková (Slovakia)

16:40-16:55 **EFFECT OF RADICAL LIFESTYLE CHANGES IN EXTREMLY OBESE**
Adela Penesová (Slovakia)

16:55-17:10 **MULTIDISCIPLINARY APPROACH TO MANAGING OBESITY** *CANCELLED*
Volkan Yumuk (Turkey)

OBESITY CALLS FOR ACTIONS
Multidisciplinary approach in prevention and treatment

8 October 2021

09:00-10:30 **Session 5: The role of physical activity in obesity**
Chair: Barbara Ukropcova

09:00-09:20 **EXERCISE MODULATES COGNITION IN PARALLEL WITH WHOLE-BODY GLUCOSE METABOLISM**
Barbara Ukropcová (Slovakia)

09:20-09:35 **INNOVATIVE TECHNOLOGIES IN OBESITY MANAGEMENT**
Martin Matoulek (Slovakia)

09:35-09:50 **PHYSICAL ACTIVITY IN SENIORS: SARCOPENIC OBESITY MANAGEMENT**
Dusan Hamar (Slovakia)

09:50-10:05 **EXERCISE TRAINING INDUCES ADAPTIVE CHANGES IN ADIPOSE TISSUE OF OLDER WOMEN**
Michaela Šiklová (Czech Republic)

10:05-10:20 **SYNERGISTIC EFFECTS OF EXERCISE AND CARNOSINE IN REGULATION OF HUMAN ENERGY METABOLISM**
Jozef Ukropec (Slovakia)

10:20-10:30 **ROLE OF PARATHYROID HORMONE IN COLD-INDUCED THERMOGENIC PROCESS AND ADIPOSE TISSUE METABOLIC ACTIVATION IN RELATIONSHIP TO WHOLE-BODY METABOLIC PHENOTYPE**
Zuzana Kovaničová (Slovakia)

10:30-10:35 Break

10:35-11:50 **Session 6: Nutrition in obesity**
Chair: Marie Kunešová

10:35-10:50 **NUTRITION IN OBESITY PREVENTION AND TREATMENT**
Marie Kunešová (Czech Republic)

10:50-11:05 **STRATEGY AND TYPES OF DIETARY PATTERNS FOR THE TREATMENT OF DIABESITY**
Viera Kissová (Slovakia)

11:05-11:20 **SUGAR REDUCTION IN BEVERAGES – FROM SCHOOL ACTION TO NATIONWIDE PUBLIC HEALTH INITIATIVE**
Juliana Bhardwaj (Austria)

11:20-11:35 **HOW HAVE THE RISK FACTORS RELATED TO OBESITY DURING THE CORONAVIRUS PANDEMIA CHANGED? – RESULTS OF TWO REPRESENTATIVE SURVEYS**
Emese Antal (Hungary)

11:35-11:50 **ENTERAL NUTRITION FOR OBESE COVID PATIENTS**
Andrea Molnár (Hungary)

11:50-12:30 Lunch – VISIT THE POSTERS ON VIRTUAL WALLS POSTERS

COMPOSITION OF GUT MICROBIOTA IN EXTREMELY OBESE SLOVAK PATIENTS
Libuša Kubánová (Slovakia)

OVERWEIGHT, CENTRAL OBESITY AND ABDOMINAL OBESITY IN THE MIDDLE-AGE ADULTS IN AN INLAND REGION OF NORTHLAND PORTUGUESE: A PILOT STUDY
Jose Eduardo Teixeira (Portugal)

CARDIOMETABOLIC RISK FACTORS IN PATIENTS WITH CORONARY ARTERY DISEASE WHO ARE REHOSPITALIZED IN THE SERVICE OF CARDIOLOGY
Gracia L. Don (Argentina)

CHARACTERISTIC COMPLEX NATURE OF THE FOREBRAIN GLUCOSE-MONITORING NEURONS
Edina Hormay (Hungary)

MODIFICATIONS OF THE GASTROINTESTINAL MICROBIOME HAS HUGE IMPACT ON PERIPHERAL AND CENTRAL NERVOUS PROCESSES
Kitti Mintál (Hungary)

THE BALKAN DIET
Svetoslav Handjiev (Bulgaria)

FADS1 GENE POLYMORPHISM(S) AND FATTY ACID COMPOSITION OF SERUM LIPIDS IN ADOLESCENTS
Tereza Metelcová (Czech Reublic)

NON-INVASIVE CARDIOVASCULAR RISK ASSESSMENT IN PREPUBERTAL CHILDREN
Sarolta Stomfai (Hungary)

12:30-12:50 **PhD Session**
Chair: Zoltán Karádi

12:30-12:40 **ASSESMENT OF NON ALCOHOLIC FATTY LIVER DISEASE PRESENCE USING A NOVEL BIOIMPEDANCE SPECTRAL ANALYSIS**
Adrián Róbert Gál (Hungary)

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ABSTRACTS

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OPENING SESSION

COVID-19 AND LIVING WITH OBESITY: THE EUROPEANS STUDY

Jason C. G. Halford
(President of the European Association for the Study of Obesity (EASO))

Early during the pandemic, it became apparent that the prevalence of COVID-19 among people with obesity was higher than the general population. Obesity increased the risk of hospitalization, of intensive care admission and need for mechanical ventilation. People living with obesity where increased risk from severe illness due to the virus.

The pandemic has also had a significant impact on eating behaviors. Lockdown led to sustained shifts in dietary patterns, levels of physical activity and worsening mental health. Food systems and supply chains were strained, and there was increased reliance on processed food. Crucially, food insecurity among the most vul-nerable increased due to reduced access to shops, food assistance programs, and school provided meals. As people were required to stay at home, media use increased and there was an apparent increase in exposure to marketing of unhealthy foods, particularly to children. These phenomena are further investigated in the EASO ECPO EUROPEANS study.

Among children in the general population, we saw increases in daily meal consumption, in snacking behaviors, red meat intake and sugary drink intake along with increased screen time. Similar changes were seen in adults, along with impacts on mental health and difficulties managing body weight. This manifested in increased snacking problems with motivation and difficulties in control around food. The study found that mental health status predicted overeating, with higher levels of emotional and external, emotionally driven eating associated with unhealthy food choices.

For people living with obesity, the picture was even worse. Across Europe, multidisciplinary obesity services were widely withdrawn, and treatment programs suspended, with bariatric surgeries cancelled. This had a significant impact on people living with obesity achieving and maintaining weight loss goals, which was accompa-nied by increases in stress related eating, anxiety, and depression. An initial survey of patient advocates showed 73% were concerned about COVID-19 and the majority were either struggling to control food and/or comfort and binge eating. This resulted in further negative impact on motivation and mental health.

The EUROPEANS study sought to examine the experiences of people living with the obesity across Europe. 3000 respondents from 10 countries (Denmark, France, Germany, Greece, Israel, Italy, Portugal, Spain, Sweden, and England) completed a brief questionnaire.

Within this sample, levels of medical vulnerability were high across all countries. However, there was great variation in self-reported psychiatric conditions, with mental health issues reported in England at more than double the prevalence of that in some other countries. Regarding food insecurity, 10% of the sample reported they had not eaten for a whole day due to issues of cost or access. This rose to 20% in England, and qualitative data indicated issues of cost and availability. 47% of people living with obesity reported being financially worse off due to the pandemic, with the issues being most pronounced in Italy, Greece, and Portugal. 45% of people living with obesity in the sample reported worsening emotional well-being (highest in Greece and Portugal). England ranked highest in psychological distress and loneliness.

Regarding media use and exposure, positive representations of people with obesity on television was associ-ated with higher levels of distress perhaps due to increased awareness of association of obesity with negative COVID-19 related outcomes. Experiencing negative representation of people with larger bodies on social media was associated with high levels of distress, depression, anxiety, and lower levels of well-being.

In conclusion, mental health issues among people living with obesity are particularly distinct due to self-isolation, disruption of routines and conventional weight control strategies, reduced access to treatment and food availability, stress, and stigmatization.

OBESITY AND CHRONIC INFLAMMATION IN POST-COVID SYNDROME

András Falus
(Hungary)

Severe obesity is a well characterized manifestation of a complex, multi-factorial inflammatory process. There are a number of gender-dependent and independent genetic factors in the process of the development and persistence of obesity further complicated with dissimilar country profiles. In addition to genetic alterations, influences of epigenetic regulation of body weight regulation have been uncovered, as well. The COVID-19 pandemic is expected to continue to impose enormous burdens of morbidity and mortality while severely disrupting societies and economies worldwide. The symptoms of acute and chronic COVID appear in various manifestations. The still poorly understood post COVID syndrome also include pathological changes in

body weight regulation. The rise of next-generation sequencing, technology one have to consider to live together with nearly a hundred times surplus of prokaryotic organisms and genetic material. Patterns of networked, interacting microorganisms with higher organisms form an ecosystem, are organ- and tissue-specific, and form part of epigenetic regulation. One of the most exciting tasks of a microbiome is to "educate" the immune system in the direction of distinguishing for the immune response what is dangerous and what is harmless for the body. It has also been established that the beneficial members of the microbiome contribute to the healthy homeostasis by suppressing pathogens, e.g. to maintain a healthy weight. Today, it can be demonstrated that the pathomechanism of many diseases, including pathological obesity, is also due to changes in the microbiome. The lecture will present examples of pathological changes in the microbiome related with obesity in post-COVID. syndrome. Some people who had severe illness with COVID-19 experience multiorgan effects or autoimmune conditions over a longer time with symptoms lasting weeks or months after the acute, virus positive COVID-19 illness. Multiorgan effects can affect most, if not all, body systems, including heart, lung, kidney, skin, and brain functions. By examining the changes of personal microbiome among post-covid conditions provides a new insight to the consequences of SARS CoV2 pandemic.

OBESITY IN CENTRAL EUROPE REGION, HISTORY AND FUTURE VISION

Dana Mullerova
(Vice president of EASO – Middle Region; Charles University in Prague, Medical Faculty and Faculty Hospital in Pilsen, Czech Republic)

A Middle region of EASO represents 12 countries: Austria, Croatia, Czech Republic, France, Georgia, Hungary, Lithuania, Poland, Romania, Slovakia, Slovenia, and Switzerland. In the past, this territory has developed differently depending on the political division of Europe. The resulting differences, including differences in the obesogenic environment and lifestyle of the population, have recently been to some extent eliminated. According to WHO data for 2016, the reported prevalence of obesity is the highest in the following countries: Hungary, Czech Republic, and Croatia, and the lowest in Switzerland, Austria, Slovenia, and Slovakia. EASO-Middle Europe region should be a voice of the obesity community in this geographical location, representing scientists, health care practitioners, physicians, public health experts, and patients. Areas of our common interest are obesity research, prevention, and management. In the field of education, we need to work to-gether to strengthen the exchange of experience between health care professionals, raising awareness in the population/patients, influencing policymakers to promote healthy diets, and build an environment for healthy living with the inclusion of health-in-all policies approaches. Recently, we must also consider the specifics of the impact of anti-epidemic measures, which, on the one hand, prevent the development of a COVID-19 pandemic, but on the other hand, can have the effect of strengthening the obesity pandemic.

SESSION 1: OBESITY AND PUBLIC HEALTH

NATIONWIDE COMPREHENSIVE HEALTH SCREENING PROGRAM IN HUNGARY (NACOHESP-HU9) 2010–2020–2030 (MAESZ)

István Barna *(1st Department of Internal Medicine, Semmelweis University Faculty of Medicine)*, Tenno Daiki, *(Eötvös Lóránd University, Teaching and Programing, Budapest, Hungary)*, Gergely Dankovics *(MAESZ committee, Director of MAESZ program, Szentendre, Hungary)*, Ede Kékes *(Advisory Board of the Program, Cardiology, University, of Pécs Medical School, Hungary)*

From 2010 a new, complex screening program started in Hungary, named NATIONWIDE COMPREHENSIVE HEALTH PROTECTION SCREENING PROGRAM in HUNGARY 2010–2020–2030. Within the framework of the Program in the largest mobile diagnostics centre in Hungary the adult population has the opportunity to obtain 40 comprehensive surveys in free form Based on the data obtained from the Comprehensive Health Screening Program of Hungary in the period 2010–2019, we analyzed the parameters reflecting the health status and the impact of the factors influencing them in different age groups (juveniles, 18–25, 26–35, 36–45, 46–55, 56–65, Age groups 66–75, 76. In the present analysis, we examined blood pressure values, total cholesterol, blood sugar, and uric acid levels, as well as body mass index in the context of type 2 diabetes, body fat, and abdominal fat.

In the analysis of the blood pressure values of 79294 women and 67310 men, the mean blood pressure value of women was 126.7 / 80.9 and that of men 135.6 / 84.4 mmHg. When evaluating the measurements, we found a higher-than-normal value in 20.2 (n = 15995) women and 31.1% of men (n = 20943). Systolic and diastolic blood pressure change with age in both sexes. Based on data from 2018, the age of participants was 42 years for women and 40 years in men. 22% in women, 23% in men

was the rate of known hypertension and 5.1% and 4.5% was the proportion of known diabetics irrespectively.

During the evaluation of cholesterol levels, we found abnormal values in 35.3% of women and 38.3% of men. Analyzing the appropriate and different cholesterol groups, we found no difference in systolic and diastolic blood pressure in either men or women. Blood pressure levels were found to be almost equally elevated in both men and women with higher than normal blood glucose values. We did not find any difference in the extent of the increase in blood pressure measured with high blood glucose.

When evaluating uric acid levels, we found abnormal values in 19.5% of women and 17.6% of men. The frequency of different values increases with age, the 11% frequency seen in women in the 18–25 age group increases to 31% in the over 76 age group, and the same frequency increase to 16–23% in men. The age-related increase in the different body mass index values is larger in women up to 65 years of age, in men up to 55 years of age, and then above 76 years of age there is some decrease in both sexes.

Elevated body mass index values are higher in all age groups and in both sexes with elevated blood pressure.

Myocardial infarction 26–22%, hypertension disease 62–55%, stroke 19–14%, cancer 47–38% and metabolic disease 42–34% occurred in the family history. In women, there was a greater risk of colon cancer and pe-ripheral vascular disease. BMI was increased in both genders, 45% in women and 59% in men. In both sexes, the proportion of smokers was over 24%.

In the light of the statistics of the screening program, it can be stated that a large proportion of the participants in the studies belong to the high-risk group.

MULTIDISCIPLINARY APPROACH TO OBESITY MANAGEMENT IN ROMANIA

Lidia Iuliana Arhire, Laura Mihalache

The prevalence of obesity in Romania has been rising in the last thirty years, a trend that has been seen in many European countries. As the risk factors for obesity go beyond individual ones, and are associated with lower educational level and other socio-economic factors, the strategies to tackle obesity should consider them together (an ecological approach).

A large epidemiological study on a representative sample of the adult Romanian population showed that the prevalence of overweight and obesity in Romania is higher than previously thought: 34.6% overweight and 31.4% obesity. Moreover, almost 43% of men and 35% of adult women have metabolic syndrome and almost 12% of the population has diabetes. The worrying results of this study (the PREDATORR study) motivated an increase in the resources allocated for the approach of these diseases. The base of the pyramid of these interventions are the risk factors associated with lifestyle which are influenced by healthier diets. The Romanian Food Based Dietary Guideline is used by policymakers, for the education of the population and in the medical field. The advantage of having a national dietary guideline is putting the scientific evidence into a socioeconomic, cultural and historical context for more suited interventions.

The Romanian Diabetes Forum has been created to create a larger multidisciplinary platform to manage type 2 diabetes. The Forum brings together the medical professional societies, the authorities, the pharma industry and has elaborated and supported in parliament a law on the prevention and early detection of diabetes; this includes screening for overweight and obesity in the population.

Following the success of the Diabetes Forum, The Romanian Obesity Forum ("FORO") has recently been set up at the initiative of the Romanian Federation of Diabetes, Nutrition and Metabolic Diseases and of the Romanian Society of Endocrinology, together with societies that are traditionally involved in obesity management. The Scientific Committee has developed „Recommendations for the care of people with obesity in Romania" aiming to create a more efficient framework for the evaluation and treatment of adults with obesity. This includes a comprehensive health risk evaluation of people with obesity and a stratified access to care in accordance with the individual risk. FORO also aims to engage authorities in finding the financial resources to support a national obesity management program.

10 YEARS RESULTS (2010–2019) ON OBESITY IN THE HUNGARIAN COMPREHENSIVE HEALTH SCREENING PRO-GRAM 2010–2020–2030

E. Halmy *(Hungarian Society for the Study of Obesity)*, L. G. Halmy *(Hungarian Society for the Study of Obesity)*, T. Daiki *(Hungarian Comprehensive Health Screening Program 2010–2020–2030),* E. Kékes *(Hungarian Comprehensive Health Screening Program 2010–2020–2030)*, G. Dankovics *(Hungarian Comprehensive Health Screening Program 2010–2020–2030)*, I. Barna *(Hungarian Comprehensive Health Screening Program 2010–2020–2030)*, A. Paksy *(Hungarian Society for the Study of Obesity)*

Background: The Nationwide Comprehensive Health Screening Program of Hungary was established in co-operation of the HSSO in 2010, supports the monitoring

of the health status of the population. In addition to screening, the Program focuses on the prevention of life-style related health risks.

Aim: To study the characteristics of obesity prevalence between 2010–2019. We examined the connections between the risk factors and comorbidities by obesity parameters (BMI, BFP, WC) and the significance of WtHR.

Methods: Body composition analyses were made by InBody 720 bioimpedance method, anthropometric parameters and blood pressure were measured. Laboratory parameters were tested, and the comorbidities were questioned 2010–2019 N= 104 869 (male: N= 47 811, age: 42.6y SD:13.9, BW: 87.1 kg SD:15.8, WC: 89.2 cm SD:13.7; female: N= 57 058, age: 41.9y SD:13.4, BW: 70.7 kg SD:15.0, WC: 97.3 cm SD:12.4). Data 2015–2019 on WtHR N=54529 (male: N=23786, mean of age: 40.0 y (SD:12.4) Height: 178.3 cm (SD:7.3) BW: 89.4 kg (SD:15.2) BMI: 28.1 kg/m^2 (SD:4.3) WC: 99.3 cm (SD:11.6) WtHR: 0.56 (SD:0.07); female: N=30743, age: 42.9 y (SD:13.6) Height: 165.4 cm (SD:6.9) BW: 71.0 kg (SD:14.8) BMI: 26.0 kg/m^2 (SD:5.3) WC: 89.3 cm (SD:3.5) WtHR: 0.54 (SD:0.009).

