Diabetes Metabolism and the Heart

Diabetes, Stoffwechsel und Herz

CVOT Summit 2023

Congress on Cardiovascular, Kidney and Metabolic Outcomes

30 November – 1 December 2023, Munich, Germany

FINAL PROGRAMME AND ABSTRACTS

10.5 European CME credits (EACCME®)

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Oliver Schnell
(Munich, Germany)

Welcome

Dear Colleagues,

On behalf of the local organizing committee we would like to cordially invite you to the Cardiovascular Outcome Trial (CVOT) Summit 2023, the Congress von Cardiovascular, Kidney, and Metabolic Outcomes. The summit will be held as a virtual congress from 30 November – 01 December.

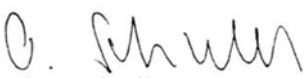
We invite you to participate in the CVOT Summit 2023, which will bring together endocrinologists, diabetologists, nephrologists, cardiologists, and primary care physicians.

Over the past decade, CVOTs have had a tremendous impact on the knowledge of cardiovascular, kidney, and metabolic disease. This year, new treatment approaches as well as new diagnostic and monitoring techniques will be of particular interest.

The CVOT Summit has become a leading platform for presenting and discussing latest developments related to CVOTs. We are committed to organising an outstanding congress with a highly interesting programme and an excellent international faculty.

The lectures and discussions will be held by high-ranking experts in the field and will cover topics such as new CVOT and study results, guidelines, treatment options and other topics relevant to daily practice.

The CVOT Summit 2023 promises to be an outstanding event once again.We look forward to welcoming you on 30 November - 01 December. Join our congress at www.cvot.org.



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PCDE primary care diabetes europe

Arbeitsgemeinschaft Diabetes und Herz
DDG Deutsche Diabetes Gesellschaft

D&CVD

CCMA China CardioMetabolic Association 中国心血管代谢联盟

General information

The CVOT Summit 2023 is run as virtual event. It can be visited on **www.virtual.cvot.org**.

CME accreditation

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THURSDAY, 30 NOVEMBER 2023 VIRTUAL

15:00 – 15:10 CET **Welcome and Introduction**
Schnell O (Munich, Germany)

15:10 – 16:50 CET **Update on Clinical Guidelines and network Meta-Analyses**
Chairs: Groop P-H (Helsinki, Finland), Rydén L (Stockholm, Sweden)

15:10 – 15:25 **Management of CKD in 2023: an update of guidelines**
Groop P-H (Helsinki, Finland)

15:25 – 15:40 **What`s new in the ESC "Diabetes and the Heart" and "Heart Failure" Guidelines 2023**
Marx N (Aachen, Germany)

15:40 – 15:50 **Discussion**

15:50 – 16:05 **Treatment for Type 2 Diabetes: systematic review and network meta-analysis for the creation of living guidelines**
Rydén L (Stockholm, Sweden)

16:05 – 16:20 **Join the Global Alliance for Living Evidence (GALE)!**
Tendal Jeppesen B (Copenhagen, Denmark)

16:20 – 16:35 **Strengthening the recognition of minority groups in clinical guidelines for diabetes**
Gavin JR (Atlanta, USA)

16:35 – 16:50 **Discussion**

16:50 – 17:00 CET **Break**

17:00 – 18:30 CET **Making sense of Patient-Reported Outcomes (PROs) and why they matter**
Chairs: Barnard-Kelly K (Hampshire, UK), Lalic N (Belgrade, Serbia)

17:00 – 17:15 **Consensus statement on PROs - why, how and what does it matter?**
Barnard-Kelly K (Hampshire, UK)

17:15 – 17:30 **IDF perspective on PROs**
Schwarz P (Dresden, Germany)

17:30 – 17:45 **PROs: What are governments doing in this space and how do they influence policy?**
Taylor B (Tampa, USA)

17:45 – 18:00 **Patient´s perspectives on PROs**
Huntley G (Indianapolis, USA)

18:00 – 18:30 **Discussion**

18:30 – 18:45 CET **Break**

18:45 – 19:45 CET **Keynote lectures: Overcoming boundaries - new options arise**
Chair: Giorgino F (Bari, Italy), Schumm-Draeger P (Munich, Germany)

18:45 – 19:05 **Multireceptor drugs for obesity: a new emerging universe**
Müller T (Munich, Germany)

19:05 – 19:15 **Discussion**

19:15 – 19:35 **New horizons for CGM in diabetes: further building a key pillar of diabetes management**
Battelino T (Ljubljana, Slovenia)

19:35 – 19:45 **Discussion**

19:45–20:45 CET Oral Presentations – Part 1

Chairs: Mankowsky B (Kyiv, Ukraine), Schnell O (Munich, Germany)

19:45 – 20:45 CET

OP 1: Lipid-Lowering Treatments and Risk of Cardiovascular Events in Over 9000 Patients From 14 European Countries: 1-year Prospective Follow-Up of the SANTORINI Registry
Aguiar C (Carnaxide, Portugal)

OP 2: Benefit of Dual Therapy With GLP-1 RA and SGLT2i on Cardiovascular Outcomes in Type 2 Diabetes
Kvist K (Søborg, Denmark)

OP 3: Tirzepatide Reduces Albuminuria in Patients With Type 2 Diabetes: Post-Hoc Pooled Analysis of SURPASS 1-5
Ranta K (Helsinki, Finland)

OP 4: Impact of Finerenone on Chronic Kidney Disease Progression in Chinese Patients With Type 2 Diabetes: FIGARO-DKD Subgroup Analysis
Li P (Nanjing, China)

OP 5: A cross-sectional survey on CKD diagnosis and management
Rötzer R (Baierbrunn, Germany)