Results: Overweight (BMI 25–30 kg/m^2) NS; the trend of obesity grad II. above BMI 35 kg/m^2 increased in both gender between 2010–2017. In comparison prevalence data 2016–2017 vs. 2018–2019 did not show significant change, in yearly data BMI≥ 30 kg/m^2 increased significantly by age, the highest in male group 55–59y, female: 60–64y. By normal BMI groups in male 13.7% vs 11.7% in female were in the highest BF% category. We have found by BMI, WC, BFP very strong correlation with prevalence of hypertension (BMI 35–39.9 kg/m^2 male: 73.6%, female: 78.4%, male: WC 102–110 cm 59.2%, WC ≥ 100 74.6%, female: WC 89–102 64.1%, WC ≥ 102 75.7%, highest BFP > 23.15% male: 64.2%, highest BPF > 33 female: 69.2%), significant correlation with type 2 diabetes mellitus (BMI 35–39.9 kg/m^2 male: 33.7%, female: 36.4%, male: WC 102–110 18.8%, WC ≥ 110 32.0%, female: WC 88–102 15.7% WC ≥ 102 29.4%, BFP > 23.15 male: 22.3%, BPF > 33 female: 21.4%), with CVD correlation was found only above BMI 35 and in highest WC group, but by BFP NS. Significant ($p<0.001$) correlations were found in all cases between the studied obesity parameters by gender. Obesity distribution was 27.6% in male vs 20.4% in female by BMI, 59.1% vs 49.9% by BPF, 37.6% vs 51.6% were above the highest waist circumference categories, and 49.3% vs 42.4% by WtHR≥0.55.

Conclusions: Drawing attention to the consequences of obesity, encouraging lifestyle change and well-aimed actions in prevention, and the early diagnosis followed by obesity treatment necessary for the public health interest to prevent further obesity related diseases. We suggest implementing the easy measurement of waist to height ratio into the GP practices to determine the CVD risk and recommend the highest risk group to cut at rate 0.55 by our population study.

Key words: obesity, comorbidities, BMI, waist circumference, body fat percent, waist to height ratio

NUTRITION SCIENCE AND THE SOCIETY

Diána Bánáti
(University of Szeged, Faculty of Engineering)

The 21st century will witness the greatest revolution in food science and nutrition. The food and nutrition landscape will dramatically change in the coming decades. How will the outcome be translated into societal needs, to fulfill consumers' interest?

Consumers do have changing needs and expectations regarding the available foods. Their need for convenient, ready-to-eat, thus processed but at the same time „fresh", „natural", additive-free, still safe foods has changed a lot in recent decades. Their health priorities have shifted and they are more focused on their health now than they ever have been.

Socio-economic changes (such as urbanisation, processed and ready-to-eat foods marketed, single households, eating out more, frequency of shopping, bigger portions, lack of physical activity, energy intake, empty calories and others) influence the way we eat and our health status. The latter (obesity, CVDs, diabetes etc.) mainly depends on our food intake and diet.

The COVID-19 pandemic underlined the need to optimize health, especially immunity. So this is the time to address health while consumers have it top of mind. 41% of diseases are in strong correlation (and almost the same proportion are in certain correlation) with our diet, anyway.

Innovation trends, including novel technologies (from PEF to HPP, from nanotech to sensors) provide wider choice than ever. The hype at around alternative protein sources, including insects, lab-grown meat and plant-based proteins reveals what we could be eating by the end of the decade to protect our planet.

Health issues fall under the competence of the EU Member States, dietary guidelines differ by country (not necessarily reflect differences in cultural heritage), recommendations of international organisations differ a lot. Harmonisation (of the legislation) would require clear definitions, consensus and transparent, evidence based scientific studies with proper scientific substantiation. However, from technical and scientific point of view, we lack definitions and consensus regarding certain issues, thus our legislation has also gaps in terms of harmonisation.

The amount of confusing and often fake information available from non-reliable resources would greatly influence the perception of consumers. The misperception of consumers, the lack of communication skills of scientists and the lack of understanding of complex scientific problems and highly technical publications by journalists and many other factors result in a huge gap between science and the society and pose great challenges for (science) communication.

Several studies pointed out discrepancies between the convictions of adult non-scientists and scientists. The difference between people believing in pseudoscience and the science shared by scientists and science communicators might be the way a particular item is shared. "Anecdotal data is not data" for scientists, but certain scientific information could be illustrated by using particular examples which are easily "consumable" by the public.

INDUSTRY LECTURES

RESULTS OF 4–10-YEAR-OLD CHILDREN DIETARY AND PHYSICAL ACTIVITY SURVEY AND THE COMPARISON OF THE MAIN RESULTS WITH THE SURVEY CONDUCTED AMONG THIS AGE GROUP IN 2014

Diana Sarga
(Nestlé, Budapest, Hungary)

Introduction: Eating habits developed in childhood greatly influence the health status of the growing genera-tion. [1] The high rate of obesity among children and the poor eating habits inherited from adults draw the attention to focus on this age group, both in gaining information about their eating habits and educating them. To understand the eating habits of the 4–10-year-old children, the representative dietary intake survey in two Hungarian cities, conducted in 2014, was repeated for the second time on a national representative sample.

Methods: Children's physical activity and parental nutritional attitudes were measured by a questionnaire. Data on children's eating habits were collected using the internationally recommended three-day dietary record method and the results were compared to national dietary recommendations. [2] [3] Following the WHO recommendation basic metabolic rate was calculated, and children with a high probability of under- and over-reporting of dietary intake were excluded from further analysis. [4] [5] In line with the method of Cole et al., lean, normal, overweight, and obese categories were developed based on body mass index. [6] [7] 725 evaluable questionnaires and 666 nutrition diaries were processed in this study. For proper statistical and professional comparison, a subsample of the 4–10-year-old children from Budapest and Kecskemét was created and compared with the survey conducted in 2014.

Results: The rate of overweight and obesity is 23% among the surveyed children which is 28% among girls and 18.2% among boys. The results show that excessive fat (34.2 % of energy) and cholesterol intake is typical, omega fatty acid ratio is unfavorable among children. Consumption of dairy products (290 g /day), and consequently calcium intake, fruit, and vegetable consumption (263 g /day), and therefore fiber intake is significantly lower than recommended for children. The salt intake calculated from sodium was 8.4 g/day, of which 41% came from food preparation. The average energy from added sugar was 11%. Low vitamin D intake was observed in almost the entire sample.

Compared to the 2014 survey, the rate of overweight and obesity among children increased by 26.7%. Among macronutrients, fat intake increased by 3.4%. Among food groups, consumption of milk and dairy products decreased by 7.65%, however, calcium intake increased by 8.9%. Consumption of whole grains decreased significantly (by 63%). Fruit and vegetable intake increased by 15.2%. Energy from added sugar decreased by 11% and sodium intake by 7.5%.

Conclusion: The obtained results prove that it is important to educate children for balanced nutrition. To develop proper eating habits, not only parental education, and examples but also various educational activities for children, health preservative programs, and food product innovations are essential.

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Keywords: 4–10-year-old children, dietary intake study, eating habits, physical activity

DIGITAL HEALTH TO TACKLE OBESITY AND CHRONIC CONDITIONS: A PERSONALISED APPROACH FOR BETTER CARE

Eva Lajko *(ALSAD Medical, Kaposvár, Hungary)*, Laszlo Varga *(ALSAD Medical, Kaposvár, Hungary)*

Objective: The number of people living with obesity or chronic conditions like diabetes, chronic kidney disease or hypertension keeps steadily growing. These patients require long-term and personalised support including changing and managing their diet, activity level and monitoring their health. Traditional approach often fails to provide sustainable results given to lack of time, personalisation level and patient engagement. Digital health innovations can enhance engagement by offering remote access to health professionals, personalised recommendations and feedback using artificial intelligence, combined with non-intrusive methods of patient monitoring using smart personal devices. The goal is to provide more effective and personalised care, without increasing the burden of healthcare staff or weakening the connection between patient and health professional. Therefore, managing obesity and chronic conditions using digital health innovations can contribute to offer personalised nutritional support, remote monitoring and patient education for better care.

Methods: Diet and lifestyle elements in obesity treatment are key, while effective treatment also requires significant changes in diet and everyday activity level. Behavior change, according to recent studies, can be very effectively supported by digital applications, especially if its services can set and positively reinforce changes leading to a healthier life. ALSAD (Automated LifeStyle ADvice) is a digital health platform to manage condition-specific, personalised diet, monitor health and activity levels of individual patients and provide patient education support tailored to individual needs and preferences, connecting patients to qualified dietitians and specialist doctors.

Results: The case study, involving more than 30 obese patients of Ormos Institute, a private hospital in Budapest, introduces forms of support, challenges and results achieved within 6 months. The average weight loss per patient was between 3 and 7 kilograms, and 33 from 38 patients could successfully complete the initial phase of the program, which was a combination of Modern Body Weight programme with a personal consultation, patient-specific diet and activity programme supported by ALSAD Digital Health tool, and regular, real time monitoring of health, activity and diet. These patients were able to set a sustainable dietary regime, based on their individual needs and preferences, while engagement and continuous support encouraged them to maintain a healthier diet and activity regime, under specialist supervision and control.

Conclusion: Changing dietary and lifestyle habits are key (and often the only) factors to treat and prevent obesity, but the treatment requires more personalisation, monitoring, feedback and engagement than what traditional approach and current healthcare resource levels can provide. Digital health tools, often combined with more traditional elements of medical treatment, can successfully contribute to a more personalised, more sustainable patient care in managing obesity and several related chronic conditions, enabling data-driven, accessible services connecting patient and health professional using telehealth channels and automating several time-consuming or repetitive tasks like nutritional calculation or analysis of patient data. Digital tools can be particularly efficient in treatments where behaviour change is required and condition management should be permanent, adjusted to actual status of the patient.

Keywords: Digital health, Nutrition, Chronic disease, Behaviour, Personalisation

SESSION 2: FROM BASIC TO CLINICAL SCIENCES

MUSCLE NONSHIVERING THERMOGENESIS

Jan Kopecky
(Adipose Tissue Biology, Institute of Physiology of the Czech Academy of Sciences, Prague, Czech Republic)

The ability of the body to maintain thermal homeostasis and energy balance, i.e. resistance to cold stress and obesity, respectively, depends on overlapping mechanisms associated with nonshivering thermogenesis (NST). A unique form of adaptive NST developed only in mammals, which depends on mitochondrial uncoupling protein 1 (UCP1) in brown adipose tissue (BAT). Skeletal muscle represents the main site of NST in birds and can mediate NST also in mammals, including humans. Skeletal muscle can account for 20 – 30% of the total oxygen uptake in the resting state. Differences in resting muscle metabolism explain part of the variance in resting metabolic rate among adult humans and may play a role in the pathogenesis of obesity. Several mechanisms could contribute to muscle NST, namely (i) mitochondrial proton leak; (ii) impaired thermodynamic efficiency of

Na+,K+-ATPase in the plasma membrane; (iii) muscle tone; (iv) futile substrate cycling between de novo lipogenesis (DNL) and fatty acid (FA) oxidation (DNL/FAox cycle) controlled by leptin – AMP-activated protein kinase (AMPK) axis; and (v) uncoupling of sarco(endo) plasmic reticulum calcium ATPases (SERCA) pump activity by sarcolipin. Muscle and BAT may represent synergistic partners in thermoregulatory NST and substitute in part one for another. Our experiments using inbred strains of mice differing in propensity to obesity suggested that resistance to obesity was associated with NST in skeletal muscle rather in BAT. Two common approaches used in the prevention and treatment of obesity are reducing calorie intake and increasing physical activity. However, in both rodents and humans, imposed weight loss by fasting leads to (i) decreased leptinaemia and sympathetic nervous system activity and (ii) increased muscle energy efficiency, i.e. decreased energy expenditure. Influencing muscle NST therefore represents a plausible treatment strategy for obesity and related diseases.

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Keywords: thermogenesis, obesity, skeletal muscle

EFFECT OF ORLISTAT ON GHRELIN LEVELS IN OBESE RATS

Teodora Handjieva-Darlenska
(Department of pharmacology and toxicology, Medical Faculty, Medical Uni-versity, Sofia, Bulgaria)

Introduction: Orlistat (Xenical) is the well-known anti-obesity. Orlistat is a lipase inhibitor, well-tolerated and has a safety profile. Ghrelin is a hormone secreted by the endocrine cells of the stomach and has strong orexogenic potency. Our hypothesis was that Orlistat could alter the secretion of ghrelin from the stomach. Thus, the aim of our study was to investigate the effect of Orlistat on ghrelin levels in the blood in obese rats.

Materials and methods: Wistar male rats (n= 30) were used in the study. The rats started a 2-month diet-induced obesity period. They were fed with a chow diet (control group) and a high-fat diet plus chow food (experimental group). After this period rats were randomized into three groups: 1st group – on a chow diet (control group), 2d group – on a high-fat diet, 3d group – on a high-fat diet plus Orlistat (5mg/kg/daily). The drug treatment lasted for one month. Then, rats were anaesthetized and sacrificed. Blood was taken for measurement of lipids and glucose in the blood, and for analyses of plasma ghrelin levels (fmol/ml) by ELISA method (LincoResearch, USA).

Results: There was a significant increase in body weight in the high-fat group compared to the control group ($p< 0.001$). Further, obese rats showed a significant increase in blood glucose ($p< 0.001$), and an increase in triglycerides ($p= 0.2$). The group treated with Orlistat demonstrated a decrease in body weight, glucose and lipid levels in the blood. More interestingly, this group showed a significant decrease in plasma ghrelin levels ($p< 0.01$) in comparison to the high-fat group not treated with the drug.

Conclusion: Orlistat could have an inhibitory effect on ghrelin secretion. Further studies are needed to elucidate this novel finding.

MELANOCORTIN PATHWAY: PATHOPHYSIOLOGICAL AND CLINICAL IMPLICATIONS

Irena Aldhoon-Hainerova *(Department of Children and Adolescents, Third Faculty of Medicine, Charles Uni-versity and Faculty Hospital Královské Vinohrady, Prague, Czech Republic)*, Vojtech Hainer *(Obesity Management Centre, Institute of Endocrinology, Prague, Czech Republic)*

Leptin-melanocortin pathway plays an important role in the regulation of energy homeostasis and thus body weight. Several hormones have been identified that affect energy balance through the melanocortin pathway. Adipose tissue derived hormone leptin induces negative energy balance by stimulating alpha-melanocyte-stimulating hormone and melanocortin-4 receptor (MC4R). Increased melanocortin signalling within hypothalamus leads to decreased food intake and increased sympathetic nervous system, energy expenditure and physical activity.

The discovery of monogenic obesities involving dysfunction of leptin-melanocortin pathway greatly contributed to understanding of energy balance regulation. Mutations in genes involved in this pathway often result in early-onset obesity. Cases of severe obesity were related to mutations in leptin, leptin receptor, proopiomelanocortin, prohormone convertase and MC4R genes. Disruption of MC4R is the most common form of monogenic obesities and include mostly missense gene mutations with different losses of function. Its prevalence greatly varies in different populations, from 0.5 to 5.8 %.

This review focuses on clinical characterization and prevalence of some of these gene mutations. Genome-wide association studies revealed that MC4R gene has been related to monogenic obesities but also to common obesity. It has also been shown that an interaction of variants in the MC4R gene with fat mass and obesity associated gene significantly increases the risk for obesity, particularly in adolescence. On the other hand, about 15 % of the MC4R gene variants is associated with gain of function that protects against obesity and presents with favourable metabolic profile.

Patients with MC4R gene mutations and obese controls exhibited similar weight loss in response to a short-term lifestyle weight management. However, carriers of MC4R gene mutations were unable to maintain their weight loss. During past decades there have been several attempts to develop specific MC4R agonists to treat obese patients with disrupted function of MC4R. A discovery of setmelanotide, a novel specific MC4R agonist, showed to be effective in animal and human studies. Its administration induced reduction in food intake and weight loss without simultaneous activation of sympathetic nervous system. Setmelanotide was approved for medical use in the United States in November 2020, and in the European Union in July 2021. Its administration is indicated for chronic weight management in adults and in paediatric patients 6 years of age and older with obesity due to proopiomelanocortin, proprotein convertase subtilisin/kexin type 1, or leptin receptor deficiency confirmed by genetic testing.

At the present time, the efficacy and safety of setmelanotide is being evaluated for the treatment of obesity and hyperphagia in individuals with Bardet-Biedl and Alström syndrome. The potential use of setmelanotide in the treatment of patients with more common gene mutations and weight promoting variants in melanocortin pathway has also been investigated. The employment of specific MC4R agonists clearly opens new horizons in the treatment of rare monogenic obesities but may in future be used in some common obesities where stimulation of MC4R would be desirable.

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Keywords: leptin-melanocortin pathway, melanocortin-4 receptor, setmelanotide, monogenic obesity

DIABESITY MANAGEMENT – GLUCOCENTRIC VS OBESITOCENTRIC POINT OF VIEW OR BOTH?

Lubomira Fabryova
(Dept. for diabetes and metabolic disorders, Metabol-KLINIK s.r.o,1 Biomedical Reseach Center of the Slovak Academy of Sciences 2, Institute for prevention and Intervention St. Elisabeth University of Health Care and Social Work3, Bratislava, Slovakia)

Over the past century, overweight and obesity has become a major global health problem, thanks to environmental and societal changes favoring a positive energy balance (increased energy intake, low physical activity and sedentary lifestyle). Overweight / obesity is a major risk factor for the development of non-communicable diseases such as cardiovascular diseases, cardiometabolic diseases – type 2 diabetes mellitus (T2DM), arterial hypertension, lipid metabolism disorders, but also some types of cancer. T2DM is most strongly associated with overweight / obesity. This close relationship has led to the creation of the term „diabesity", which underlines the fact that most of type 2 diabetic patients (90%) suffer from overweight / obesity. Overweight / obesity have to treat comprehensively and it is best to prevent it in the „good times". Effective weight control is the primary prevention not only for chronic non-infectious but also dangerous acute infectious diseases (COVID-19), as other months of our lives have convinced. Prevention of overweight/obesity/diabesity is prevention of the development other serious diseases. Subsequent T2DM is already a conglomerate of two serious complex chronic diseases with costly treatment of comorbidities.

If we want to help our patients, we have to clearly take combined treatment strategy focusing on both com-ponents of diabesity. The longer a patient suffers from obesity/diabesity, the more difficul the treatment is. Current recommendations for obese type 2 diabetic patients call for comprehensive personalized medicine, which should clearly include a combination of non-pharmacological treatment (lifestyle intervention, cognitive-behavioral therapy), phaarmacotherapy (non-weight gain antidiabetics, antiobesity drugs), in indicated cases also bariatric/metabolic surgery.

Pharmacotherapy with non-weight gain antidiabetics as well as antiobesity drugs is an important part of the comprehensive management of obese diabetics. The ideal antidiabetic / antiobesity drug is one that effectively achieves weight reduction, maintains weight loss, provides long-term safety, and reduces chronic obesity-related diseases. GLP-1 (glucagon-like peptide-1) receptor agonists – liraglutide and semaglutide – are becoming an important part of the management of obese diabetic patients. Treatment must be timely, vig-

orous and long-term. New hope for better management of diabetes is shining with the arrival of new molecules in clinical practice.

Keywords: overweight, obesity, diabesity, glucocentric management of diabesity, obesity-centric management of diabesity

TREATMENT OF SARCOPENIC OBESITY IN ONCOLOGY

Magdolna Dank *(Department of Internal Medicine and Oncology, Semmelweis University, Budapest, Hungary)*, Ágnes Juhász *(Department of Internal Medicine and Oncology, Semmelweis University, Budapest, Hungary)*, Anett Hajdu *(Department of Internal Medicine and Oncology, Semmelweis University, Budapest, Hungary)*, Barbara Kerék *(Department of Internal Medicine and Oncology, Semmelweis University, Budapest, Hungary)*

Sarcopenia, defined with loss of muscle mass, muscle strength, and physical performance, is common in cancer patients and may be associated with obesity. Sarcopenic obesity negatively affects anti-cancer therapy, contributes to the development of postoperative complications, increased chemotherapeutic toxicity, and adversely affects survival. The patient has high body weight, total body fat, and BMI, and all of this hides sarcopenia, there for it is misleading physicians. Nutritional therapy is also warranted in obese patients. This pathological nutritional condition can be improved with physiotherapy in addition to an individualized diet, as it improves aerobic fitness, body composition, and quality of life. In the case of these kind of patients, special attention should be paid to their mental state and proper communication with them.

Keywords: sarcopenia, cancer, rehabilitation, nutrition, physiotherapy

TARGETING THE GASTROINTESTINAL TRACT TO TREAT OBESITY AND DIABETES

Martin Haluzík
(Diabetes Centre, Institute for Clinical and Experimental Medicine, Praha, Czech Republic)

Bariatric surgery is the most efficacious method in the treatment of both obesity and its metabolic complications, in particular type 2 diabetes mellitus (T2DM). Numerous studies have shown that bariatric surgery either markedly improves glucose control in patients with T2DM or even achieves diabetes remission in high percentages of these patients. While in purely restrictive procedures (e.g. gastric banding, gastric plication) metabolic improvements are mainly due to marked weight reduction, in combined or malabsorptive procedures numerous mechanism partially or fully independent of body weight reduction are in place. Typical example of such operation is a gastric bypass where in addition to stomach restriction proximal part of small intestine is bypassed and thus excluded from the contact with food. Subsequently, numerous changes in incretin hormone secretion, bile acid concentrations, gut microbiota composition and other yet undiscovered mechanism contribute to complex metabolic improvements in patients undergoing these procedures.

While being highly efficacious, bariatric operations may be still accompanied by risk of complications. Therefore, endoscopic methods based on the principles of bariatric surgery are being intensively explored to partially substitute for surgical procedures. The first more widely available method is endoscopic gastric plication. During this endoscopic procedure the stomach is folded in on itself and sutured (stitched) to make it smaller and shorter resulting in decreased gastric volume and subsequently decreased food intake. Numerous other endoscopic methods are currently under development. Furthermore, a better understanding of the mechanism of action of bariatric surgery may lead to less invasive endoscopic treatments of diabetes and obesity that may complement and widen current therapeutic options.

SESSION 3: CONNECTIONS OF RISK REDUCTION IN OBESITY RELATED DISEASES

CARDIOVASCULAR RISK AND HARM REDUCTION IN LIFESTYLE RELATED DISORDERS

Edward Franek
(Mossakowski Clinical Research Institute, Polish Academy of Sciences, Warsaw, Poland)

Lifestyle related disorders, like overweight, obesity, diabetes type 2 and others are very common. In the lecture because of time limitation I will focus on diabetes, the first noncommunicable disease declared by WHO as pandemia.

Type 2 diabetes is a state of increased cardiovascular risk. This results of increased number of cardiovascular incidents and cardiovascular deaths in this population. The cardiovascular risk is dependent on may cardiovascular risk factors. Part of them are diabetes-specific, like hypo- and hyperglycemia, part nonspecific, like obesity, hypertension and smoking.

In the new paradigm of diabetes treatment the most important strategy is not to lower hyperglycemia, but rather to fight cardiovascular risks and to avoid the related harm. This harm cannot be fully avoided, but it can be substantially reduced. It can be achieved on

many ways, like lifestyle change with especially quitting smoking (although also different nicotine replacement therapies, electronic nicotine-delivery systems including), use of antidiabetic and other treatment which reduces cardiovascular risk (e.g. antihypertensive and lipid-lowering therapy).

It seems intuitively, although good evidence is lacking, that in patients with type 2 diabetes multifactorial harm and risk reducing treatment, like used in the STENO-2 study, is the best strategy for achieving longer life and reduced complications rate.

HOW DOES DIET AND EXERCISE AFFECT CORONARY PLAQUES? INSIGHTS FROM THE DISCO-CT STUDY

Jan Henzel
(Department of Coronary Artery and Structural Heart Diseases, National Institute of Cardiology in Warsaw, Poland)

Lifestyle intervention remains the forefront strategy in the treatment of coronary artery disease. Smoking cessation, healthy diet, exercise, and body mass reduction have the highest-class recommendation in the management of chronic coronary syndromes [1] as reducing all-cause mortality, cardiovascular mortality, and cardiovascular events. A growing body of evidence suggests that the reduction of inflammation and oxidative stress can be attributed to the non-pharmacological approach. However, the direct impact of non-pharmacological treatment on coronary plaques remains unknown.

Dietary Intervention to Stop COronary Atherosclerosis in Computed Tomography (DISCO-CT) [NCT02571803], a randomized, single-center studyaimed to ascertain the impact of intensive diet and lifestyle intervention on coronary plaque volume and composition assessed by serial computed tomography angiography. 92 patients with nonobstructive coronary atherosclerotic lesions were randomized to either experimental or control arm in a 1:1 fashion. The experimental group was subjected to a systematic dietary and lifestyle counselling at our sitesupervised by a dietitian,in accordance with DASH diet principles, while patients in the control group received only basic lifestyle counselling. All patients had medical therapy optimized throughout the study. The detailed methodology can be found elsewhere [2]. The results of the study show that the lifestyle intervention may decelerate the progression of atherosclerosis and promote the regression of high-risk plaque, defined as the sum of necrotic core and fibrofatty plaque component. Additionally, it was found that the study intervention was beneficial in terms of body mass reduction, fat reduction, visceral fat reduction, and resulted in a substantial decrease in total cholesterol, low density lipoprotein cholesterol, and high-sensitivity C-reactive protein [2,3].We also observed significantly lower plasma concentrations of pro-inflammatory cytokines, such as CXCL4/Platelet Factor-4, monocyte-chemotactive protein-1 (MCP-1) and C-C motif chemokine ligand 5 (CCL5) in the experimental group[3-5].

It can be concluded that a comprehensive lifestyle intervention may slow the progression of atherosclerosis and reduce plaque vulnerability.These findings are congruent with beneficial trends in the anthropometric and laboratory endpoints.Secondly, the results of our study highlight the role of coronary computed tomography angiographyas a convenient tool for non-invasive monitoring of plaque vulnerability in patients with coronary artery disease.

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OBESITY AND CANCER

David Khayat
(Former President of French National Cancer Institute, Paris France; Clinique BIZET, Medical Oncology Department, 21–23 rue Georges Bizet, 75116 Paris France)

Out of 57 million deaths that occurred worldwide in 2019, 71% were due to NCDs. These include cardiovascular and respiratory diseases, diabetes and cancers.

There are many reasons that can explain this epidemy, but, in fact, whatever the reason, they are all related to poor lifestyle choices.

They can be due to bad diet, to lack of exercise, to obesity, to smoking, or to an excess of exposure to alcohol and sun light, and so many other lifestyles.

In the vast majority of the cases, people are aware of the negative impact their behaviours are going to have on their health. But even though, they do continue to stick to these bad habits, and continue to die prematurely.

We know for instance, the powerful link between obesity and cancer and the mechanisms underlying this relationship are already partly discovered. Despite some of the limitations of the study designs, there is now consistent evidence that higher amounts of body fat are associated with increased risks of a number of cancers, and the evidence related to body fat holds despite the fact that inappropriate diet such as excess of salt, high sugar intake, lack of fruits and vegetables, etc., which can lead to obesity can also be independently linked to cancer. Given that obesity causes cancer it is important to understand whether avoiding weight gain and/or losing weight reduces the risk. There is consistent evidence from observational that people who gain less weight during adulthood have lower risks of a number of cancers. However, assessing losing weight is much harder to study, because you have to consider how the weight was loss and evaluate if the weight loss was intentional or unintentional (related to and underlying health condition). But in studies of bariatric surgery patients we do see a lower risks of obesity-related cancers than obese people who do not have bariatric surgery. And lastly there is evidence to support that obesity may worsen several aspects of cancer survivorship, including quality of life, cancer recurrence, cancer progression, and prognosis (survival).

The common explanation usually hidden beyond these uncontrolled behaviours, is what we call now an addiction, or more precisely the loss of self-control.

As an oncologist practicing for more that forty years, obesity and other bad behaviours are a tremendous challenge because all of them are partly responsible for the development of cancers, a disease of which the incidence is doubling every year, demonstrating the relative failure of health education and all the public health policies that have been implemented in the world during le past 20–30 years, which have only focused on preventing and eradicating the bad behaviours while using social stigma to try and shame people into changing their behaviors.

My mission is not to eradicate that or that behaviour, it is finally to avoid the deaths and the sufferance related to them, helping people to reduce their risk of cancer by implementing the concept of harm reduction in their daily life.

SESSION 4: MULTIDISCIPLINARY OBESITY MANAGEMENT

CLINICAL EVALUATION OF THE OBESE PATIENT

Constantine Tsigos
(Professor of Endocrinology, Nutrition and Metabolism, Harokopio University, Athens, Greece)

All physicians should be able to clinically assess an obese patient, identify potential genetic, behavioral and environmental factors that may have contributed to the development of obesity and screen for obesity-related complications. More specifically, the physician should be aware of important elements from the family and personal history of the obese patient, as well as of clinical signs that may provide clues as to the aetiology of obesity. A biochemical and hormonal screening is also essential both to identify potential contributing factors and to document the presence of metabolic complications. The presence of other complications of obesity should also be actively explored (e.g. sleep apnea, musculoskeletal problems, psychological symptoms, reproductive disturbances, etc). Further, it is important that the physician gains the trust of the obese patient by acknowledging the problem and avoiding wording that may be offensive to the patient in order for any intervention to be successful in the long-term. Finally, we should all recognize that obesity is a complex, adiposity-based chronic disease, where management targets both adiposity and weight-related complications in order to improve overall health and quality of life. Individualization of care is essential as well as optimization of health outcomes and safety.

European guidelines on obesity management recommend to establish multidisciplinary teams and multilevel obesity management networks that include obesity specialists.

PRIMARY CARE OBESITY MANAGEMENT IN HUNGARY

Imre Rurik
(Chair, Hungarian Society of Nutrition, Budapest, Hungary)

Background: In Hungary a two-thirds of the population is affected by obesity and overweight. This threatening pandemic has an important public health implication. Before proper medication become available widespread for an affordable price, primary care providers have a distinguished role in the management. Their performance may be influenced by many factors but their personal motivation is still an under-researched area.

Method: The knowledge, attitudes and practice were reviewed in this questionnaire study involving a representative sample of 10% of all Hungarian family physicians. In different settings, 521 practitioners (448 GPs and 73

residents/vocational trainees) were questioned using a validated questionnaire.

Results: The knowledge about multimorbidity, a main consequence of obesity, was balanced.

Only 51% of the GPs were aware of the diagnostic threshold for obesity; awareness being higher in cities (60%) and the highest among residents (90%). They also considered obesity an illness rather than an aesthetic issue.

There were wider differences regarding attitudes and practice, influenced by the doctors' age, gender, known BMI, previous qualification, less by working location.

GPs with qualification in family medicine alone considered obesity management as higher professional satis-faction, compared to physicians who had previously other board qualification (77% vs 68%). They measured their patients' waist circumference and waist/hip ratio (72% vs 62%) more frequently, provided the obese with dietary advice more often, while this service was less frequent among capital-based doctors who accepted the self-reported body weight dates by patients more frequently / commonly. Similar reduced activity and weight-measurement in outdoor clothing were more typical among older doctors.

Diagnosis based on BMI alone was the highest in cities (85%). Consultations were significantly shorter in practices with a higher number of enrolled patients and were longer by female providers who consulted longer with patients about the suspected causes of developing obesity (65% vs 44%) and offered dietary records for patients significantly more frequently (65% vs 52%). Most of the younger doctors agreed that obesity management was a primary care issue.

Doctors in the normal BMI range were unanimous that they should be a model for their patients (94% vs 81%).

Conclusion: More education of primary care physicians, available practical guidelines and higher community involvement are needed to improve the obesity management in Hungary.

GENERAL PRACTITIONERS IN SLOVAKIA AND CANCER PREVENTION RELATED TO OBESITY AND OTHER LIFESTYLE FACTORS

Daniela Mináriková *(Faculty of Pharmacy, Comenius University in Bratislava, Bratislava, Slovakia)*, Peter Minárik *(Biomedical Research Center of the Slovak Academy of Sciences, Bratislava, Slovakia)*, Peter Makara *(Slovak Society of General Practice, Bratislava, Slovakia)*, Ľubomíra Fábryová *(MetabolKLINIK s.r.o., Depart-ment for diabetes and metabolic disorders, Bratislava, Slovakia)*, Ľubica Lehocká *(Faculty of Pharmacy, Comenius University in Bratislava, Bratislava, Slovakia)*, Mariana Mrázová *(Institute of Prevention and Inter-vention, St. Elisabeth University of Health and Social Work, Bratislava, Slovakia)*

Slovakia has relatively high mortality rates from preventable and treatable causes. The second most common cause of death in 2019 was cancer, with 13 500 deaths (27.7% in men and 22.9% in women).

Obesity plays a central role in morbidity and mortality of diseases of multiple organs and systems, and it is a major contributor to the growing incidence of cancer.

General practitioners (GPs) are at the forefront of healthcare in Slovakia with unique position to deliver pre-ventive healthcare. It includes prevention of illness, the early detection of specific disease, and the promotion and maintenance of health. Due to their direct contact with patients, GPs are important actors in multispectral approach of cancer prevention, but with the stronger orientation on treatment and clinical outcomes of oncological diseases than on the cancer own prevention.

In an effort to describe the actual situation about cancer prevention performed by Slovak GPs, the cross-sectional study was carried out in September and October 2016 among members of the Slovak Society of the General Practitioners. In total, 226 (approx. 23%) GPs participated in the survey.

The objective of the study was to investigate the actual and potential roles of Slovak GPs in the prevention of cancer, to identify the barriers and facilitators of GPs anticancer activities and to characterise the perception and acceptability of GP´s cancer prevention role,

It can be stated that while the role of GPs in secondary cancer prevention has being strengthened, primary cancer prevention still remains beyond the reach of health professionals.

Slovak GPs positively accept their position and responsibility in cancer prevention, but they expect the support of other partners. They focus mainly on the secondary prevention with the provision of colorectal cancer screening. Primary prevention activities are opportunistic. As their actual role in cancer prevention GPs recognize mainly education of their patients. Smokers (75.66% of respondents) and patients with positive family anamnesis (71.68% of respondents) are the most groups, which are frequently educated about cancer prevention. GPs give little attention to other groups, such as patients with obesity/overweight (49.11%) and obese diabetics (8.85%).

The survey revealed the need for education and the interest of GP's about cancer prevention (only 18.72% declared sufficient knowledge about cancer prevention). Guideline for complex management of overweight an obesity in adults has recently approved by Ministry of Health in Slovakia, including a clear role for GPs in preventing and solving obesity. In practice, however, it will be necessary to prepare special intervention programs and trainings for GPs, how to perform this activity,

as well as to ensure the expertise and quality of their procedures in daily practice.

The Slovak Obesity Association will develop the close collaboration with the Slovak Society of General Practi-tioners how GPs can be participated on the implementation of this guideline, because strengthening of the GP's role in obesity management is more than crucial challenge in improvement of cancer prevention in Slovakia.

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Keywords: general practitioners, obesity, cancer, prevention

EFFECT OF RADICAL LIFE STYLE CHANGES IN EXTREME OBESE PATIENTS

Adela Penesova *(Institute of Clinical and Translational Research,, Biomedical Research Center, Slovak Academy of Sciences, Bratislava, Slovakia, Bratislava, Slovakia)*, Andrea Havranová *(Institute of Clinical and Translational Research, Biomedical Research Center, Slovak Academy of Sciences, Bratislava, Slovakia, Bratislava, Slovakia)*, Miroslav Vlček *(Institute of Clinical and Translational Research, Biomedical Research Center, Slovak Academy of Sciences, Bratislava, Slovakia, Bratislava, Slovakia)*, Michal Páleník *(PLANEAT s.r.o, Bratislava, Slovakia, Bratislava, Slovakia)*, Jana Babjaková *(Institute of Hygiene, Faculty of Medicine, Comenius University in Bratislava, Slovakia, Bratislava, Slovakia)*, Žofia Rádiková *(Institute of Clinical and Translational Research, Biomedical Research Center, Slovak Academy of Sciences, Bratislava, Slovakia, Bratislava, Slovakia)*

Management of obesity (OB), especially extreme (EO, BMI> 40 kg/m^2) requires a multidisciplinary approach to treatment. The goal of treatment should not be „only" to reduce body weight and BMI but also to improve cardiometabolic parameters. In addition, obesity management focuses on the comprehensive treatment of comorbidities and the improvement of the quality of life of OB patients. To reduce any postoperative morbidity, weight reduction of at least 10% is recommended before surgery in EO patients. Therefore, the aim of our work is to monitor the effect of intensive lifestyle changes (diet and physical activity) in patients with EO on cardiometabolic parameters (insulin, glucose, insulin resistance index (IR HOMA), lipidogram). So far, we have more 32 EO patients (18F; mean age 33.1 ± 7.5 years, initial weight 105 – 276 kg) in the weight loss program. All extremely obese subjects undergoing intensive life style program were followed up for up to 1 year. Life style changes composed in decreased caloric intake and 10 hours of intensive exercise per week under the professional fitness trainer control. Glycosylated hemoglobin (HbA1c) as well as liver parameters (aspartate transaminase (AST), alanine transaminase (ALT), (gamma-glutamyl transferase (GGT) and bilirubin (Bi)) were analyzed in certified lab. Average weight loss after 6 months was 39 ± 13 kg ($p < 0.001$), was associated with decreased blood pressure and heart rate. Excessive weight loss also led to a significant decrease in the plasma concentration of fasting plasma glucose p=0.02), insulin (p=0.003), IR HOMA ($p < 0.001$) and HbA1c ($p < 0.001$). Lipid profile analysis revealed a reduction in the plasma concentrations of total and LDL cholesterol and triglycerides (p=0.002; p=0.03, p=0.003 resp.). Liver parameters AST, ALT and GMT decreased after intervention (p=0.008; $p < 0.001$, p=0.004 resp.).