20:45 CET **Closing of Day 1**

FRIDAY, 01 DECEMBER 2023 VIRTUAL

08:30–09:50 CET Prevention of Type 1 Diabetes and its complications

Chairs: Hummel M (Munich, Germany), Malik RA (Doha, Qatar)

08:30 – 08:45 **Type 1 Diabetes: early detection and preventive approaches**
Larsson HE (Lund, Sweden)

08:45 – 09:00 **Teplizumab – Delaying the onset of Type 1 Diabetes**
Mathieu C (Leuven, Belgium)

09:00 – 09:15 **Treatment strategies for neuropathy in Type 1 Diabetes**
Tesfaye S (Sheffield, UK)

09:15 – 09:30 **Preventing and delaying the progression of chronic kidney disease (CKD) in Type 1 Diabetes**
Groop P-H (Helsinki, Finland)

09:30 – 09:50 **Discussion**

09:50–10:00 CET Break

10:00–11:15 CET Identification of chronic kidney disease to guide therapeutic decision

Chair: Topsever P (Istanbul, Turkey), Ji L (Bejing, China)
in Cooperation with PCDE

10:00 – 10:15 **Self-rated knowledge and competence regarding the management of chronic kidney disease in primary care**
Topsever P (Istanbul, Turkey)

10:15 – 10:30 **Shaping the role of primary care in diagnosis of CKD**
Itzhak B (Haifa, Israel)

10:30 – 10:45 **Identifying people with CKD in primary care: the role of POCT in KDIGO Guidelines**
Jacob S (Villingen-Schwenningen, Germany)

10:45 – 11:00 **Diagnosing CKD with UACR in China - Paving the Way for Effective Treatment**
Yu X (Tongji, China)

11:00 – 11:15 **Discussion**

11:15 – 11:30 CET **Break**

11:30 – 12:30 CET **Current considerations in the management of CKD**
Chair: Heerspink H (Groningen, Netherlands), Fernández-Fernández B (Madrid, Spain)

11:30 – 11:50 **SGLT-2 inhibitors in CKD: new outcomes to strengthen the bridge to clinical care**
Heerspink H (Groningen, Netherlands)

11:50 – 12:10 **Non-steroidal MRAs: recent and future perspectives**
Rossing P (Copenhagen, Denmark)

12:10 – 12:30 **Discussion**

12:30 – 13:15 CET **Heart failure and Cardiovascular Risk**
Chair: Ceriello A (Barcelona, Spain), Škrha J (Prague, Czech Republic)

12:30 – 12:45 **Current and future aspects of heart failure management**
Kosiborod M (Kansas City, USA)

12:45 – 13:00 **CLEAR Outcomes: reducing cardiovascular mortality and morbidity with bempedoic acid**
Ray KK (London, UK)

13:00 – 13:15 **Discussion**

13:15 – 13:45 CET **Break**

13:45 – 14:30 CET **Cancer – an emerging, yet largely underrecognized important topic in metabolic diseases**
Chair: Ceriello A (Barcelona, Spain), Ibrahim M (Charlotte, USA)

13:45 – 14:00 **Type 2 Diabetes & Cancer**
Standl E (Munich, Germany)

14:00 – 14:15 **Obesity & Cancer**
Herzig S (Munich, Germany)

14:15 – 14:30 **Discussion**

14:30 – 16:15 CET **Diabetes, Obesity and NASH – Discovering the New Now**
Chairs: Forst T (Mannheim, Germany), Rodbard H (Rockville, USA)

14:30 – 14:50 **Recent advances in incretin therapy**
Frías JP (Los Angeles, USA)

14:50 – 15:10 **Successful treatment of Type 2 Diabetes and obesity: managing cardiovascular risk and implementing new treatment pathways**
Vilsbøll T (Copenhagen, Denmark)

15:10 – 15:30 **Diagnosis, prognosis and future treatment options of fatty liver disease**
Tacke F (Berlin, Germany)

15:30 – 15:50 **How to communicate successfully with people who are obese**
Snoek F (Amsterdam, Netherlands)

15:50 – 16:15 **Discussion**

16:15 – 16:30 CET **Break**

16:30 – 17:30 CET Industry´s perspective - panel discussion

17:30 – 18:30 CET Oral Presentations – Part 2

Chairs: Forst T (Mannheim, Germany), Mankowsky B (Kyiv, Ukraine)

17:30 – 18:30 CET

OP 6: Change in Fibrosis-4 Index (FIB4) is Associated With Risk of Liver Events, Cardiovascular Events, and All-Cause Mortality in Patients With Obesity and/or Type 2 Diabetes (T2D)
Khunti K (Leicester, UK)

OP 7: Prevalence and Effect of Semaglutide on Non-Alcoholic Steatohepatitis in People With Obesity With and Without Type 2 Diabetes: Analyses From the STEP 1 and 2 Trials Using SomaSignal Tests
Long M (Søborg, Denmark)

OP 8: Heart Failure in Patients With Type 2 Diabetes Mellitus and Coronary Artery Disease With and Without Cardiovascular Autonomic Neuropathy
Monashnenko O (Kyiv, Ukraine)

OP 9: Glycaemic Control in Users of Automated Insulin Delivery Systems Increased Slightly From 2019 to 2021: Longitudinal Data of the Digitalisation and Technology Report
Ehrmann D (Bad Mergentheim, Germany)

OP 10: Real-World Evidence Showing Sustained Improvements in Glycemia at 1 Year in People With Type 2 Diabetes Using the OneTouch Reveal® Mobile App With OneTouch® Blood Glucose Meters
Holt E (Malvern, USA)

18:30 – 18:45 CET Abstract Awards and Closing

Schnell O (Munich, Germany)