However bilirubin concentrations increased (0.01). Initial Fatty liver index (FLI) was decreased after intervention (from 83 ± 21 to 25 ± 34 ($p < 0.001$)). Our preliminary results indicate that the weight loss induced by radical life style changes ameliorates the atherogenicity, leaded to improvement of glucose metabolism, liver parameters and overall decreased cardiometabolic risk factors.

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Keywords: extreme obesity, cardiometabolic risk factors, lipidogram, life style

SESSION 5: THE ROLE OF PHYSICAL ACTIVITY IN OBESITY

EXERCISE MODULATES COGNITION IN PARALLEL WITH THE WHOLE-BODY GLUCOSE METABOLISM

Barbara Ukropcová

(Biomedical Research Center Slovak Academy of Sciences, Faculty of Medicine Comenius University, Slovak Obesity Association, Bratislava, Slovakia)

Acute intense physical activity induces energy deficit, activates mobilisation and oxidation of energy substrates and stimulates cardiovascular system. Regular exercise induces the systemic adaptive response, translated into an increase in physical fitness, improved energy metabolism and enhanced brain plasticity. Improvements of systemic metabolism include increased lipid oxidation, insulin sensitivity, metabolic flexibility and mitochondrial biogenesis in both skeletal muscle and the brain, which are linked to the improved glycemic control and cognitive functions in patients with obesity and type 2 diabetes (T2D).

Insulin resistance, one of the primary patho-physiological substrates of metabolic dysfunction in T2D, is con-sidered to be the common denominator of pathophysiological processes at the level of many organs and tissues. Reduction of biological effect of insulin is linked to the sedentary lifestyle, high content of saturated fat in the diet and the accumulation of visceral adipose tissue. Insulin resistance and hyperinsulinemia contribute to the pathogenesis of atherosclerosis, hypertension, NAFLD, neuroinflammation and neurodegeneration.

In our clinical intervention studies we assess the effects of regular aerobic-strength training on metabolism, physical fitness and cognitive functions of different patients' populations. We observed the associations be-tween training-induced changes of hippocampal volume and cognitive functions with training-induced changes in systemic and skeletal muscle energy metabolism. The relationships between exercise-induced changes of metabolism, cognition and specific areas of the brain support the existence of common molecular mediators, which are involved in the synchronization of the systemic adaptive response to exercise.

Intervention studies with exercise describe positive effects of aerobic and/or strength training in different populations. An increase in physical activity represents one of the key components of complex lifestyle modi-fications, aimed at long-term lifestyle modification, weight reduction & maintenance, improved physical fitness, health and quality of life in patients with obesity and type 2 diabetes.

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INNOVATIVE TECHNOLOGIES IN OBESITY MANAGE-MENT

Martin Matoulek

(3rd Internal Clinic 1st Medical Faculty, Charles University and General University Hospital in Prague, Prague, Czech Republic)

The COVID-19 pandemic has again brought with it an increase in the number of overweight and obese people in the Czech Republic. At present, we are around 66% of the overweight and obese adult population, of which 28% are obese. The availability of obesity workplaces is very small and treatment is somewhat lengthy. The use of modern technologies can not only shorten the actual visit, but also enable their automatic processing and visual display. We currently have the „Time for Health" application available, which integrates other applications that are on the market for free. It is also free for the patient. The application summarizes in one place data on lifestyle / diet, exercise activity, weight, but also, for example, glycemia, blood pressure, heart rate or mood record, etc. /. This allows you to intervene effectively in the event of sudden changes, communicate with therapists who have a view of the data. The patient himself decides who will work on his data, which will shorten the conversation time between him and the therapist when looking at the history of the application. Even the patient himself can see in history what lifestyle he had when he was successfully losing weight at the time. Currently, there are also research applications such as "OBEFIS" for obese patients with atrial fibrillation in the clinical study PRAGUE-25. There are currently approximately 3,600 patients in the Time for Health application. Already the first results show an improvement in results of about 20%

compared to regular care. At present, the development of software for glycemic prediction is underway on the basis of learning software using artificial intelligence in the evaluation of national data of diabetics – DICATIL. The use of modern technologies is the only hope for the availability of not only obesity care in today's modern world

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PHYSICAL ACTIVITY IN SENIORS: SARCOPENIC OBESITY MANAGEMENT

Dusan Hamar
(Faculty of Physical Education and Sports, Comenius University, Bratislava, Slovakia)

Decrease of muscle mass belongs to the most expressive senior age related changes. Sarcopenia is usually accompanied by increase of body fat, which aggravate its negative effects. Out of those a decrease of muscle strength and power gradually impairs daily activities, and in most serious cases may lead to disability. Together with worsening of proprioceptive function leads to deterioration of static and namely dynamic balance control with increased risk of falls and injuries. Decrease of resting metabolic rate tends to contribute to positive energy balance with tendency to weight gain and gradual loss of insulin receptor sensitivity with increased incidence of type 2 diabetes mellitus.

The only efficient means to ameliorate sarcopenic obesity, in addition to moderate diet, is physical activity. However, traditionally recommended aerobic exercise provides only incomplete positive effects. Although it may increase energy output and contribute to negative energy balance as prerequisite of body fat and body weight reduction, it only exerts a marginal effect of muscle mass and strength. The intensity of repeated muscle contractions during long-term aerobic activity is well below 50 % of maximal strength, i.e. well below level necessary to stimulate anabolic processes leading to muscle growth and changes of neuro-regulatory mechanisms responsible for increase of muscle strength. Such an effect can only be achieved by performing contraction over 50 % of maximal strength, typically produced during resistance exercise, provided they are executed in sufficient volume and with sufficient frequency. On the other hand, in order to avoid excessive blood pressure response, resistance should not exceed 80 % of maximal strength. Generally, suitable intensity corresponds with the highest resistance, one can repeat 10 to 12 times. One to three such sets performed with major muscle groups should complement traditional aerobic program 2 times a week. Such a complex program of physical activity effectively counteracts negative effect of sarcopenia and substantially increases quality of senior´s life.

EXERCISE TRAINING INDUCES ADAPTIVE CHANGES IN ADIPOSE TISSUE OF OLDER WOMEN

Michaela Šiklová *(Dept of pathophysiology, Third Faculty of Medicine, Charles University, Praha, Czech Re-public)*, Tereza Čížková *(Third Faculty of Medicine, Charles University, Prague, Czech Republic)*, Marek Štěpán *(Third Faculty of Medicine, Charles University, Prague, Czech Republic)*, Klára Daďová *(Faculty of Physical Education and Sports, Charles University, Prague, Czech Republic)*, Michal Koc *(Third Faculty of Medicine, Charles University, Prague, Czech Republic)*, Eva Krauzová *(Second Department of Internal Medicine, University Hospital Kralovske Vinohrady, Prague, Czech Republic)*, Zuzana Varaliová *(Third Faculty of Medicine, Charles University, Prague, Czech Republic)*, Ondřej Kuda *(Institute of Physiology of the Czech Academy of Sciences, Prague, Czech Republic)*, Martin Rossmeisl *(Institute of Physiology of the Czech Academy of Sciences, Prague, Czech Republic)*, Lenka Rossmeislová *(Third Faculty of Medicine, Charles University, Prague, Czech Republic)*

The aim of this study was to investigate the effects of long-term regular physical activity and short-term exercise training (ET) on adipose tissue (AT) characteristics and to assess whether the changes in AT induced by ET can contribute to an improvement of insulin sensitivity (IS) and metabolic health in the elderly.

Two studies were conducted in older women (62–80 years, BMI 19.3–37.0 kg/m^2, n=86): 1) a cross-sectional study comparing long-term trained and sedentary women, and 2) a double-blind randomized intervention using 4-month ET with or without omega-3 supplementation (Calanus oil). Physical performance was assessed using the Maximal Graded Stress Test and the Senior Fitness Test, and insulin sensitivity was determined by hyperinsulinemic-euglycemic clamp. The inflammatory state of subcutaneous AT was analysed by flow cytometry to determine the immune cell content, as well as by measuring mRNA levels of inflammation-related genes. Furthermore, adipogenesis (i.e. the ability of preadipocytes to proliferate and differentiate), adipocyte size and lipidomic profile were studied.

Although a higher content of large hypertrophied adipocytes was found in sedentary women, no difference in adipogenic potential was found between long-term trained and sedentary participants. Both long-term training and 4-month ET resulted in lower levels of

inflammatory markers in AT. ET also led to an increase in short-chain triacylglycerols in AT, suggesting increased de novo lipogenesis. Importantly, we found elevated levels of insulin-sensitising lipokines from the family of branched palmitic acid esters of hydroxy stearic acid (PAHSAs) in women subjected to ET. The levels of these lipokines as well as inflammatory parameters in AT correlated with whole-body insulin sensitivity and cardiorespiratory fitness of participants.

Thus, regular physical activity induces adaptations in AT that may contribute to beneficial metabolic changes in older women.

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Keywords: exercise training, adipose tissue, aging

SYNERGISTIC EFFECTS OF EXERCISE AND CARNOSINE IN REGULATION OF HUMAN ENERGY METABOLISM

J. Ukropec *(Institute of Experimental Endocrinology, Biomedical Research Center Slovak Academy of Sciences, Slovakia)*, M. Nemec *(Institute of Experimental Endocrinology, Biomedical Research Center Slovak Academy of Sciences, Slovakia)*, M. Schön *(Institute of Experimental Endocrinology, Biomedical Research Center Slovak Academy of Sciences, Slovakia)*, L. Slobodová *(Institute of Experimental Endocrinology, Biomedical Research Center Slovak Academy of Sciences, Slovakia)*, V. Tirpáková *(Institute of Physical Education, Slovak Health University, Bratislava, Slovakia)*, P. Krumpolec *(Institute of Experimental Endocrinology, Biomedical Research Center Slovak Academy of Sciences, Slovakia)*, Z. Sumbalová *(Pharmacobiochemical Laboratory, Faculty of Medicine Comenius University, Bratislava, Slovakia)*, J. Cvečka *(Faculty of Physical Education and Sports, Comenius University, Bratislava, Slovakia)*, M. Vician *(Deptartment of Surgery, Slovak Medical University, Bratislava, Slovakia)*, P. Turčáni *(1st Department of Neurology, University Hospital Bratislava, Medical Faculty Comenius University, Bratislava Slovakia)*, M. Sedliak *(Faculty of Physical Education and Sports, Comenius University, Bratislava, Slovakia)*, P. Valkovič *(2nd Department of Neurology, University Hospital Bratislava, Medical Faculty Comenius University, Bratislava Slovakia)*, B. Ukropcová *(Institute of Experimental Endocrinology, Biomedical Research Center Slovak Academy of Sciences, Slovakia & Institute of Pathophysiology, Faculty of Medicine Comenius University, Bratislava, Slovakia)*

Sedentary ageing accelerates metabolic and cognitive health decline, while regular exercise effectively supports metabolic and cognitive health in aged population. Here we tested hypothesis that the adaptive response to regular exercise in the elderly at the level of energy metabolism, physical fitness and cognitive performance could be enhanced by carnosine, a dipeptide with the physiological function in skeletal muscle and brain.

Glucose tolerance (oral glucose tolerance test), metabolic flexibility (ΔRQ) & insulin sensitivity (euglycemic hyperinsulinemic clamp/EHC & indirect calorimetry), resting energy expenditure & metabolic substrate pref-erence (indirect calorimetry), body composition (bioelectrical impedance), physical fitness (Rockport 1 mile walk test, VO2max; sit-to-stand test) and cognitive functions (ACE-R, computerized CogState) were assessed. Bergström needle biopsy of m. vastus lateralis was performed. Oxygen consumption rate (pmol/s/mg tissue wet weight) was evaluated in saponin-permeabilized muscle fibers by O2k high-resolution respirometry (Oroboros). Sixty sedentary (BMI 27.1±3.9kg/m^2) elderly volunteers (age 66.9±1.2yrs, MMSE score 28.2±1.2) were subjected to either 3-month supervised aerobic-strength training (3x1h/week) (n=36) or stretching exercise training (n=24, active controls). Half of the individuals in each intervention group were randomized to take oral carnosine (2g/day), or placebo. RM-2-way ANOVA and paired T-test were used.

Training intervention combined with carnosine improved performance in sit-to-stand test (9.2%, $p<0.05$), metabolic flexibility (ΔRQ 7.3%, $p<0.05$) and aerobic fitness (VO2max 14.8%, $p<0.05$). Combination of exercise with carnosine has been more effective in stimulating coupled mitochondrial respiration rate in permeabilized muscle fibers, as compared to exercise alone (36.5%, $p<0.01$). Addenbrooke's cognitive examination (ACE-R) score correlated positively with lean body mass and muscle strength and the training-induced change in ACE-R memory sub-score correlated with concurrent change of lean body mass. Metabolic flexibility (capacity to increase RQ during EHC) correlated positively with short term memory and executive functions (CogState score).

Here we show synergistic effects of regular exercise and carnosine on systemic and muscle metabolism, which could potentially help to improve cognitive functions in overweight sedentary elderly individuals.

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ROLE OF PARATHYROID HORMONE IN COLD-INDUCED THERMOGENIC PROCESS AND ADIPOSE TISSUE METABOLIC ACTIVATION IN RELATIONSHIP TO WHOLE-BODY METABOLIC PHENOTYPE

Zuzana Kovaničová *(Institute of Experimental Endocrinology, Biomedical Research Center, Slovak Academy of Sciences, Bratislava, Slovakia)*, Jozef Ukropec *(Institute of Experimental Endocrinology, Biomedical Research Center, Slovak Academy of Sciences, Bratislava, Slovakia)*

Introduction: Brown adipose tissue (BAT) is an organ with high thermogenic, endocrine and metabolic activity potentially exerting beneficial effects to individual's metabolic health. Recruitment of BAT occurs during regular cold exposure or exercise as well as during cancer cachexia, while obesity is associated with decreased BAT volume and activity. Hormonal regulation of this process is however not completely understood. We aimed to evaluate the role of parathyroid hormone (PTH) in the cold-induced adaptive thermogesis and in modulation of adipose tissue metabolic activity in cold-acclimatized or non-acclimatized individuals with or without metabolic disease.

Methods: Blood sample was collected before and immediately after a 15min swim in 2.6°C water in 15 regular ice-water swimmers (Cohort 1: 13M/2F, age: 48.7±9.0y, BMI: 29.8±4.2kg/m²). Deep-neck BAT, adjacent subcutaneous adipose tissue (SAT) and blood samples were collected in patients undergoing elective neck surgery (Cohort 2: 5M/31F, age: 43.5±14.5y, BMI: 25.9±4.2kg/m²). Abdominal SAT was obtained by needle biopsy from 24 sedentary men without pharmacotherapy (Cohort 3: age=45.7±7.8y, BMI=20.6–37.2kg.m−2). Degree of glucose tolerance was assessed by oGTT. Gene expression was assessed by RT-qPCR (QuantStudio 5, ThermoFisher), resting energy expenditure and metabolic substrate preference (RQ) by indirect calorimetry (Ergostik, Geratherm), serum leptin and adiponectin by ELISA (BioVendor), PTH in certified clinical biochemistry laboratory.

Results: Circulating PTH increased acutely after ice-water swimming and its cold-induced levels (Cohort 1) correlated with visceral adiposity (n=13, $p<0.05$, r=-0.56). PTH concentration (Cohort 2) correlated with gene expression of UCP1 (n=27, $p<0.001$, r=0.76), PPARGC1A (n=27, $p<0.01$, r=0.57) and DIO2 (n=27, $p<0.05$, r=0.43) in BAT. Individuals with impaired glucose tolerance (IGT) or Type 2. diabetes (T2D, Cohort 3, n=12) had lower PTH receptor 1 (PTH1R) gene expression in SAT than individuals with normal glucose tolerance (NGT, n=12), irrespective of obesity (p=0.005). PTH1R expression in SAT correlated negatively with glycemia at 30min (p=0.003, R=-0.61, n=20) and at 60min (p=0.02, R=-0.50, n=20) of oGTT and positively with resting energy expenditure (p=0.02, R=0.49, n=21), metabolic flexibility (acute euglycemic hyperinsulinemia-induced change in RQ; p=0.04, R=0.45, n=21) and with serum adiponectin (p=0.03, R=0.49, n=19).

Conclusion: Circulating PTH levels seem to be induced by cold exposure in cold-acclimatized individuals and to increase with the level of adipose tissue browning in non-acclimatized individuals. Adipose tissue expression of PTH receptor gene is related to markers of metabolic health and energy metabolism. Our results indicate that PTH might play an important role in adipose tissue metabolic activation, that is also reflected at the whole-body metabolic phenotype.

SESSION 6: NUTRITION IN OBESITY

NUTRITION IN OBESITY PREVENTION AND TREATMENT

Marie Kunešová *(Obesity Management Centre, Institute of Endocrinology, Praha 1, Czech Republic)*, Radka Taxová Braunerová *(Obesity Management Centre, Institute of Endocrinology, Praha 1, Czech Republic)*, Pavla Kalousková *(Obesity Management Centre, Institute of Endocrinology, Parha 1, Czech Republic)*, Tereza Metelcová *(Obesity Management Centre, Institute of Endocrinology, Praha 1, Czech Republic)*, Vojtěch Hainer *(Obesity Management Centre, Institute of Endocrinology, Praha 1, Czech Republic)*, Hana Zamrazilová *(Obesity Management Centre, Institute of Endocrinology, Praha 1, Czech Republic)*

Poor nutrition is one of the factors which are responsible for obesity development. Effect of the diet differs according to genetic background of the subject. Knowledge of genetic characteristics of individual may help to prescribe optimal dietary pattern. Current knowledge of genotype still does not allow to specify the diet precisely (Loos R 2019).

Some studies show predictive effect of genetic characteristics and response to nutrients. Eg. genetic risk score (GRS) consisting of 31 genes associated with the effect of n-3 PUFA on level of triglycerides is associated with the effect of n-3 FA´s on level of triglycerides. The constructed GRS is a good predictor of the plasma TG response to supplementation with n-3 PUFA´s DHA (22:6n-3) or EPA (20:5n-3) (Valleé Marcotte et al. 2020). Nevertheless, the result should be confirmed in other populations or age categories.

The term precision nutrition was suggested for individual nutritional regimens for treatment or prevention of diseases. Precision nutrition takes into account the interaction between metabolic, genetic, social, and envi-ronmental factors. In this context precision nutrition can occur at three levels: conventional nutrition

based on general guidelines for population, individual nutrition that adds phenotypic information about the subject (body composition, biochemical and metabolic parameters etc) and genotype-directed nutrition based on gene variants.

Specific part represents metagenomics which is focused on the gut microbiome. Microbiota can alter gene expression and protein synthesis to produce functional metabolites. The diversity of gut bacteria found in healthy individuals can be radically altered in several diseases with resulting inflammation which leads to diabetes, obesity, inflammatory bowel disease and other (Iizuka et al. 2020).

Metabolic characteristics of the subject change individual reactivity to different types of diet. In last years, it has been confirmed that prediabetic and diabetic individuals have different weight loss according to dietary composition in comparison with subjects with normal insulin sensitivity or with differing fasting glucose or insulin levels (Hjorth et al. 2019, Ritz et al. 2019).

Nutrition plays a key role in obesity development and treatment, and many new dietary approaches to the prevention and management of obesity have occured in recent years.

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Keywords: nutrition, overweight, obesity, prevention, obesity treatment

STRATEGY AND TYPES OF DIETARY PATTERNS FOR THE TREATMENT OF DIABESITY

Viera Kissova
(DiaInt ambulancia, Nitra, Slovakia)

An individualized diet for diabetics (Medical Nutrition Therapy) is the basis of its management. Its dietary patterns are defined by the amount, proportions, variations or combinations of different foods and beverages and the frequency of consumption. According to the ADA opinion from 2017, it is not possible to recommend 1 universal ideal dietary formula for the distribution of energy (calories) from individual macronutrients (carbohydrates, fats, proteins). The choice of dietary formula should be individualized, taking into account the patient's preferences and necessary therapeutic goals.

The DIETFITS study (JAMA Feb 2018) provides pilot answers to the question of the preference for the type of most commonly used diets (low-carbohydrate and low-fat diets) according to genotype, the level of basal insulin secretion of a given patient. However, the results open up more questions than they provide answers.

The primary treatment strategy for obese diabetics is to achieve the necessary weight reduction, as 80–90% of patients with type 2 diabetes mellitus are obese. Weight loss (reduction of about 15 kg) participates in the initial remission of type 2 diabetes. Reduction of 5% body weight significantly improves HbA1C, serum levels of total cholesterol, LDL cholesterol, HDL cholesterol, triacylglycerols, blood pressure and insulin sensitivity. Drug therapy is also needed, it should be at least weight-neutral, optimally lead to weight reduction.

Therapeutic and preventive care for obese diabetics has 2 aspects:

1. Body weight management and remission of type 2 diabetes

In general, a multicomponent lifestyle intervention with macronutrient ratio variability is accepted for diabetic weight reduction, including fat-reduced diets, carbohydrate-reduced diets, Mediterranean-style diets, very strict reduction diets (VLCDs), dietary supplement replacement therapy (TDR), increased physical activity and within commercial programs. Achieving weight reduction is associated with a better prognosis for long-term maintenance of weight loss. The individual approach includes diet, physical activity, adequate drug treatment and, in indicated cases, surgical treatment.

2. Metabolic control and type 2 diabetes mellitus

Type 2 diabetics are advised to permanently reduce their body weight by at least 5% in overweight patients by restricting caloric recovery and increasing energy expenditure. Restriction of energy intake can be realized

by one of the recommended dietary patterns effective for diabetics, e.g. foods with a low glycemic index (GI), or by reducing the entire amount of carbohydrates in the diet. Energy expenditure is recommended for a minimum of 150 minutes of moderate or intensive activity per week / 3 days per week. However, changes in HbA1C are not associated with baseline BMI, which means that obese patients may benefit from the same diabetes treatment as normal weight patients. In an effort to improve adherence to reduction diets, it is pos-sible to indicate drug care for obesity, which reinforces lifestyle changes, including primary activity (naltrexone / bupropion). As an alternative, it refers to metabolic surgery in indicated cases.

SUGAR REDUCTION IN BEVERAGES – FROM SCHOOL ACTION TO NATIONWIDE PUBLIC HEALTH INITIATIVE

Manuel Schätzer *(Special Institute for Preventive Cardiology and Nutrition – SIPCAN, Elsbethen/Salzburg, Austria)*, Juliana Bhardwaj *(Special Institute for Preventive Cardiology and Nutrition – SIPCAN, Els-bethen/Salzburg, Austria)*, Nadine Moser *(Special Institute for Preventive Cardiology And Nutrition – SIPCAN, Elsbethen/Salzburg, Austria)*, Julia Schätzer *(Special Institute for Preventive Cardiology And Nutrition – SIPCAN, Elsbethen/Salzburg, Austria)*, Friedrich Hoppichler *(1. Special Institute for Preventive Cardiology and Nutrition – SIPCAN; 2. Hospital of the Brothers of St. John of God Salzburg, Department of Internal Medicine, 1. Elsbethen/Salzburg; 2. Salzburg, Austria)*

Introduction: According to the WHO, sugar-sweetened beverages (SSBs) are one of the main causes of obesity and type 2 diabetes. In Austrian schools SSBs are offered at school cafeterias and in vending machines. SIPCAN advocates a gradual reduction in the sweetness of SSBs to support a healthier lifestyle.

Methods: Based on the WHO recommendation to reduce the intake of free sugars to less than 10% of the total energy intake, the value of 6.7 g of sugar per 100 ml was derived in agreement with the Ministry of Health and Education. In addition, no artificial sweeteners should be used. Both criteria are target parameters for the industry, consumers, and also for catering companies in schools. In order to control these requirements, a nationwide survey is conducted annually since 2010. The results are made comparable as a checklist.

Results: In the last 11 years the average sugar content decreased from 7.53 g per 100 ml to 6.01 g per 100 ml (-20.2%). The percentage of beverages containing artificial sweeteners decreased from 19.3% to 12.5%. The proportion of beverages that meet the specifications increased from 39.3% to 57.6%.

Conclusions: The developed method leads to a gradual reduction of the sugar content and to a smaller range of beverages containing artificial sweeteners. Next, special attention should be paid to the portion size of those beverages that do not meet the current criteria (including sports and energy drinks). If consumed, this should be in the smallest possible portion size (e.g. 250 ml or smaller).

Keywords: sugar-sweetened beverages, artificial sweeteners, obesity, type 2 diabetes, beverage checklist

HOW HAVE THE RISK FACTORS RELATED TO OBESITY DURING THE CORONAVIRUS PANDEMIC CHANGED? – RESULTS OF TWO REPRESENTATIVE SURVEYS

Emese Antal *(Hungarian Platform of Diet, Physical activity and Health, Budapest, Hungary)*, Róbert Pilling *(Hungarian Platform of Diet, Physical activity and Health, Budapest, Hungary)*, Dávid Szakos *(National Food Chain Safety Office, Budapest, Hungary)*, Mihály Soós *(University of Debrecen, Faculty of Economics and Business, Institute of Marketing and Trade, Debrecen, Hungary)*, Enikő Kontor *(University of Debrecen, Faculty of Economics and Business, Institute of Marketing and Trade, Debrecen, Hungary)*, Gyula Kasza *(National Food Chain Safety Office, Budapest, Hungary)*, Zoltán Szakály *(University of Debrecen, Faculty of Economics and Business, Institute of Marketing and Trade, Debrecen, Hungary)*

Goals: The National Food Chain Safety Office, The University of Debrecen, Faculty of Economics and Business, Institute of Marketing and Trade and the Hungarian Platform of Diet, Physical activity and Health have carried out two surveys about the effects of the coronavirus pandemic to the lifestyle of the adult population. One of the goals of the surveys was to recognise the risk factors of obesity, such as nutrition, body weight, physical activity, and how the nutrition habits have changed during the 1st and 3rd waves of coronavirus pandemic.

Methods: The first survey was based on a questionnaire and carried out in May 2020, and we repeatedly used the same questionnaire 1 year later, in April–May 2021. We wanted to see the long-term changes. In the first study a total of 3000 adults participated, in the second the number of the participants were 1940. Both studies were representative for the Hungarian population concerning age and sex. We used the statistical analysis package SPSS 25.0.

Results: We observed many unfavourable changes about the risk factors of obesity. Between the first and the third waves of pandemic the number of people who gained weight was twice of the people who lost weight. The average loss was higher (7,5 kg), than the average

gain (5 kg), the total body weight of the Hungarian population increased further 0,3 kg in the observed period of time. Therefore, we could not lose that 1 kg surplus what we gained during the 1st wave. At the same time the physical activity decreased substantially, 38 % of the population spent sitting more than 8 hours per day. There are positive tendencies we also observed, 3 persons in every 10 are willing to follow a healthier diet, start to control their calorie intake and to increase the consumption of fruits and vegetables. The consumptions of many food groups related to increase the risk of obesity have decreased, such as salty snacks, energy drinks, fast foods.

Conclusion: We can conclude that the majority of the population adapted well for the new situation, there are many habits which they want to keep after the pandemic. They want to be more conscious consumer; they intent to plan their shopping better. They want to select the ingredients of the diet more carefully, and the way how they cook. If we could control the portion size and increase the physical activity, we will be able to stabilize the energy balance.

ENTERAL NUTRITION FOR OBESE COVID PATIENTS

Andrea Molnar *(Member of the Scientific Committee, Hungarian Dietetic Association, Budapest, Hungary)*, Nikolett Börcsök *(Albert Szent-Györgyi Medical University, Szeged, Hungary)*, Tünde Restár Tóthné *(Albert Szent-Györgyi Medical University, Szeged, Hungary)*

Introduction: There is an increase in the proportion of obese people in Europe, not only among healthy (10–30% of adults) population, but also among patients requiring enteral nutrition (EN). During the COVID pan-demics, significantly more obese patients (47.5%) were admitted to the Intensive Care Unit (ICU) and required EN. Obesity having COVID-19 results in more severe clinical outcome (more respiratory support, hospitalization is higher, and longer ICU stay). Patients with severe obesity had a higher mortality rate; under- and overfeeding also contribute to their worse survival rate.

Objective: The main purpose is to present recommendations for enteral nutrition of obese patients. It was also a goal to show difficulties faced by dietitians during the pandemic (to develop and monitor nutrition therapy remotely and to work with overloaded physicians).

Method: We have collected guidelines and reviewed the results of the latest research for enteral nutrition to highlight sections on obese patients, and also added our own clinical experiences (with 14 dietitians of a clinical institution with 1,400 inpatients).

Results: For obese COVID patients the nutritional support method depends on the respiratory support. These patients with chronic diseases are at high risk for reduced skeletal muscle mass. Early nutritional intervention should start during hospitalization (within 24–48h). Energy intake should be guided by indirect calorimetry, or if it is not available energy intake can be based on “adjusted body weight”, which is calculated as 0.67*IdealBodyWeight + 0.33*ActualBodyWeight, where for obese patients the IdealBodyWeight is calculated with BMI = 25 kg/m^2. For persons with obesity during critical illness, 1.3–2.0 g/kg protein per day for “adjusted body weight” can be delivered progressively. In COVID-19 intubated and ventilated ICU patients EN should be started through a nasogastric tube; post-pyloric feeding should be performed patients with gastric intolerance (such as vomiting, diarrhoea and gastroparesis), and continuous EN should be used instead of bolus EN. The prone position does not represent a limitation or contraindication for EN, but enteral pump is preferred in this case. Contraindications of EN are the presence of uncontrolled shock and unmet hemodynamic and tissue perfusion goals; and in case of uncontrolled life-threatening hypoxemia, hypercapnia or acidosis. High incidence of dysphagia has been experienced after extubating (around 50%), and some post extubation swallowing disorders have been shown even months after discharge.

Keywords: obesity, COVID, adjusted body weight, tube feeding

PhD SESSION

ASSESSMENT OF PRESENCE OF NON-ALCOHOLIC FATTY LIVER DISEASE PRESENCE USING A NOVEL BIOIMPEDANCE SPECTRAL ANALYSIS

Adrián Róbert Gál *(Medical Biology Institute, Szentágothai Research Centre, University of Pécs, Medical School, Pécs, Hungary)*, Attila Tóth *(Institute of Physiology, Szentágothai Research Centre, University of Pécs, Medical School, Pécs, Hungary)*, Zoltán Vízvári *(Department of Environmental Engineering, University of Pécs, Faculty of Engineering and Information Technology, Pécs, Hungary)*, Nina Győrfi *(Institute of Physiology, Szentágothai Research Centre, University of Pécs, Medical School, Pécs, Hungary)*, András Fincsur *(Department of Patology, University of Pécs, Medical School, Pécs, Hungary)*, Károly Kalmár-Nagy *(Department of Surgery, University of Pécs, Medical School, Clinical Centre, Pécs, Hungary)*, Gabriella Pár *(1st Department of Internal Medicine, University of Pécs, Medical School, Pécs, Hungary)*, Attila Miseta *(Department of Laboratory Medicine, University of Pécs,*

Medical School, Pécs, Hungary), Zoltán Sári *(Department of Technical Informatics, University of Pécs, Faculty of Engineering and Information Technology, Pécs, Hungary)*, Mihály Klincsik *(Department of Technical Informatics, University of Pécs, Faculty of Engineering and Information Technology, Pécs, Hungary)*, György Eigner, László Lénárd, András Vereczkei, Zoltán Karádi

Morbid obesity represents a constant challenge due to the various metabolic disorders that trigger a spectrum of clinical diseases. In the highly developed, industrialised countries in case of physically inactive population, morbid obesity has become the leading cause in disease development. Liver steatosis development has multiple causes and can be defined as an etiopathogenic source for cardiovascular (stroke, coronaropathies, myocardiac disease etc.), gastrointestinal (liver steatosis, type II of DM), locomotor (arthritis), and sleeping disorders. This condition may lead to several types of tumor formation, such as endometrial, breast, colo-rectal and liver cancers, and can become the reason for severe behavioural changes (anorexia) as well.

WHO defined obesity as one of the 21st century major epidemiological non-transmissible disease challenge. Obesity can decrease the quality of life, thus having a negative impact on life-expectancy. Recently, there are several scientific data regarding the obesity and the probable negative outcome among COVID-19 hospitalised patients.

Material and methods: 103 patients were evaluated between 2017–2020. These patients were all admitted to the Surgery Clinic of Pécs University having three types of diagnosis: 1. morbid obesity 2. cholelithiasis 3. liver tumors. A four electrode output analysis was carried out by measuring the adipose tissue resistance present in the body (skeletal adiposity evaluation) as well as in the liver (liver adiposity evaluation). The silver enmashed electrodes were placed on the body and five measurements were performed. Our research team developed a novel bioimpedance spectral analysis device which is able to measure in an ultralow frequency intervallum (from 0 Hertz to several hundred Hertzes) where the various impedances are present. To validate our results, during surgical intervention, a piece of liver tissue is removed and sent to pathological evaluation. The pathologist asseses the bioptical sample according to Bedossa – SAF criterias (S- steatosis, A – inflammatory activity, F – fibrosis). By this score system we obtain a result describing not only the presence of liver steatosis but the severity of the illness as well.

Results and further goals in future: in case of patients having morbid obesity (n=78), measurements were carried out with the first generation measuring unit. The curves presented have a decreasing pattern formation which were well correlated with the pathologist results. The obtained records were pre-processed (approx. 15% of the cases) and the curves pattern remained unchanged. In case of a minority of the patients, we noticed measurement errors that were due to generator anomalies, components intently usedrring with the impedance measurements, etc. These problems were solved by the next generation measurement device and the newest software update and measurement method that were all implemented. The presently used upgraded device made the obtained results more valid.

This measuring method has good applicability for screening purpose. Our results can be similar those obtained by other image-based radiological techniques. For medical doctors it can be a valuable tool to obtain diagnosis and to have a feed-back information in therapeutic drug-effectiveness. The analysis is non-invasive, safe without any tissue harm and can be repeated several times.

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Keywords: morbid obesity, bioimpedance spectral analysis, COVID-19

STIGMA IN THE CONTEXT OF HEALTHCARE: GENDER STEREOTYPES AS A LIMITATION IN OBESE PATIENT TREATMENT

Dagmar Halo *(Palacky University, Olomouc, Czech Republic)*, Judita Konečná *(Charles University, Prague, Czech Republic)*

Obesity as a disease of affluence is one of the multifactorial diagnostical categories. People treated for obesity experience the negative physical consequences of their diagnosis as well as the psychological ones throughout their lives. Research suggests that people attribute more negative traits to individuals with obesity than to non-obese individuals. Treatment outcomes are therefore significantly influenced by the prejudices the

healthcare providers hold. These aspects greatly mirror the inherent gender schema towards obese patients and, to a greater extent, affect the general quality of provided healthcare. Gender stereotypes are present throughout the entire society as in many forms inscribed in our thoughts and behavior. They represent our persistent and often irrational convictions about many social phenomena that influence our everyday actions. Gender as a social category holds its position as an arbitrarily selected sum of images and opinions about norms and roles one has to practice regarding their sex. Moreover, the fulfillment of gender expectations is linked to many areas of human life. Obese patients are confronted with many adverse reactions to their body image and supposed behavior. These reactions are often determined by our notion about men's and women's desirable character traits and ideal body shape. This conference talk aims to summarize existing theory and practice and will try to suggest possible methods for a solution.