Oral Presentatins (OP)

OP 1

Lipid-Lowering Treatments and Risk of Cardiovascular Events in Over 9000 Patients From 14 European Countries: 1-year Prospective Follow-Up of the SANTORINI Registry

Carlos Aguiar, Kausik K. Ray, Marcello Arca, Derek L. Connolly, Mats Eriksson, Jean Ferrieres, Ulrich Laufs, Jose M. Mostaza, David Nanchen, Jarkko Soronen, Mathias Lamparter, Aurélie Bardet, Ernst Rietzschel, Timo Strandberg, Hermann Toplak, Frank L.J. Visseren, Alberico L. Catapano on behalf of the SANTORINI Investigators

Carnaxide, Portugal

Background and Aims: Registries conducted prior to the ESC/EAS Lipid Modification guidelines in 2019 using cross sectional data showed that the approach to lipid-lowering therapy (LLT) was largely based on statin monotherapy (84% use) rather than through combination LLT (10%). This resulted in only 1/3 of the population achieving 2019 risk-based LDL-C goals. SANTORINI, the first observational study dedicated to cardiovascular (CV) risk management conducted in Europe post 2019 guidelines, demonstrated that although the use of combination LLT had increased to 25.6%, only 1/5 of high- and very high-CV risk patients achieved goals. When combination therapies were used, goal attainment was more likely to be achieved. Here, we present the implications of this approach on CV outcomes over 1 year of prospective follow-up from the SANTORINI registry (NCT04271280).

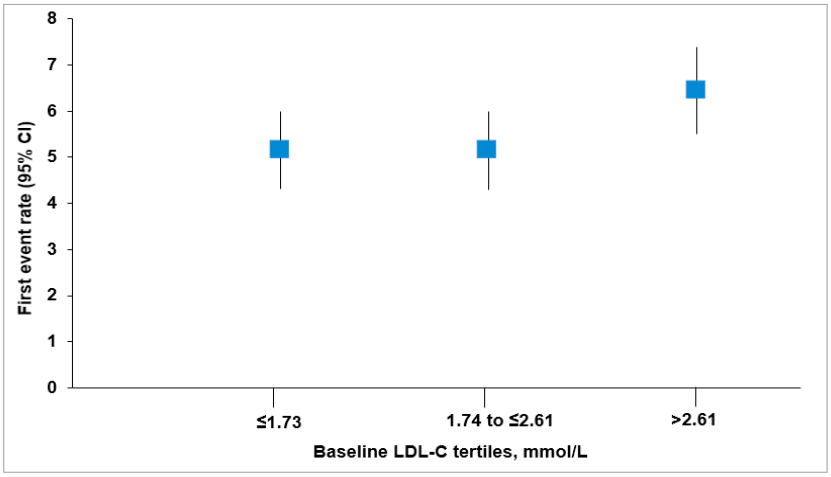
Materials and Methods: SANTORINI enrolled high- and very high-CV risk patients between March 2020 and February 2021, across 623 sites and 14 countries in Europe from primary & secondary care settings, with a further 1-year of prospective follow-up until 31 May 2022. Risk at baseline was investigator-classified. Demographic characteristics, type of LLT and LDL-C at baseline and at the end of follow up were recorded from routine healthcare records. CV deaths, non-fatal myocardial infarction, non-fatal stroke, and revascularisation (4-component MACE)

Table. Baseline characteristics and baseline LLTs of the patients included in the 1-year follow-up

Baseline characteristics	Overall (N=9136)
Female, n (%)	2489 (27.2)
Age, years, mean (SD)	65.5 (10.9)
BMI, mean (SD)	28.3 (4.9)
Systolic blood pressure, mmHg, mean (SD)	134.0 (18.1)
Diastolic blood pressure, mmHg, mean (SD)	77.9 (10.6)
Smoking history, n (%)	
Current	1504 (16.5)
Former	3878 (42.5)
Hypertension, n (%)	6508 (71.2)
Familial hypercholesterolaemia, n (%)	934 (10.2)
Diabetes, n (%)	3192 (34.9)
ASCVD, n (%)	7069 (77.4)
LDL-C, mmol/L, mean (SD)	2.4 (1.2)
HDL-C, mmol/L, mean (SD)	1.3 (0.4)
Total cholesterol, mmol/L, mean (SD)	4.3 (1.4)
LLTs at baseline, n (%)	
No LLT	1909 (20.9)
Monotherapies	4892 (53.5)
Statin alone	4516 (49.4)
Ezetimibe alone	170 (1.9)
PCSK9i alone	151 (1.7)
Any other oral LLT alone	55 (0.6)
Combination therapies	2335 (25.6)
Statin + Ezetimibe	1561 (17.1)
PCSK9i combination	430 (4.7)
Any other oral combinations	344 (3.8)

ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index; EZE, ezetimibe; HDL-C, high density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; LLT, lipid-lowering therapy; PCSK9i, proprotein convertase subtilisin kexin 9 inhibitor; SD, standard deviation

Figure. First event rate of 4-component MACE by baseline tertiles of LDL-C (N=9136; P trend=0.042)



MACE, major adverse cardiovascular events; LDL-C, low density lipoprotein cholesterol

were the secondary outcome of interest as well as CV deaths independently.