Keywords: obesity, stigma, gender, stereotypes, treatment

SESSION 7: CIRCADIAN DYSFUNCTION IN OBESITY AND RELATED COMORBIDITIES

CIRCADIAN ALTERATIONS IN OBESITY

Germaine Cornelissen
(Halberg Chronobiology Center, University of Minnesota, Minneapolis, MN, USA)

A weakened circadian system is associated with an elevated risk of disease, notably in relation to metabolism. Selected results from cooperative chronobiological studies of obesity will be presented, some related to leptin and others to blood pressure. In healthy normal-weight women, leptin is characterized by a circadian rhythm peaking around midnight. In obesity, leptin is elevated ($P<0.001$) and its circadian amplitude is reduced ($P<0.05$). A 3-hour phase difference exists between women with gynoid (lower-body fat) or android (upper-body fat) obesity ($P<0.001$). Already in cord blood, leptin concentrations are higher from infants born before noon than from infants born later in the day ($P=0.005$). Cord blood leptin concentrations are elevated in the presence of a family history of obesity on the paternal side, but not on the maternal side. While neuronal leptin-receptor knockout mice show obesity and diabetes, a mutant mouse strain lacking endothelial leptin receptor signaling is partially resistant to diet-induced obesity, mediated by a higher metabolic activity. In young healthy individuals, an increased body mass index (BMI) is associated with a dampened circadian rhythm of blood pressure assessed by 7-day/24-hour ambulatory blood pressure monitoring (ABPM). BMI also correlates with pulse pressure as well as with C-reactive protein and tumor necrosis factor, markers of inflammation. ABPM and flow-mediated brachial artery dilatation of 10 normal-weight, 10 overweight and 15 obese healthy adults showed that abnormal circadian patterns of blood pressure and/or heart rate (VVDs, short for Vascular variability Disorders) only occurred in the presence of obesity ($P=0.005$). Obese adults with VVDs had elevated hs-CRP, fibrinogen, fasting serum glucose, and cardiac risk ratios. They also had attenuated flow-mediated brachial artery dilatation. Screening for abnormal circadian behavior may help detect an elevated disease risk among asymptomatic obese individuals and guide the timely institution of countermeasures.

CAN CALORIC RESTRICTION WITH SIX-HOUR TIME RESTRICTED FEEDING, MODULATE RISK OF OBESITY?

Ram B. Singh *(Halberg Hospital and Research Institute, Moradabad, India)*, M. A. Manal *(Khalifa University, UAE)*

There is evidence indicating, that alteration in energy intake, frequency of meals and type of foods can also alter metabolism in the peripheral clocks resulting in to weight gain or weight loss. In a pilot study, we observed that restricted feeding in the evening, along with low calorie intake have independent effects on body weight. In another study, 117 volunteers, aged 25–85 years, received low caloric diet with time restricted feeding in the evening, compared to 150 age- and sex-matched urban subjects as control group. After 1 year, mean body weight, body mass index (BMI), and systolic and diastolic blood pressure showed significant decline in the study group, compared to control group. Fasting blood glucose, triglycerides and total and LDL cholesterol, also showed significant decrease with mild increase in HDL in the study group, compared to control subjects. Mean concentrations of immunoglobulins A, M and G showed significant increase in the intervention group without such changes in the control group. There was no decline in physical performance. It is clear that regular intake of low caloric diet especially, in the evening, may be quite effective, with significant decline in body weight, BMI and significant increase in immune-globulins and physical performance.

It is possible that caloric restriction recruits biological clocks as a natural mechanism of metabolic optimization under conditions of limited energy resources. Recently, it has been reported that caloric restriction affects the daily rhythms in the expression of several circadian clock genes in mammals and flies, which poses the possibility

that circadian clocks might be involved in the mechanisms if caloric restriction [1-4]. Experimental evidence indicate that caloric restriction significantly affected the rhythms in the expression of circadian clock genes in mice on the mRNA and protein levels, suggesting that caloric restriction reprograms the clocks both transcriptionally and post-transcriptionally [2]. It has also been found that 30% caloric restriction affects the amplitude and absolute level of expression for several circadian clock genes7. However, caloric restriction does not provide all physiological benefits including the effect on longevity in mice deficient for the circadian transcriptional factor BMAL1. Similarly, caloric restriction does not have full effects on the increase in lifespan in Drosophila flies with genetic ablation of some clock genes [1]. Thus, circadian clocks might represent a conserved physiological system essential for mechanisms of caloric restriction, which warrants a further study on interaction between circadian clocks and caloric restriction. The effect of caloric restriction on gene expression is distinct from the effects of time-restricted feeding or fasting. Furthermore, caloric restriction influenced the circadian output through up- or down-regulation of the expression of several clock-controlled transcriptional factors and the longevity candidate genes. In another experiment the caloric restriction-dependent effects on some clock gene expression were impaired in the liver of mice deficient for BMAL1, suggesting importance of this transcriptional factor for the transcriptional reprogramming of the clock [3]. However, BMAL1- independent mechanisms also exist.

WHY ARE OBESE SUBJECTS MORE SUSCEPTIBLE TO COVID-19S: CELLULAR AND BIOCHEMICAL MECHANISMS?

Manal M. Smail *(Department of Human Anatomy, College of Medicine and Health Sciences, United Arab Emirates University & Corniche Hospital, United Arab Emirates)*, Jaipaul Singh *(Department of Human Anatomy, College of Medicine and Health Sciences, United Arab Emirates University & School of Natural Sciencess, University of Central Lancashire, Preston, PR1 2HE, England, United Kingdom)*, Abla Mohammed Ismail *(Cor-niche Hospital, United Arab Emirates)*, Carlin Hanoman *(Department of Human Anatomy, College of Medicine and Health Sciences, United Arab Emirates University & School of Medicine, College of Medical Sciences University of Guyana, Georgetown, Guyana)*, Sunil Rupee *(School of Medicine, College of Medical Sciences University of Guyana, Georgetown, Guyana)*, Khemraj Rupee *(School of Medicine, College of Medical Sciences University of Guyana, Georgetown, Guyana)*, Ernest Adeghate *(Corniche Hospital, United Arab Emirates)*

Overweight is a major global health problem currently affecting almost 2 billion people and 800 million are obese. These figures represent 40% of adults, 18 years and over, who are overweight and 14% with obesity. What is now worrying is that children as young as 5 years of age are either overweight or obese amounting for 40 million worldwide. Obesity is when the body mass index (BMI) is 30 kg/m^2 and over whereas overweight is when the BMI is 25–29 kg/m^2,. Obesity is an imbalance between calories intake and calories expenditure. In general, obesity is due to excessive eating and reduced physical activity. Obesity is a major risk factor for such non-communicable diseases as diabetes mellitus (DM), respiratory dysfunction, cancers, musculoskeletal disorders, cardiovascular diseases (CVDs) and others. Obesity is also a major risk factor for coronavirus disease (Covid-19) which induces severe cases of pneumonia and sepsis or acute respiratory distress syndrome (ARDS). In many cases Covid-19 can cause severe and long- lasting harm and damage to the lungs and other organs of the body resulting in death of the patient. This review describes the cellular and biochemical mechanism(s) whereby obese patients become susceptible to risk for Covid-19 infection. It also outlines how obesity on its own can affect the lungs which in turn become more compromised to Covid-19 disease and possible death of the patient.

Keywords: Obesity, overweight, Covid-19, respiratory dysfunction, BMI, mortality

DISTURBED CIRCADIAN RHYTHM AND OBESITY

Ghizal Fatima *(Era's Lucknow Medical College and Hospital, Lucknow, India)*, R. B. Singh *(Halberg Hospital and Research Institute, Moradabad, India)*

The epidemic of obesity continues to increase worldwide. Multiple risk factors and complex mechanisms are involved in the development of obesity. Recent studies indicate that circadian system coordinates cellular and physiological processes and synchronizes them with daily cycles, of feeding schedules as well as food types. Emerging evidence also indicate that the circadian rhythm is important for regulating energy metabolism and influence certain metabolic activities during day and night. Physical activity also has a significant impact on the circadian system. Exercise training in the morning may have greater safety compared to exercise training in the night or evening. Epidemiological studies among night shift workers indicate that eating in the night may have circadian dysfunction leading to obesity and metabolic syndrome. The mechanism may be; an increase in cortisol and ghrelin with a decline in leptin

and melatonin. Food anticipatory activity is mediated by a self-sustained circadian timing and its principal component is food entrained oscillator. However, the hypothalamus has a crucial role in the regulation of energy balance rather than food intake. Omega-3 Fatty acids and arachidonic acid or their metabolites can modulate neuronal activity by brain nutrient-sensing neurons involved in the regulation of energy and glucose homeostasis. The timing of three-meal schedules indicates close association with the plasma levels of insulin and preceding food availability. desynchronization between the central and peripheral clocks by altered timing of food intake and diet composition can lead to uncoupling of peripheral clocks from the central pace-maker and to the development of metabolic disorders. Metabolic dysfunction is associated with circadian disturbances at both central and peripheral levels and, eventual disruption of circadian clock functioning can lead to obesity. The underlying mechanism may be, disruption of clock genes resulting in to dyslipidemia, insulin resistance and obesity. Modifying the time of feeding alone can greatly affect body weight. Changes in the circadian clock are associated with temporal alterations in feeding behavior and increased weight gain. Thus, shift work in conjunction with increased intake of Western diet may be associated with circadian dysfunction leading to increased risk for obesity, diabetes and cardio-vascular diseases.

vascular changes are correlated with the presence of cardiovascular risk factors including obesity, elevated blood pressure, dyslipidemia, diabetes mellitus and cigarette smoking. These findings suggest that the atherosclerosis process originates from childhood and risk factor intervention in youth might delay the process of atherosclerotic alteration and thus reduce future CVD risk.

Unfortunately, many NCD-related risk factors among children and adolescents, particularly for obesity and its related risk factors, are prevalent. Childhood is a critical period among all life stages and is characterized by rapid physical, neurological, and social development. During this period, individuals' behavior habits including diet and exercise are being established. Once unhealthy behavioral habits are established at an early age, they will strongly track into adulthood without effective and timely intervention strategies.

In the present session our working group concentrates on special aspects of early prevention and screening:

1/ First 1000 days of life with special focus on in vitro fertilization,

2/ Non-invasive screening of CVD risk factors in early childhood

3/ C-reactive protein as a screening tool in childhood obesity

Keywords: childhood obesity, noncommunicable chronic diseases, prevention

SESSION 8: CHILDHOOD OBESITY

INTRODUCTORY LECTURE TO THE CHILDHOOD OBESITY SECTION OF 8TH CECON: NONCOMMUNICABLE CHRONIC DISEASE PREVENTION SHOULD START FROM CHILDHOOD

Dénes Molnár
(Pediatrics, University of Pécs, Pécs, Hungary)

Noncommunicable chronic diseases (NCDs), such as cardiovascular disease (CVD), diabetes, cancers, and osteoporosis, are the leading causes of death and health costs.

NCDs are characterized by long duration and generally slow progression. Although clinical manifestations of many NCDs often occur from middle age, the pathogenic process of NCDs already begins early in life. Atherosclerosis is the pathological basis of CVD. Autopsy studies of young people, including the Bogalusa Heart Study and the Pathobiological Determinants of Atherosclerosis in Youth, have shown that fatty streaks and fibrous plaques in the aorta and coronary arteries are present in adolescents and young adults, and the subclinical

NUTRITIONAL STATUS OF CHILDREN IN HUNGARY AND INVESTIGATION OF FACTORS RESPONSIBLE FOR OBESITY IN THE LIGHT OF COSI

Nikolett Szilfai *(National Institute of Pharmacy and Nutrition, Budapest, Hungary)*, Andrea Horváth *(National Institute of Pharmacy and Nutrition, Budapest, Hungary)*, Márta Bakacs *(National Institute of Pharmacy and Nutrition, Budapest, Hungary)*, Andrea Zentai *(National Institute of Pharmacy and Nutrition, Budapest, Hungary)*, Edit Feigl *(National Institute of Pharmacy and Nutrition, Budapest, Hungary*), Kitti Susovits *(National Institute of Pharmacy and Nutrition, Budapest, Hungary)*

The global prevalence of overweight and obesity in children has increased over the last few decades. Childhood obesity has major implications on individual and population health and burdens the health care systems, therefore it is important to assess provoking reasons and develop an action plan to stop obesity. The WHO European Childhood Obesity Surveillance Initiative (COSI) was initiated to investigate a nationally representative analysis and to take standardized weight and height measurements and collect information on

school environments and dietary and physical activity habits. Hungary participated in COSI for the third time in 2019. The national representative surveillance of 2019 contains 6194 participants, including 1123 children at age of 6, 3102 children at the age of 7, and 1869 8-years old. The students are measured by trained staff with standardized high-quality equipment and studied on the basis of a common protocol and approach. Meanwhile, information about the school environment was asked by the school survey, questions about individual eating and physical habits were collected by the parental survey. The collected data were analyzed by the STATA® program. Overall, we found that compared to previous years, the prevalence of overweight (including obesity) shows a small increase among Hungarian children. One-quarter of the children do not eat fresh fruits or vegetables every day, whilst every third child eats less than five times a day. Kids who do not have breakfast and spend more time in front of electronic screens are more likely to be classified into the overweight or obese categories. The availability of energy drinks and soft drinks at schools has decreased, but many products covered by the Public Health Product Tax are still available there. There is a need for strong monitoring mechanisms on the variety of food products available in school buffets and in school vending machines as well. To expand the numbers in healthy weight categories, it would be necessary to acknowledge the importance of prevention and to plan and implement population-based interventions.

Keywords: COSI, childhood, obesity, nutrition, Hungary

EFFECTS OF COVID-19 LOCKDOWN ON CHILDREN'S LIFESTYLE

Kinga Orsolya Bartha *(Health Sciences School of PhD Studies, Semmelweis University, Budapest, Hungary)*, Jolán Kubányi *(Hungarian Dietetic Association, Budapest, Hungary)*, Zsuzsanna Szűcs *(Health Sciences School of PhD Studies, Semmelweis University, Budapest, Hungary)*

Introduction: Childhood obesity is one of the most severe public health challenges of the 21st century. In 2016, 20,9% of children were identified as overweight or obese in Hungary. WHO calls upon all stakeholders to take action at global, regional, and local levels to improve diets and physical activity patterns at the population level. The GYERE®-Children's Health Programme aims to prevent childhood overweight and obesity in Hungary by focusing on the whole family's behavior, changing its environment and community norms. Obesity is associated with a higher risk of developing non-communicable diseases (NCDs) and COVID-19 severity and mortality. Healthy diet, sufficient physical activity, and sleep are critical factors in preventing, combating, and recovering from infections.

Objective: Our study aimed to assess the effects of school closures, due to the COVID-19 pandemic, on children's sleep, screen time, physical activity, and eating habits.

Methods: In Diósgyőr, 387 parents of five elementary school students between 16–26 June 2020 were interviewed through an online questionnaire.

Results: The majority of children, 61%, slept more than usual, and 64% moved much less than before. Due to online learning, they generally spent 15–20% more time on the computer or their phone. 40% of children ate more than usual, and 48% did not consume more food than before. According to parents, one-third of the children (34%) had a healthier diet because more vegetables and fruits were included, missed breakfast less often, and drank more water instead of sugary drinks. During school closures and lockdown 44% of the children (44%) gained weight.

Discussion: The present survey results under GYERE®-Children's Health Program show that nearly half of the children gained weight during the lockdown, attributed to a sedentary lifestyle and higher food consumption. However, one-third of the children followed a healthier diet.

Conclusion: In conclusion, primary and secondary school children slept, ate more and moved much less than before.

C-REACTIVE PROTEIN LEVEL IN OBESE HUNGARIAN CHILDREN

Béres Dalma *(2nd Department of Pediatrics, Targu-Mures, Romania)*, Molnár Dénes *(Department for Pediatrics, University of Pécs Medical School, Pécs, Hungary)*

Background: Childhood obesity is a major public health problem. Obesity in children is associated with metabolic alteration, among which increased CRP heralds, low grade chronic inflammation and may increase the risk of metabolic and cardiovascular disease in later life.

Objectives: To examine low grade inflammation in 4- to 19-year-old Hungarian children with high BMI, high waist circumference and body fat% and compare these with controls, and it`s relationships with CRP, the most routinely analyzed marker of inflammation.

Methods and Results: We assessed cross-sectionally the association of high-sensitivity (hs)-CRP levels with overweight/obesity 667 (413 overweight/obese and 254 normal weight) from Pécs Hungary (4 to 19 years) were recruited between 2007 and 2016 at the Metabolic Section of the Department of Pediatrics of Pécs. The population

was divided into 3 categories, according to the baseline hs-CRP levels and BMI percentile for age and sex. Hs-CRP levels were classified as low, medium and high according to the following values: <1.0; 1.0–3.0 and >3.0 mg/L. BMI percentile for sex and age less than 75th percentile was considered normal weight, between the 75th and 95th percentiles overweight. Individuals with a BMI greater than the 95th percentile were classified as obese. The mean hs-CRP level in obese group was 3.15 mg/l(±2.48), in overweights 2.35 mg/l(±2.23) respectively in normal weight countpartners was 0,34 mg/l(±0.98) mg/l.

Conclusions: High BMI values are associated with increased hs-CRP levels in children and adolescents. The high hs-CRP levels may be a marker of chronic, low-grade inflammation and later cardiovascular diseases. The hs-CRP level measurements should be part of the laboratory checkups in obese children and adolescents.

EARLY LIFE OUTCOMES OF ASSISTED REPRODUCTION TECHNOLOGIES AND THE UNDERLYING EPIGENETIC CHANGES

Szilvia Bokor *(Department of Paediatrics, University of Pécs, Pécs, Hungary*), Réka A. Vass *(Department of Obstetrics and Gynaecology, University of Pécs, Pécs, Hungary)*, Simone Funke *(Department of Obstetrics and Gynaecology, University of Pécs, Pécs, Hungary)*, Tibor Ertl *(Department of Obstetrics and Gynaecology, Uni-versity of Pécs, Pécs, Hungary)*, Dénes Molnár *(Department of Paediatrics, University of Pécs, Pécs, Hungary)*

Background: Assisted reproduction technologies (ART) are increasing worldwide (9 million babies have been born with the help of ART since the first successful case in 1978) and its possible health consequences are a topic of intense study.

Objectives: To summarise the available literature data on the early life outcomes of ART and the possible underlying epigenetic changes.

Results: Growing evidence in the current literature suggest that children conceived through ART are at in-creased risk for a number of perinatal complications, birth defects (OR: 1.32 [1.24–1.42]), alterations in body composition and rare imprinting disorders (OR: 3.67 [1.39–9.74]). Parental characteristics, underlying infertility etiology and ART procedures themselves may contribute to this. ART involve multiple exposures that occur at critical times of development, which coincidence with global reprogramming of the epigenome and the establishment of epigenetic changes. Therefore, multiple studies have focused on the association between ART and candidate gene regions and/or global methylation levels, and support that ART is linked to epigenetic changes including alterations in DNA methylation of imprinted genes and genes related to growth, development, and body composition of the foetus and in the postnatal period, however, the results are still conflicting.

Conclusion: The perinatal outcomes in children born after ART have improved over the time, still many concerns remain over the health and development of ART children, thus large scale, well-controlled studies are necessary.

This work was supported by the National Laboratory on Reproduction as part of the “Establishment of Nati-onal Laboratories 2020” program.