Results: There were 9136 patients of whom 6504 were classified as very high-risk and 2626 as high-risk patients, with mean (SD) baseline LDL-C of 2.29 (1.14) mmol/L and 2.68 (1.30) mmol/L, respectively (Table). During 1-year follow-up, 4-component MACE events, including 88 CV deaths, occurred in 497 patients. The overall rate of first 4-component MACE was 5.60 events/100 person-years (PY) (95% confidence interval [CI] 5.11–6.10) and CV death was 0.96 deaths/100 PY (0.76–1.17). Rates of 4-component MACE and CV death were higher among very high-risk (6.55 events/100 PY, 5.92–7.19) and (1.02 deaths/100 PY, 0.77–1.26), respectively as compared to high-risk patients (3.30 events/100 PY, 2.60–4.00) and (0.83 death/100 PY, 0.48–1.18). The association between baseline LDL-C and rate of 4-component MACE overall is shown in the Figure, with highest first event rate observed among the highest tertile of LDL-C at baseline (p trend=0.042).

Conclusion: Despite increase in the use of combination LLT in Europe, 1-year rates of 4-component MACE and CV death were high. Event rates tend to be higher with higher LDL-C. Hence it follows that there is a need to evaluate strategies that better implement the 2019 lipid guidelines with a particular focus on implementing early and greater use of combination LLTs.

Grant/Support Information: This study and oral presentation were funded by Daiichi Sankyo Europe GmbH, Munich, Germany. Writing and editorial support was provided by Aoife Egan and Vicky Hinstridge from inScience Communications, UK and funded by Daiichi Sankyo Europe GmbH, Munich, Germany.

OP 2

Benefit of Dual Therapy With GLP-1 RA and SGLT2i on Cardiovascular Outcomes in Type 2 Diabetes

Kajsa Kvist, Bochra Zareini, Thomas Gerds, Kathrine Kold Sørensen, Kim K. B. Clemmensen, Jens-Peter David, Christian Torp-Pedersen
Søborg, Denmark

Background and Aims: Evidence on the cardiovascular benefit of dual glucagon like peptide-1 receptor agonist (GLP-1 RA) and sodium-glucose co-transporter-2 inhibitor (SGLT2i) therapy is lacking. This study aimed to compare the benefit of dual GLP-1 RA and SGLT2i therapy to other dual type 2 diabetes therapies with respect to heart failure and major cardiovascular adverse events (MACE).

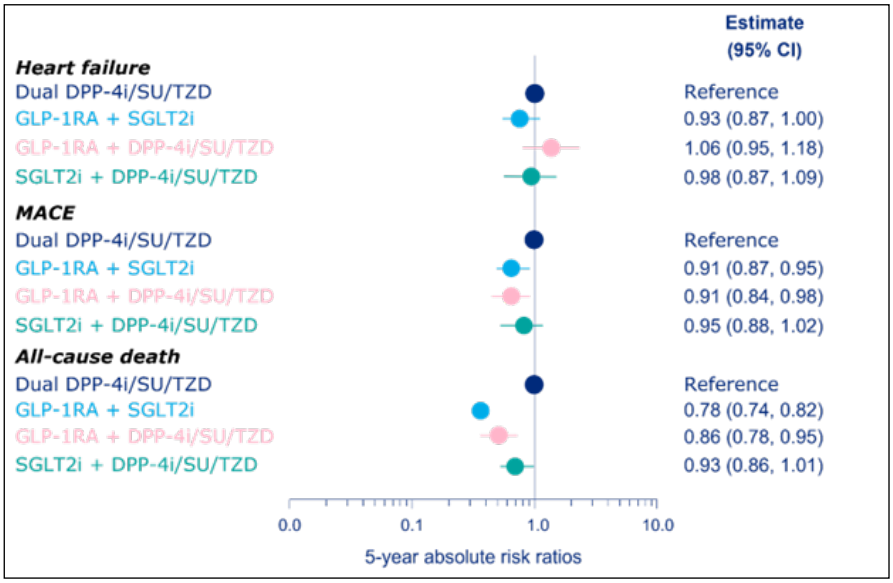
Materials and Methods: From 2010-2021 patients from the Danish nationwide registries were followed from start of dual second-line type 2 diabetes treatment. Primary outcome was heart failure, and secondary outcomes were MACE and all-cause death. The estimated risk following 1 of 4 dual therapy combinations was determined using a longitudinal targeted maximum likelihood estimation assuming all patients followed one dual therapy for 5 years.

Results: A total of 87,201 persons were included (GLP-1 RA and SGLT2i: 14,831, GLP-1 RA and DPP4/SU/TZD: 20,417, SGLT2i and DPP4/SU/TZD: 22,803, dual DPP4/SU/TZD: 29,150). The 5-year risk ratio (95% CI) of dual GLP-1 RA and SGLT2i therapy compared to reference (dual DPP4/SU/TZD) for heart failure was: 0.93 (0.87;1.00), for MACE: 0.91 (0.87;0.95) and for all cause death: 0.78 (0.74;0.82), see Figure.

Conclusion: Dual therapy with GLP-1 RA and SGLT2i was associated with a decrease in risk of heart failure compared to other dual therapies. Dual therapy with GLP-1 RA and SGLT2i was associated with a decrease in risk of MACE and all-cause death compared to the reference treatment.

Grant/Support Information: This study was funded by Novo Nordisk A/S.

Five-year absolute risk ratios for cardiovascular outcomes with dual therapies



OP 3

Tirzepatide Reduces Albuminuria in Patients With Type 2 Diabetes: Post-Hoc Pooled Analysis of SURPASS 1-5

Kari Ranta, Hiddo J. L. Heerspink, Katherine R. Tuttle, Imre Pavo, Axel Haupt, Zhengyu Yang, Russell J. Wiese, Andrea Hemmingway, David Z. I. Cherney, Naveed Sattar
Helsinki, Finland

Background and Aims: In SURPASS 4, the GIP/GLP-1 receptor agonist tirzepatide (TZP) showed a potential kidney protective effect in people with type 2 diabetes (T2D) and high cardiovascular risk by slowing the rate of eGFR decline and reducing urine albumin-creatinine ratio (UACR) vs insulin glargine over 2 years. In this post-hoc analysis, we explored effects of TZP on UACR changes in SURPASS 1-5 trials.

Materials and Methods: UACR (% difference) for TZP (5, 10, 15 mg) vs comparators (COMPs) was analysed. Analyses were conducted in the pooled entire SURPASS 1-5 population and populations pooled by COMP: placebo (SURPASS 1 & 5); active (SURPASS

2 [semaglutide 1 mg] & SURPASS 3-4 [insulins]); and insulins. In each pooled population, data were examined in all patients and in subgroups defined by baseline UACR ≥30 mg/g or eGFR <60 mL/min/1.73m². Mixed model for repeated measures was used to analyse on-treatment data from baseline up to the end of treatment visit.

Results: UACR data was available in 6263 patients of whom 1846 had ≥30 mg/g and 537 had eGFR <60 mL/min/1.73m². UACR decreased more with TZP 5, 10, and 15 mg vs COMPs in pooled SURPASS 1-5 and consistently across pooled placebo, active, and insulin COMP studies. UACR lowering appeared more pronounced in subgroups with baseline UACR ≥30 mg/g or eGFR <60 mL/min/1.73m².

Conclusion: In people with T2D, including those with reduced kidney function, TZP decreased UACR vs COMPs to a clinically relevant degree, supporting a potential kidney protective effect.

Grant/Support Information: Kari Ranta is a full-time employee of Eli Lilly and Company. Medical writing assistance was provided by Angela Pozo Ramajo and Renee E. Granger of Envision Pharma Group, and was funded by Eli Lilly and Company.

OP 4

Impact of Finerenone on Chronic Kidney Disease Progression in Chinese Patients With Type 2 Diabetes: FIGARO-DKD Subgroup Analysis

Ping Li, Hongguang Zheng, Jianhua Ma, Weiping Lu, Ling Li, Fang Liu, Qing Su, Yuxiu Li, Yi Fang, Zhaohui Mo, Fei Xiong, Ying Zhang, Li Wang, Luke Roberts, Meike Brinker, Dalong Zhu, on behalf of the FIGARO-DKD Investigators
Nanjing, China

Background and Aims: Finerenone, a selective nonsteroidal mineralocorticoid receptor antagonist, significantly improved cardiovascular (CV) outcomes (HR 0.87; 95% CI 0.76–0.98; p=0.0264) with a favourable trend on kidney outcomes (HR 0.87; 95% CI 0.76–1.01) in patients with chronic kidney disease and type 2 diabetes in FIGARO-DKD. This analysis explored the benefits of finerenone in Chinese patients.

Materials and Methods: Patients with type 2 diabetes, urine albumin-to-creatinine ratio (UACR) ≥30–<300 mg/g and estimated glomerular filtration rate (eGFR) ≥25–≤90 ml/min/1.73m² or UACR ≥300–≤5000 mg/g and eGFR ≥60 ml/min/1.73m², treated with optimized renin–angiotensin system blockade were randomized to finerenone or placebo. The primary CV composite outcome was time to CV death, nonfatal myocardial infarction, nonfatal stroke or hospitalization for heart failure. The key secondary kidney composite outcome was time to kidney failure, sustained eGFR decline ≥40% from baseline or renal death. Further outcomes included change in UACR from baseline and safety was assessed as investigator-reported adverse events (AEs).

Results: Of 325 Chinese patients, 50% received finerenone. In these patients, a trend in the lowering of CV outcomes with finerenone was broadly similar to that observed in the overall FIGARO-DKD population (HR 0.91; 95% CI 0.50–1.67). Finerenone significantly reduced the risk of the key secondary kidney outcome vs placebo (HR 0.48; 95% CI 0.29–0.79; p=0.0029) in the Chinese subgroup, and a greater reduction in UACR at month 4 was observed with finerenone vs placebo (ratio of least-squares [LS] means 0.61; 95% CI 0.53–0.70). Overall, finerenone demonstrated similar safety in Chinese patients between the treatment groups. In the overall FIGARO-DKD population, hyperkalaemia AEs were increased with finerenone vs placebo. Incidence of investigator-reported hyperkalaemia was higher in the Chinese population than the overall FIGARO-DKD population (18.8% vs 8.0%), but similar between finerenone and placebo in the Chinese subgroup (19.1% vs 18.5%).

Conclusion: Heart and kidney benefits of finerenone in Chinese patients were broadly consistent with that reported in the overall FIGARO-DKD population, with higher rates of hyperkalaemia AEs in the Chinese subgroup but no notable differences between treatment groups.

Grant/Support Information: This analysis was supported by Bayer AG, who funded the FIDELIO-DKD and FIGARO-DKD studies and combined analysis.

OP 5

A Cross-Sectional Survey on CKD Diagnosis and Management

René Rötzer, Pinar Topsever, Christoph Wanner, Oliver Schnell
Baierbrunn, Germany

Background and Aims: Chronic kidney disease (CKD) is a global health challenge with an increasing prevalence. Diagnosis rates remain low, particularly during the silent early stages of the disease. Possible reasons for this include the insufficient acknowledgment of CKD as a progressive condition requiring early intervention and the unawareness of strategies to identify and treat it. Uncovering particular deficiencies in CKD management can facilitate the implementation of precise measures to enhance proficiency and heighten the standard of care for diseased individuals.

Materials and Methods: An online survey with 22 questions targeting primary care physicians (PCPs) was developed, to assess their confidence in and approach to managing CKD, as well as the infrastructure of the clinical practice. Global anonymous data was collected and analyzed using descriptive statistics.