Keywords: Assisted reproduction technologies, epi-genetic

SESSION 9: BARIATRIC AND METABOLIC SURGERY

BARIATRIC AND METABOLIC SURGICAL TREATMENT – CURRENT SITUATION AND NEW DEVELOPMENTS

Martin Fried

(Professor of Surgery, 1st Faculty of Medicine, Charles University Prague, Czech Republic & Head of OB Klinika – Center for Treatment of Obesity and Metabolic Disorders, Prague, Czech Republic)

Obesity as a serious health crisis that has an epidemic character. Obesity negatively and significantly affects general health of population worldwide. Obesity is considered to be a strong risk factor for developing type 2 DM. Prevalence of diabetes is rising tremendously all over the world.

Some sixty years ago, when surgical treatment of obesity begun, the sole indication criterion for surgical in-tervention was patient weight and/or BMI. That was the era of so called bariatric “weight loss surgery”.

By that time, the most commonly performed procedures were those mechanically restricting stomach capacity, thus limiting the amount of food eaten at a time (so called “restrictive” operations), or procedures limiting absorption of nutrients through partial bypassing/shortening of certain length of small bowel (malabsorptive procedures).

At the turn of the Century the concept of effective surgical treatment of obesity-related metabolic diseases, (i.e. Type 2 Diabetes Mellitus was proven, and the field of so called “metabolic surgery” gained substantial importance. Effects of metabolic surgery go beyond mechanical food restriction and/or caloric malabsorption. Most of positive effects of metabolic surgery are observed before major weight loss is achieved.

In conjunction with steeply rising importance of metabolic surgery, more emphasis is given to

improvement of technical equipment for surgeries as well as to further lowering invasivity of surgical interventions. This trend is driven by concerns of patients as well as referring physicians about relatively high invasivity and irreversibility of the current, standard surgical operations. Extensive scientific research is conducted to lower the invasivity of existing laparoscopic operations, and find preferably anatomically reversible options.

There are several possible evolution ways in minimizing invasivity, however still maintaining acceptable treatment effectivity.

As an examples may serve so called partial jejunal diversion (PJD), performed laparoscopically, and/or endo-scopically (endoluminally), involving a single anastomosis, side to side jejuno-jejunostomy. This metabolically effective procedure may be counted among low invasive operations primarily for treatment of T2DM. PJD offers promising, low invasive, reversible procedure, namely for the management of T2DM.

Another promising endoluminal/gastroscopic procedure (which to certain extent anatomically mimics laparoscopic gastric plication), is endoluminal gastric plication (endoluminal vertical sleeve).

Among rather new, very low invasive procedures, is to be mentioned so called

Percutaneous Transcatheter Bariatric Embolotherapy (PTBE). In clinical studies it demonstrates its minimal invasivity and promising treatment results for weight loss. PTBE targets fundus region of the stomach through embolization of the left gastric artery (LGA) and as fundus contains a majority of ghrelin-producing cells. Ghrelin is the major appetite-stimulating hormone. PTBE, affects not only Ghrelin, however several other hormones related metabolic disorders as well.

Surgical treatment of obesity dramatically evolved in the past six decades. Nowadays, there´s a clear trend towards the least possible invasivity which will still enable to achieve acceptable treatment efficacy. This trend leads to involvement of broader spectrum of medical specialties (i.e. gastroenterologists, invasive radiologists) in obesity treatment algorithm, as well as more acceptance of obesity treatment from patient and referring physician sites.

PARTIAL JEJUNAL DIVERSION (PJD) WITH JEJUNO-COLIC ANASTOMOSIS

Pavol Holeczy *(Surgical, Hospital Agel Ostrava Vitkovice, Ostrava, Czech Republic)*, Marek Bužga *(Faculty of Education, University of Ostrava, Ostrava, Czech Republic)*, Martin Bolek *(Surgical, Hospital Agel Ostrava Vitkovice, Ostrava, Czech Republic)*, Matej Pekař *(Surgical, Hospital Agel Ostrava Vitkovice, Ostrava, Czech Republic)*

Introduction: Bariatric surgery is an effective tool in the treatment of severe obesity and related diseases. In the era of the pandemic of type II diabetes mellitus and COVID 19, its importance increased even more. The aim of our work is to present the initial results of a new operation that minimizes surgical trauma.

Method: In a prospective study, we laparoscopically constructed a side-to-side anisoperistaltic jejuno-colic anastomosis in order to derive part of the chyme by anastomosis. Patients were operated on at time IV / 2018 – VII / 2019, mean age was 48.43 ± 10.36, mean weight 112.3 ± 16.6 kg and mean BMI 41.9 ± 5.2. Patients were examined one month before surgery and then followed in the 3rd, 6th and 12th months after the operation. We evaluated weight loss and changes in carbohydrate metabolism.

Results: We did not record any perioperative or postoperative surgical complications. There was a statistically significant weight loss during the study period. There was a significant absolute decrease in weight in kilograms (p 0.005) and in BMI (p 0.005). The reduction in overweight expressed by the EWL (Excess Weight Loss) index was 82.9% after twelve months. In carbohydrate metabolism, we observed a statistically significant reduction in fasting blood glucose, both after three months (P 0.04) and after six months (P 0.03). Blood glucose values were significantly reduced after twelve months, however, no statistical significance was demonstrated (p 0.09). Decreases in glycated hemoglobin A1c (HbA1c) were observed, but no statistical significance was demonstrated.

Conclusion: Our proposed operation represents a new option in the treatment of severe obesity and related diseases. Preliminary results are promising. It will be necessary to monitor a larger number of patients in the longer term.

Keywords: Bariatric surgery, Partial jejunal diversion, Jejuno-colic anastomosis, Laparoscopy

RISK OF SARCOPENIA AFTER BARIATRIC-METABOLIC SURGERY

Matej Pekar *(1. Department of Surgery, Hospital AGEL Ostrava-Vitkovice, Ostrava, Czech Republic. 2. De-partment of Physiology, Faculty of Medicine, Masaryk University, Brno, Czech Republic, Ostrava, Czech Republic)*, Anna Pekarova *(1. Department of Physiology, Faculty of Medicine, Masaryk University, Brno, Czech Republic. 2. Lung disease Department, Faculty Hospital, Ostrava, Czech Republic, Ostrava, Czech Republic)*, Marek Buzga *(Department of Human Movement Studies, Faculty of Education, University of Ostrava, Ostrava, Czech Republic, Ostrava, Czech Republic)*, Pavol Holeczy *(1. Department*

of Surgery, Hospital AGEL Ostrava-Vitkovice, Ostrava, Czech Republic 2 Department of Physiology, Faculty of Medicine, Masaryk University, Brno, Czech Republic 3 Department of Human Movement Studies, Faculty of Education, University of Ostrava, Ostrava, Czech Republic. 2. Department of Surgical Disciplines, Faculty of Medicine, University of Ostrava, Ostrava, Czech Republic, Ostrava, Czech Republic), Marek Soltes *(1st Department of Surgery, University of Pavol Jozef Safarik, Kosice, Slovak Republic, Kosice, Slovakia)*

Introduction: Obesity is a serious metabolic disease affecting human health. It has the character of pandemics and significantly increases the cardiovascular risks and other health complications. Its treatment is complex and requires a multidisciplinary approach. Nowdays the most powerful therapy with long-term effect is bariatric-metabolic (BM) procedure. BM procedures lead to changes in body composition. Sarcopenic obesity is characterised by fat infiltration of skeletal muscles accompanied by lowering their strength. Aim: To detect the risk of sarcopenia in patients 24 months after different BM procedures by dual-energy X-ray absorptiometry (DEXA).

Methods: Nineteen patients scheduled for a BM procedure were enrolled (age: 46.3±8.9 years, 15 women, body mass index-BMI: 42.4±6.3 kg/m^2). One day before and 24 months after surgery they underwent basic anthropometric assessment (weight, height, waist and hip circumference, skin folds by caliper) and their blood samples were taken to determine the following parameters: fasting blood glucose, glycated hemoglobin HbA1c and lipid spectrum (cholesterol, low / high density lipoprotein-LDL, HDL, triacylglycerols TAG). DEXA scans and their calculated indexes were used to detect body composition changes: Fat Mass Index (FMI), Estimated Visceral Fat Area (EstVAT), Lean Mass Index (LMI), Appendage Lean Mass Index (ALMI), Bone Mineral Content (BMC), Z and T scores. The International Physical Activity Questionnaire (IPAQ) was answered to assess physical activity.

Results: All 19 patients completed the study. Excess weight loss was 72±25 %. Anthropometric measurements improved significantly ($p<0.001$). Significant changes in DEXA parameters were observed: FMI (19.5±4.7 vs. 12.1±3.7 kg/m^2), EstVAT (235.8±70.0 vs. 126.5±50.4 cm2), LMI (22.1±2.4 vs. 18.1±2.3 kg/m^2), ALMI (9.7±1.3 vs. 7.7±1.1 kg/m^2), BMC (1.22±0.1 vs. 1.12±0.1 kg), Z score (2.32 vs. 0.96), and T score (0.58 vs. –0.58). Biochemical parameters significantly improved (glycemia: 6.7±2.0 vs. 5.2±0.5 mmol/l; HbA1c: 40.9±9.9 vs. 36.6±3.6 mmol/mol; TAG: 2.4±1.0 vs. 1.2±0.6 mmol/l; HDL 1.1±0.1 vs.1.5±0.4 mmol/l). A low level of physical activity was reported by all patients.

Conclusions: BM procedures lead to significant changes in body composition at 24 months after surgery. Desired fat loss is associated with significant reduction of skeletal muscle and bone mineral mass. DEXA detects these changes effectively. Our results show, that patients after BM surgery are at risk of sarcopenia. A low level of physical activity may also play a negative role. According to our point of view, it is recommendable to complement the team of medical experts with a rehabilitation specialist who would care for obese patients.

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Keywords: bariatric surgery, dual-energy X-ray absorptiometry (DXA), metabolic surgery, obesity, sarcopenia

SINGLE CENTER RESULTS AFTER 1357 METABOLIC SURGICAL INTERVENTIONS – VESZPRÉM 2010–2021

Elemér Mohos *(Surgical dep., Veszprém County Hospital, Veszprém, Hungary)*, Petra Mohos *(Surgical dep., Veszprém County Hospital, Veszprém, Hungary)*, Tibor Nagy *(Surgical dep., Veszprém County Hospital, Vesz-prém, Hungary)*

Introduction: The metabolic surgical activity started in 2010 in Veszprém in the surgical department of the county hospital, since then the number of the cases is increasing. We usually choose laparoscopic Roux Y gastic bypass (LRYGB). Laparoscopic sleeve resection (LSG) is performed, when there is a surgical technical reason, or this is the preference of the patient. We present our results with these two types of operations.

Methods: Between Feb. 2010. and Jan. 2021.09. we had 1357 metabolic surgical cases, the indication in our department is the BMI > 40 kg/m^2 (BMI > 35 kg/m^2 with T2DM). In 1224 cases LRYGB (91%) and in 133 cases LGS (9 %) were performed. 11% of the LRYGB (n=133) was revisional procedure.

Among the 133 revisional cases there were 107 patients after gastric banding (from other centers), band removal and LRYGB was achieved. After our interventions 12 revisions after sleeve (12/133; 9%) and 14 revisions after bypass (14/1224; 1,1 %) were performed. 7 patients of us after sleeve had insufficient weight loss our weight regain and 5 other developed severe reflux, all of them were converted to LRYGB. After LRYGB we performed 7 pouch resections with new anastomosis because of anastomosis stricture, 6 pouch resizing with distalisation of the Y anastomosis because of weight gain, and 1 reconstruction to normal anatomy because of severe dumping-sy.

Results: The extra weight loss (EWL) was 85% after LRYGB, and 70 % after LSG. The remission rate of hypertension (72% vs 50%), and diabetes (90% vs 70%) were higher after bypass compared to sleeve. Concerning on the resolution of sleep apnoe and on joint disease we found no significant difference between the two procedures. There was no significant difference in complication rate (early reoperation because of leakage or bleeding 1 % after bypass and 1 % after sleeve).

Summary: We experienced, that after LRYGB the weight loss and the remission rate of T2DM and hypertension is higher compared to sleeve gastrectomy. After LRYGB the rate of the revisional procedures is almost ten times less among our patients (9 vs 1,1 %).

For these reasons -and considering the more frequently published 16–18 % rate of Barrett metaplasia in ten years after sleeve resection-, our first choice intervention for morbid obesity is LRYGB. LGS is reserved mostly for patients above BMI 60 kg/m^2 in our practice.

Keywords: Roux Y gastric bypass, Sleeve gastrectomy

POSTER SESSION

COMPOSITION OF GUT MICROBIOTA IN EXTREME OBESE SLOVAK PATIENTS

Libuša Kubáňová *(Department of Biological and Medical Science, Faculty of Physical Education and Sport, Comenius University in Bratislava, Slovakia, Bratislava, Slovakia)*, Katarína Šoltys *(Department of Microbiology and Virology, Faculty of Natural Sciences, Comenius University in Bratislava, Slovakia, Bratislava, Slovakia*), Ivan Hric *(Department of Biological and Medical Science, Faculty of Physical Education and Sport, Comenius University in Bratislava, Slovakia, Bratislava, Slovakia)*, Simona Ugrayová *(Department of Biological and Medical Science, Faculty of Physical Education and Sport, Comenius University in Bratislava, Slovakia, Bratislava, Slovakia)*, Žofia Rádiková *(Institute of Clinical and Translational Research, Biomedical Research Center SAS, Bratislava, Slovakia)*, Viktor Bielik *(Department of Biological and Medical Science, Faculty of Physical Education and Sport, Comenius University in Bratislava, Slovakia, Bratislava, Slovakia)*, Adela Penesová *(Institute of Clinical and Translational Research, Biomedical Research Center SAS, Bratislava, Slovakia)*

It is very well known that obese patients have specific changes in gut microbiota. However, to date, only few studies have addressed gut microbiota characterization in extreme obesity. Therefore, the purpose of this research was to study the effect of extreme obesity on gut microbiota composition and the association with metabolic parameters.

Subjects and methods: 19 extremely obese patients (EO, age: 35.4 ± 7.0 yrs, BMI: 48.8 ± 6.7 kg.m-2) and 23 lean healthy controls (CTRL, age: 31.7 ±14.8 yrs, BMI: 22.2 ± 1.7 kg.m-2) completed the study. Fasting glucose and insulin concentrations, total cholesterol, low-density lipoprotein (LDL), high-density lipoprotein (HDL), and triglyceride (TG) levels were measured. Faecal samples were collected and subjected to selective plating and quantitative real-time PCR (qPCR). A multi-parallel metagenomic sequencing of the 16S rDNA gene was used to determine microbiome differences from faecal samples.

Results: As expected, we found significantly increased levels of fasting serum glucose ($p<0.0001$), and insulin ($p<0.0001$) and triglycerides($p<0.0001$), however we did not find any differences in levels of total, HDL and LDL cholesterol in group of EO patients with extreme obesity compared to CTRL. The diversity of gut microbiota defined by Shannon index was significantly decreased in EO group in comparison to CTRL ($p<0.0001$). Furthermore, we have found significant differences in relative amount of several bacterial population between groups. The EO group had a significantly higher Bacteroidetes ($p<0.0001$) but no significant differences of Firmicutes were detected. Therefore, we observed significantly decreased Firmicutes/Bacteroidetes ratio ($p=0.0008$) in the EO group in comparison to CTRL group. In accordance with previous research we detected lower relative amount of Akkermansia muciniphila($p=0.0008$) in EO group. We didn't find differences of Faecalibacterium between groups, though significant negative correlation between Faecalibacterium and total cholesterol ($p=0.020$), LDL cholesterol ($p=0.024$) and TG ($p=0.039$) were find. Moreover, several significant changes in SCFA-producing bacteria between groups, which higher levels are also important in health. In EO group, we observed a lower relative amount of several SCFA-producing bacteria namely genus Buttyrivibrio($p=0.0236$), Marvinbryanthia ($p=0.0104$) and Eubacterium halli groups ($p=0.0189$). In addition, we found a significant positive correlation between Eubacterium hallii and fasting insulin concentrations ($p=0.047$).

Conclusion: These preliminary results confirmed the altered gut microbiome and metabolic parameters of extremely obese patients. Further results suggest limited associations between intestinal microbiome and metabolic parameters. Therefore, non-invasive manipulation of gut microbiota composition in extremely obese patients via healthy lifestyle offers a new approach to manage extreme obesity and associated disorders.

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strategic research on the prevention, intervention and mechanisms of obesity and its comorbidities, ITMS code: 313011V344, co-financed by the EU Regional Development Fund.

Keywords: extreme obesity, gut microbiome, metabolic parameters

OVERWEIGHT, CENTRAL OBESITY AND ABDOMINAL OBESITY IN MIDDLE-AGE ADULTS IN AN INLAND REGION OF NORTHEAST PORTUGUESE: A PILOT STUDY

José Eduardo Teixeira *(Centro de Investigação em Desporto, Saúde e Desenvolvimento Humano (CIDESD), Vila Real, Portugal & Departamento de Desporto e Educação Física, Instituto Politécnico de Bragança, Bragança, Portugal)*, José A. Bragada *(Centro de Investigação em Desporto, Saúde e Desenvolvimento Humano (CIDESD), Vila Real, Portugal & Departamento de Desporto e Educação Física, Instituto Politécnico de Bragança, Bragança, Portugal)*, João P. Bragada *(Unidade Local de Saúde do Nordeste – Unidade de Saúde de Santa Maria, Bragança, Portugal*), Joana P. Coelho *(Unidade Local de Saúde do Nordeste – Unidade de Saúde de Santa Maria, Bragança, Portugal)*, Isabel G. Pinto *(Unidade Local de Saúde do Nordeste – Unidade de Saúde de Santa Maria, Bragança, Portugal)*, Luís P. Reis *(Unidade Local de Saúde do Nordeste – Unidade de Saúde de Santa Maria, Bragança, Portugal)*, Pedro M. Magalhães *(Departamento de Desporto e Educação Física, Instituto Politécnico de Bragança, Bragança, Portugal)*

Background: The prevalence of central and abdominal obesity has been increasing over last decades in developed countries. As well, the high prevalence of obesity in Portugal has already been documented, however it is need to better understand the prevalence in each region of the country. Thus, the aim of this study was to evaluate the prevalence of the overweight, central obesity and abdominal obesity in middle-age in an inland region of Northeast Portuguese.

Methods: A descriptive and cross-sectional community sample was collected from two Portuguese primary health care centres between January 2019 and December 2020. A total of 673 individuals aged 40–65 years were included for analysis, among which 400 women (53.34 ± 7.33 years) and 273 men (53.01 ± 7.20 years). Prevalence of overweight, central obesity and abdominal obesity were analysed across sexes using body mass index and waist circumference. Categorical variables were expressed by counts and proportions with a 95% confidence interval (CI). Chi-squared test or fisher exact test were applied whenever appropriate. To compare continuous variables independent sample t-test or Mann-Whitney U test were used. Statistical significance was set at $p < 0.05$.