Results: PCPs comprised the largest proportion of survey participants engaged in the diagnosis and treatment of CKD. Interrogating confidence of the management and diagnosis of CKD revealed that many considered themselves to be confident with some learning needs. Key results on diagnosis point to gaps in the assessment of kidney condition using urine albumin-creatinine ratio (UACR) and estimated glomerular filtration rate (eGFR). Furthermore, the screening of individuals with a single risk factor was not fully established in practice. Additional key findings show that a large percentage of respondents did not utilize risk-prediction tools, nor did many consider monitoring individuals diagnosed with CKD more than twice a year. From challenges faced in the management of CKD, most participants perceived screening as a key aspect.

Conclusion: The risk factors for the development of CKD, as well as the need for screening of all those affected by these risk factors, must be communicated vigorously. Additionally, it is

crucial to highlight the significance of utilizing eGFR and UACR in conjunction for diagnostic purposes, as well as the importance of a tailored monitoring schedule in line with the disease's progression stage. Improvement is also required to establish risk-prediction tools in therapeutic and referral guidance.

Grant/Support Information: The survey has been funded by an unrestricted educational grant from AstraZeneca.

OP 6

Change in Fibrosis-4 Index (FIB4) is Associated With Risk of Liver Events, Cardiovascular Events, and All-Cause Mortality in Patients With Obesity and/or Type 2 Diabetes (T2D)

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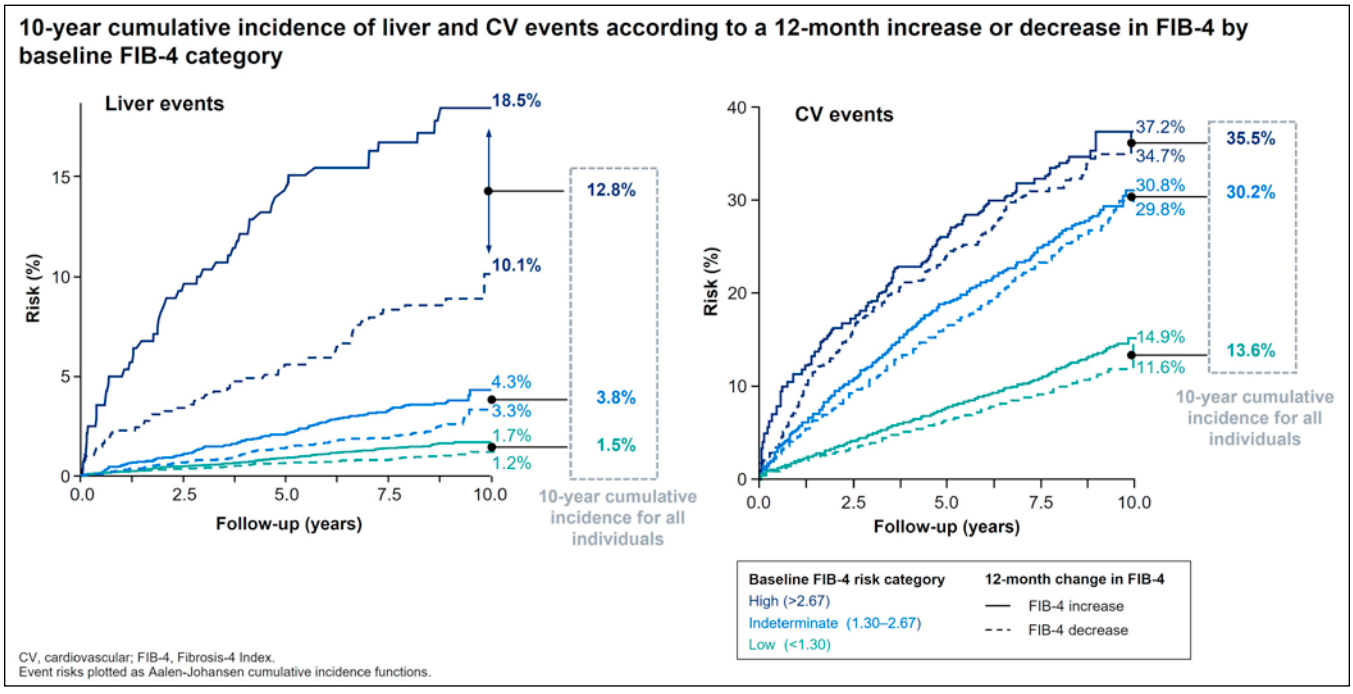
Background and Aims: There is a lack of tools to monitor and assess risk of morbidity and mortality in people with metabolic dysfunction-associated steatohepatitis (MASH). We evaluated the association of 12-month changes in FIB-4 (ΔFIB-4) and risk of developing severe MASH-related clinical events.

Materials and Methods: A longitudinal cohort study was conducted using data from the UK Clinical Practice Research Datalink linked with Hospital Episodes Statistics and Office for National Statistics data. Patients were aged ≥18 years with obesity and/or T2D, ≥2 FIB-4 measurements, and no alcohol-related disorders, chronic liver diseases other than metabolic dysfunction-associated steatotic liver disease or prescriptions of drugs inducing liver disease. ΔFIB-4 was calculated using score at baseline and after 12 (±3) months. Patients were followed from second measurement until time of first liver event; time of first cardiovascular (CV) event (hospitalization/death); all-cause mortality; database migration; 10 years' follow-up; or 1 Jan 2020, whichever was first. Aalen-Johansen and Cox proportional hazards models were used to estimate cumulative incidence and hazard ratios (HRs).

Results: Analyses of liver events and CV events were conducted in 20,443 and 18,117 patients, respectively. During the 10-year follow-up, there were 466 liver events and 3060 CV events. In patients with high baseline FIB-4 (>2.67), risk of a liver event after 10 years was 12.8%; after 12 months, the risk was 18.5% and 10.1% in those with FIB-4 increase and decrease, respectively (Figure). Increased risk of liver events with increasing FIB-4, and vice versa, was also seen in patients with an indeterminate (1.30–2.67) or low baseline FIB-4 (<1.30). Risk of CV events after 10 years was 35.5%, 30.2% and 13.6% in patients with high, intermediate and low baseline FIB-4, respectively (Figure). Risk of a liver event was positively associated with ΔFIB-4 in Cox models adjusted for sex, age, and baseline FIB-4, with the association depending on baseline FIB-4. Compared with patients with low baseline FIB-4 and no change in FIB-4 (reference), the HR (95% confidence interval) was 24.27 (16.98, 34.68) for those with high baseline FIB-4 and a 1-unit FIB-4 increase, and 10.90 (7.90, 15.05) for those with high baseline FIB-4 and a 1-unit decrease. Compared with the reference, those with indeterminate and low baseline FIB-4 and 1-unit FIB-4 increase/decrease also had significantly higher/lower risk. Similar results were seen with CV events and mortality, though the association with CV events was attenuated after adjustment for age.

Conclusion: In patients with obesity and/or T2D, changes in FIB-4 at 12 months were positively associated with risk of long-term clinical events across all FIB-4 groups, highlighting the potential of using FIB-4 to identify patients at risk of severe events.

Grant/Support Information: This study was sponsored by Novo Nordisk A/S.



OP 7

Prevalence and Effect of Semaglutide on Non-Alcoholic Steatohepatitis in People With Obesity With and Without Type 2 Diabetes: Analyses From the STEP 1 and 2 Trials Using SomaSignal Tests

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Background and Aims: Novel, non-invasive biomarkers to grade and stage non-alcoholic fatty liver disease (NAFLD) and its progressed form, non-alcoholic steatohepatitis (NASH), are urgently needed. A targeted proteomics signature derived from patients with histologically-defined NASH has been developed collaboratively with the NASH Clinical Research Network (SomaSignal tests) to relate to the presence and severity of NASH components and changes over time. In this analysis, SomaSignal tests were applied to proteomics data generated from two weight-loss trials in order to characterise the prevalence of NASH components at baseline and investigate the effect of semaglutide.

Materials and Methods: STEP 1 (NCT03548935) and STEP 2 (NCT03552757) were phase 3a, randomised, placebo-controlled trials of once-weekly subcutaneous semaglutide (2.4 mg in STEP 1; 1.0 mg and 2.4 mg in STEP 2) vs placebo for weight reduction in adults with overweight/obesity without (STEP 1) or with (STEP 2) type 2 diabetes (T2D). Patients received treatment for 68 weeks. Prediction probabilities (PP) for NASH components at baseline were derived using SomaSignal models. The efficacy of semaglutide vs placebo was analysed as presence or absence of NASH components using a binary classifier derived from the PP (PP ≥ 0.5) at the end of the trial (EOT) and as odds ratios at EOT based on PPs directly. The SomaSignal categories included: steatosis grade 1–3 vs 0; lobular inflammation grade 2–3 vs 0–1; hepatocyte ballooning grade 1–2 vs 0; and fibrosis stage 2–4 vs 0–1. Based on the SomaSignal classifiers, patients were characterised into NAFLD stages: NAFL if steatosis was present but with no other NASH components; indeterminate if some, but not all, NASH components or fibrosis were present; and NASH if steatosis, inflammation and ballooning (with or without fibrosis) were present.

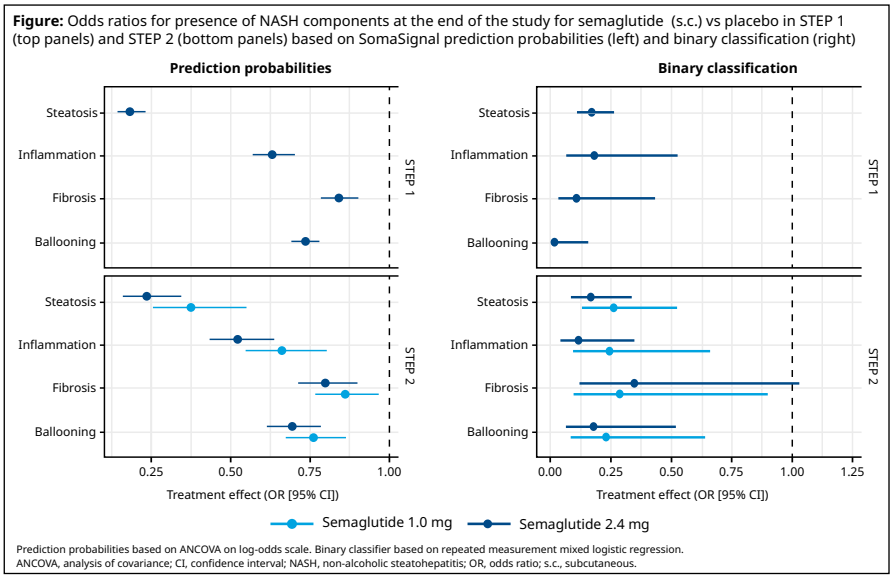

Figure: Odds ratios for presence of NASH components at the end of the study for semaglutide (s.c.) vs placebo in STEP 1 (top panels) and STEP 2 (bottom panels) based on SomaSignal prediction probabilities (left) and binary classification (right)
Prediction probabilities based on ANCOVA on log-odds scale. Binary classifier based on repeated measurement mixed logistic regression.
ANCOVA, analysis of covariance; CI, confidence interval; NASH, non-alcoholic steatohepatitis; OR, odds ratio; s.c., subcutaneous.