Results: The prevalence of overweight, central obesity and abdominal obesity in this cross-sectorial sample were 41.01%, 30.61% and 67.20%, respectively. Significant differences among men and women were found for abdominal obesity ($p < 0.001$). Women presented a higher prevalence of abdominal obesity (67.5%). Men have higher prevalence of overweight (48.72%) and central obesity (31.14%) than women (35.75% and 30.25%, respectively). However, differences were not statistically significant between sexes for overweight and central obesity ($p \geq 0.05$).

Conclusion: A higher prevalence of overweight, central obesity and abdominal obesity was reported for middle-age adults in this inland region of Northeast Portuguese. Our data suggest a higher prevalence of all three clinical conditions, comparing previous Portuguese epidemiological studies. Current report provides the study pilot for a more detailed epidemiological research. Also, preliminary findings emphasise the importance of implementing physical activity programmes and promoting healthy lifestyles to tackling this growing public health problem.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. The experimental approach was approved and followed by the local Ethical Committee from North East Local Health Unit (CNPD nº2020/149).

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Keywords: Obesity, Body Mass Index, Waist Circumference, Regional, Epidemiology

CARDIOVASCULAR RISK FACTORS IN PATIENTS WITH CORONARY ARTERY DISEASE WHO ARE RE-HOSPITALIZED IN THE SERVICE OF CARDIOLOGY

Gracia L Don *(Service of Cardiology. San Martín Hospital, Entre Ríos, Paranà, Entre Ríos, Argentina)*, Maira F Centurion *(Epidemiology Residence,Directorate of Epidemiology, Ministry of Health of the Province of Entre Ríos., Paraná, Entre Ríos, Argentina)*, Eugenia Y Macbeth *(Cardiology Residence ,Service of Cardiology. San Martín Hospital, Entre Ríos, Paraná, Entre Ríos, Argentina)*

Introduction: Coronary artery disease is one of the main causes of cardiovascular disease. Secondary preven-tion based on pharmacological treatment and life style changes maintained along time are fundamental to diminish the risk factors and to guarantee success of the treatment.

Objective: To analyze cardiovascular risk factors in patients with coronary artery disease who are re-admitted at hospital.

Methods: Descriptive prevalence study carried out from September 2018 to August 2019.

Number of patients: 537 patients hospitalized at the Service of Cardiology.

Sample: 77 patients with antecedents of ischemic heart disease who were re-admitted.

Variables: age, sex, risk factors: diabetes, hypertension, dyslipidemia, smoking, overweight, or obesity (Body Mass index (BMI) (weight/height2) ≥ 25 Kg/m^2), sedentary lifestyle was not evaluated. Laboratory values: HDL Cholesterol (< 60: low), LDL Cholesterol (≥130: high), triglycerides (≥ 150: high), fasting blood glucose (> 110: impaired); reason for hospitalization (discharge diagnoses classified according to ICD – 10 coding). BMI was obtained from 39 patients. Lipid values were taken from 47 patients and fasting blood glucose values from 75 patients. We calculated relative frequencies and percentages. We used Microsoft Excel 2013 and R Studio 4.0.3 for data processing.

Results: re-admission percentage was 14.3% of which, 66% (51/77) were males and a 96% (74/77) were over 50 years old. As for risk factors in regards to the risk of cardiovascular disease: a 35% of the patients presented diabetes mellitus, 84% presented hypertension, 29% dyslipidemia, 27% were smokers at the moment of re-admission and 33% had stopped smoking. An 82% presented overweight, or obesity.

As for the distribution of laboratory results: it was found that 98% presented a low value HDL Cholesterol; a 30% had a high-level triglycerides; and high LDL Cholesterol in a 6% of the patients. A 48% presented impaired fasting blood glucose.

In regards to the discharge diagnoses: 40% was for heart failure, 21% for acute myocardial infarction, 14% for angina pectoris and an 11% for chronic ischemic heart disease.

Conclusion: those patients re-admitted having coronary artery disease presented: hypertension, overweight and obesity as main risk factors. Lipid values of LDL Cholesterol and triglycerides were optimal in most cases in respect of the mandatory use of statins; however, they presented low values of HDL Cholesterol. Almost half of them presented fasting hyperglycemia. The main discharge diagnoses was heart failure, favored

by the predominant risk factors, though the prevalence of ischemic manifestations in different presentations shows the progression of the atherosclerotic pathology before the insufficient global check up of cardiovascular risk factors.

It is necessary to set up integral monitoring and educational programs, as well as constant follow ups of patients with coronary artery disease, which may lead towards active participation and access to cardiac rehabilitation in order to achieve treatment success and adherence.

CHARACTERISTIC COMPLEX NATURE OF THE FOREBRAIN GLUCOSE-MONITORING NEURONS

Edina Hormay *(Cellular Bioimpedance Research Group, Szentágothai Research Centre, University of Pécs, Pécs, Hungary; Centre for Neuroscience, University of Pécs, Pécs, Hungary;, Institute of Physiology, University of Pécs, Medical School, Pécs, Hungary, Pécs, Hungary)*, Kitti Mintál *(Cellular Bioimpedance Research Group, Szentágothai Research Centre, University of Pécs, Pécs, Hungary; Centre for Neuroscience, University of Pécs, Pécs, Hungary;, Institute of Physiology, University of Pécs, Medical School, Pécs, Hungary, Pécs, Hungary)*, Bettina László *(Institute of Physiology, University of Pécs, Medical School, Pécs, Hungary, Pécs, Hungary)*, István Szabó *(Institute of Physiology, University of Pécs, Medical School, Pécs, Hungary, Pécs, Hungary)*, Attila Tóth *(Cellular Bioimpedance Research Group, Szentágothai Research Centre, University of Pécs, Pécs, Hungary; Centre for Neuroscience, University of Pécs, Pécs, Hungary;, Institute of Physiology, University of Pécs, Medical School, Pécs, Hungary, Pécs, Hungary)*, Zoltán Karádi *(Cellular Bioimpedance Research Group, Szentágothai Research Centre, University of Pécs, Pécs, Hungary; Centre for Neuroscience, University of Pécs, Pécs, Hungary;, Institute of Physiology, University of Pécs, Medical School, Pécs, Hungary, Pécs, Hungary)*

Introduction: The glucose monitoring (GM) neurons are special chemosensory cells capable to react (with increasing or decreasing their firing frequency) to changes of the local intracerebral extracellular or systemic concentration of D-glucose [1-3]. In previous experiments, the involvement of dysfunction of these neurons was identified in the background of various peripheral regulatory disturbances, additionally even of certain nutritional and metabolic diseases [4-7]. In addition to the above, experimental data provided evidence for that the effects of these chemosensory cells is greatly influenced by characteristic functional attributes (distribution of neural activation, neuronal activity and reactivity patterns, etc.) of the given brain area.

Aim: One of the main goals of the present experiment was to investigate the occurrence and activity of the forebrain GM neurons after long term sugar treatment in laboratory rats. The other aim was to further examine the involvement of these chemosensory neural cells in the organization of feeding and metabolism related regulatory processes.

Methods: By means of the multibarreled micro-electrophoretic technique, we examined the activity of the GM neurons, as how they change their activity in response to local intracerebral or peripheral administration of D-glucose after long term (4 week) sugar drinking treatment (0,04 g saccharose /ml).

Results: The neuronal responses of 8 GM from 283 neural cells were shown to vary depending on the age of the animals, the way of the actual blood sugar level changes, and the brain area where we tried to find these chemosensory neural cells.

Conclusions: Our findings indicate involvement of GM neurons in adaptive control mechanisms of the homeostatic regulation. These neurons form the so called central glucose monitoring neural network [8, 9], whose elements, depending on the brain region, appear to represent the most important regulatory entity of the adaptive central feeding and metabolic control.

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Keywords: glucose-monitoring, neurons, electrophysiology

MODIFICATIONS OF THE GASTROINTESTINAL MICROBIOME HAS HUGE IMPACT ON PERIPHERAL AND CENTRAL NERVOUS PROCESSES

Kitti Mintál *(Cellular Bioimpedance Research Group, Szentágothai Research Centre, University of Pécs, Institute of Physiology, Medical School, University of Pécs, Pécs, Hungary)*, Attila Tóth *(Cellular Bioimpedance Research Group, Szentágothai Research Centre, University of Pécs, Institute of Physiology, Medical School, University of Pécs, Pécs, Hungary)*, Edina Hormay *(Cellular Bioimpedance Research Group, Szentágothai Research Centre, University of Pécs, Institute of Physiology, Medical School, University of Pécs, Pécs, Hungary*), Anita Bufa *(Insti-tute of Bioanalysis, Medical School, University of Pécs, Pécs, Hungary)*, Tamás Marosvölgyi *(Institute of Bioana-lysis, Medical School, University of Pécs, Pécs, Hungary)*, Anita Kovács *(Institute of Physiology, Medical School, University of Pécs, Pécs, Hungary)*, Béla Kocsis *(Department of Medical Microbiology and Immunology, Medical School, University of Pécs, Pécs, Hungary)*, Adorján Varga *(Department of Medical Microbiology and Immunol-ogy, Medical School, University of Pécs, Pécs, Hungary)*, László Lénárd *(Cellular Bioimpedance Research Group, Szentágothai Research Centre, University of Pécs, Institute of Physiology, Medical School, University of Pécs, Pécs, Hungary)*, Zoltán Karádi *(Cellular Bioimpedance Research Group, Szentágothai Research Centre, Univer-sity of Pécs, Institute of Physiology, Medical School, University of Pécs, Pécs, Hungary)*

In recent years, our knowledge on the intestinal microbiota has greatly improved. The composition and the ecological balance of the gut microbiome are essential for physiological functioning of the organism; therefore, dysfunctions of this system have been shown to induce modifications of peripheral and central regulatory processes, ultimately leading to functional deficits in brain functions and leads to behavioral alterations [1;2].

Therefore, our study's main purpose was to explore in adulthood the effect of alterations of the gut microbiome on behavioral responses and to compare these alterations to the changes of the concentration of short chain fatty acids produced by bacteria. To determine the impact of the alterations on the behavior we used adult male Wistar rats. Animals have been divided into four – 1. antibiotics treated; 2. antibiotics and probiotic treated; 3. probiotic treated; 4. control groups. Antibiotics treated groups were given broad spectrum antibiotics mixture, dissolved in their drinking water for 4 weeks. Probiotic treated groups received our probiotic mixture, per os every day for 2 weeks (the probiotic mixture of ours contained four beneficial bacterial species). Throughout the whole experiment, fecal samples were collected. The concentrations of the short chain fatty acids were analysed from the fecal samples before and after the treatments, and the measurements were car-ried out on a gas chromatograph with a mass spectrometer detector. Following the treatments, we carried out behavioral tests.

The present findings demonstrate significant group-differences in the behavioral test and in the analysis of short chain fatty acids as well. Abnormal behavioral phenomena were identified among the antibiotics treated animals and the concentrations of the short chain fatty acids were diminished, too. However, these alterations were no longer noticed following the probiotic treatment.

Our results elucidate that, alterations of the microbiota play important modulating role in the central regulatory processes, and it appears that probiotic treatment could attenuate the antibiotic induced abnormal behavior by reorganizing the gut microbiome and re-establishing the short chain fatty acids.

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Keywords: Animal behavior, Microbiome-gut-brain axis, Antibiotics

THE BALKAN DIET

Svetoslav Handjiev
(Bulgarian Association for the Study of Obesity and Related Diseases)

Our recent studies have shown that the traditional Balkan cooking from the end of the 19th and the first half

of the 20th century is much similar to the Mediterranean diet. Furthermore, the nutritional habits in all of the Balkan countries are stressing on an exclusive closeness. This fact is giving the right to define the Balkan healthy food or the Balkan diet. The traditional nutrition in the Balkan countries is responding to many of the major aspects of healthy food. From the nutritional prevention point of view, the results, related to the risks of developing a disease and their connection to the dietetic models, seem to be promising. The healthy effects of the integral dietetic models are of extreme importance in the nutritional prevention. The traditional Balkan nutrition is rich in antioxidants. The Balkan healthy food contains the highly active antioxidants resveratrol and pycnogenol. The diet is rich in alpha-tocopherol, ascorbic acid, beta-carotene, selenium, bioflavonoids, and many other biologically-active substances. The traditional for the Balkan cuisine meals are distinguished with various and rich content of biologically active components. Besides the Bulgarian yoghourt and the typical kinds of cheese, here belong the traditional vegetables – a rich source of various flavonoids and carotenoids. The specific character of the culinary treatment preserves the biological activity of the contents. Balkan diet has numerous positive effects and all of the elements of the healthy nutrition. With its rich content of healthy food ingredients, the Balkan diet is a basis for developing of various preventative and curative dietary regimens.

FADS1 GENE POLYMORPHISM(S) AND FATTY ACID COMPOSITION OF SERUM LIPIDS IN ADOLESCENTS

Tereza Metelcová *(Department of Obesitology, Institute of endocrinology in Prague; 1st Medical Faculty, Charles University, Prague, the Czech Republic, Prague, Czech Republic)*, Markéta Vaňková *(Institute of endocrinology in Prague, Prague, Czech Republic)*, Hana Zamrazilová *(Institute of endocrinology in Prague, Prague, Czech Republic)*, Milena Hovhannisyan *(Institute of endocrinology in Prague, Prague, Czech Republic)*, Eva Tvrzická *(4th Department of Internal Medicine, 1st Medical Faculty, Charles University, Prague, the Czech Republic, Prague, Czech Republic)*, Barbora Staňková *(4th Department of Internal Medicine, 1st Medical Faculty, Charles University, Prague, the Czech Republic, Prague, Czech Republic)*, Martin Hill *(Institute of endocrinology in Prague, Prague, Czech Republic)*, Josef Včelák *(Institute of endocrinology in Prague, Prague, Czech Republic)*, Marie Kunešová *(Institute of endocrinology in Prague, Prague, Czech Republic)*

Background: Fatty acid desaturase 1 (FADS1) gene controls the fatty acid metabolism pathway in the human body (Sergeant et al., 2012). Single nucleotide polymorphism (SNP) in FADS1 gene was associated with fatty acid composition, which could have impact to cardiovascular disease (Yuan et al., 2019).

Methods: Samples obtained in the COPAT project (Childhood Obesity Prevalence And Treatment) were used. 670 children (336 girls and 334 boys) were examined. Genomic DNA was extracted from peripheral blood leucocytes in whole blood samples. For genotype analysis TaqPath (LC480, Roche) was used. We tested two polymorphisms in FADS1 gene (rs174546, rs174537). Fatty acid composition in the serum lipids was assessed using gas chromatography. Regression was used for statistical evaluation.

Results: In both polymorphisms, minor allele T carrier had a significantly negative association with arachidonic acid 20:4(n-6) and palmitic acid 16:0 in both sexes. In girls, minor allele T carrier had association with eicosadienoic acid 20:2(n-6). We found relationship allele T carrier and dihomo-γ-linolenic acid 20:3(n-6) in boys.

Conclusion: SNPs in the FADS gene cluster should have impacted desaturase activity, which may contribute to different efficiency of PUFA synthesis.

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Keywords: FADS1, fatty acid, SNP

NON-INVASIVE CARDIOVASCULAR RISK ASSESSMENT IN PREPUBERTAL CHILDREN

Sarolta Stomfai *(Department of Paediatrics, Medical School, University of Pecs, Pécs, Hungary)*, Manuel Pasieka *(Szentágothai Research Centre, University of Pécs, Pécs, Hungary)*, Attila Gyenesei *(Szentágothai Research Centre, University of Pécs, Pécs, Hungary)*, Wolfgang Ahrens *(Leibniz Institute for Prevention Research and Epidemiology – BIPS, Bremen, Germany)*, Stefaan De Henauw *(Department of Public Health/ Department of Movement and Sport Sciences, Ghent University, Faculty of Medicine and Health Sciences,*

Ghent, Belgium), Kathrin Günther *(Leibniz Institute for Prevention Research and Epidemiology – BIPS, Bremen, Germany)*, Staffan Marild *(Department of Pediatrics, The Queen Silvia Children's Hospital, Goteborg University, Gothenburg, Sweden)*, Kirsten Mehlig *(Department of Public Health and Community Medicine at Institute of Medicine, Goteborg University, Gothenburg, Sweden)*, Dénes Molnár *(Department of Paediatrics, Medical School, University of Pecs, Pécs, Hungary)*, Éva Erhardt *(Department of Paediatrics, Medical School, University of Pecs, Pécs, Hungary)*, Luis Moreno *(Growth, Exercise, Nutrition and Development Research Group, University of Zaragoza, Zaragoza, Spain)*, Alfonso Siani *(Institute of Food Sciences, Unit of Epidemiology & Population Genetics, National Research Council, Avellino, Italy)*, Michael Tornaritis *(Research and Education Institute of Child Health, Stovolos, Cyprus)*, Toomas Veidebaum *(National Institute for Health Development, Tervise Arengu Instituut,Tallinn, Estonia)*

Aims: In spite of the fact that the development of cardiovascular diseases begins in childhood, there is no widely accepted tool for early risk assessment. The aim of the present investigation was to introduce a new, non-invasive risk estimation method for prepubertal children.

Methods: 5960 IDEFICS (Identification and prevention of Dietary- and lifestyle-induced health EFects In Children and infantS) children with a complete data set for this analysis (boys: 3079; age range: 2.1–9.9 years; body weight: [mean±SD] 23,8±7.01 kg; BMI: 16.36±2.42) of the total population (n=16229) were selected. The input variables consisted of individual clinical (overweight/ obesity, waist-to-height-ratio, hypertension, weight small/large for gestational age, breast feeding) and family history (early cardiovascular disease, diabetes type 2, hypertension and dyslipidemia) parameters. These factors were analyzed together and validated against the presence of pathological cardiometabolic laboratory parameters (fasting blood glucose, total cholesterol, HDL-cholesterol, triglyceride, HOMA-index, HbA1C and CRP). The laboratory parameters were categorized by using the cutoff point of the 90th percentile's of IDEFICS population taking age and gender into account. In case of HDL the 10th percentile values were used as cutoff points.

Results: Children having more than three abnormal input variables had a significantly higher risk (OR > 1.7 [CI: 1.4–2.0]; p<0,05) for having at least one pathological cardiometabolic laboratory parameter. It was also revealed that each input variable had different effect on the examined laboratory values.

Conclusions: Our results indicate that the developed simple, non-invasive tool can be applied to detect children with cardiovascular risk. The current results demonstrate that the presented method can be useful in primary care setting.

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