Results: Proteomics data were available for 1307/1961 and 643/1210 randomised patients in STEP 1 and 2; these patients were representative of the full study populations in each trial. At baseline, steatosis was present in 43% of patients in STEP 1, and the prevalence of the other components was 5% or less. In STEP 2, steatosis was present in 72% of patients, 15% had NASH and 12% had NASH with fibrosis. The odds of having each NASH component were significantly lower at EOT for patients who received semaglutide vs placebo, with a dose-dependency trend in STEP 2, using both PP and binary classification (Figure). Further, semaglutide was associated with significantly lower odds of having a more severe NAFLD stage after treatment vs placebo.

Conclusion: Steatosis is highly prevalent in people with overweight/obesity, with NASH likely present in 15% of patients with overweight/obesity and T2D (STEP 2). Semaglutide had a favourable effect on NASH components in the current analysis in populations with overweight/obesity, with and without T2D, as measured by SomaSignal models.

Grant/Support Information: This study was sponsored by Novo Nordisk A/S.

OP 8

Heart Failure in Patients With Type 2 Diabetes Mellitus and Coronary Artery Disease With and Without Cardiovascular Autonomic Neuropathy

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Background and Aims: Cardiovascular autonomic neuropathy (CAN) is an established risk factor for cardiovascular disease in patients with diabetes mellitus. However, the association between CAN and heart failure is not yet fully investigated. The aim of this study was to assess the association between CAN and echocardiographic signs of heart failure in a cohort of subjects with type 2 diabetes mellitus and coronary artery disease (CAD).

Materials and Methods: We studied 40 patients with type 2 diabetes mellitus and CAD aged 64.2±11.3 years (data are presented as mean±SD), with a BMI of 31.4±5.0 kg/m^2, a mean diabetes duration of 7.8±6.0 years, and an HbA1c of 6.9±1.4%. The patients were admitted to our clinical center with the clinical signs of CAD for the further evaluation and treatment. CAN was diagnosed by the standard battery of tests and the diagnosis was confirmed if 2 abnormal tests were found. Systolic and diastolic heart failure were diagnosed by echocardiography. Statistical analysis was performed using the Fisher test for rela-

tive values.

Results: CAN was diagnosed in 19 patients studied (47.5%). The age, duration of diabetes and levels of HbA1c did not differ significantly between patients with and without CAN. We found that diastolic dysfunction was more prevalent than systolic dysfunction in the studied cohort of subjects with type 2 diabetes mellitus and CAD. The prevalence of diastolic dysfunction was numerically higher in patients with CAN compared to those without CAN (58 vs. 52.4%) while the prevalence of systolic dysfunction was 10.5 vs. 9.5% in patients with and without CAN, respectively. However, the difference in the prevalence of systolic and diastolic dysfunction between groups of patients with and without CAN did not reach the levels of statistical significance (p>0.05), probably due to the small number of patients studied.

Conclusion: We found a high prevalence of CAN along with myocardial dysfunction with a predominance of diastolic dysfunction in patients with type 2 diabetes mellitus and CAD. The association between diastolic dysfunction and CAN in this cohort requires further investigation.

OP 9

Glycaemic Control in Users of Automated Insulin Delivery Systems Increased Slightly From 2019 to 2021: Longitudinal Data of the Digitalisation and Technology Report

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Background and Aims: The digitalisation and technology report (dt-report) is an annual survey of healthcare professionals and a biannual survey of people with diabetes (PwD) in Germany since 2018. We compared HbA1c values between people with type 1 diabetes with vs. without use of an automated insulin delivery (AID) system in 2019 and 2021.

Materials and Methods: The dt-report was based on an online survey among people with type 1 diabetes. In addition to current diabetes treatment, we asked AID users whether they used a 'Do-it-yourself-system' (DIY) or a commercial AID-system. PwD also reported their last measured HbA1c value. Repeated measures ANOVA with year and use of AID systems was conducted. Subsequent analysis was conducted comparing DIY vs. commercial AID users for the year 2021.

Results: Data were analysed from a total of 3783 participants (2439 in 2019 and 1369 in 2021), of whom 370 were AID users (170 in 2019 and 200 in 2021). HbA1c was significantly lower in AID users than in non-users (6.5±0.8% vs. 7.0 ±1.0%, Cohens d=0.48). While PwD without an AID system had rather similar HbA1c values in both years (2019: 7.1±1.1% vs. 2021: 6.9±0.8%; p>0.05), the HbA1c of AID users increased from 6.3±0.7% to 6.8±0.8% (p<0.001). In 2021, the HbA1c level of DIY users was significantly lower than that of commercial AID system users (6.3±0.7% vs. 6.9±0.8% p<0.001, Cohens d=0.84).

Conclusion: The HbA1c data showed a moderate increase in HbA1c levels between 2019 and 2021 in AID system users. This increase may be related to the shift from DIY to commercial systems. However, the limitations of this observational study should be kept in mind, as the data are based on self-report and the study is not randomised.

OP 10

Real-World Evidence Showing Sustained Improvements in Glycemia at 1 Year in People With Type 2 Diabetes Using the OneTouch Reveal® Mobile App With OneTouch® Blood Glucose Meters

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Background and Aims: Cardiovascular disease is present in more than 30% of people with type 2 diabetes (PwT2D), while it is estimated that at least 40% of PwT2D also develop diabetic kidney disease. The progressive nature of T2D highlights the importance of providing advanced blood glucose (BG) monitoring that provides guidance, insight, and encouragement, facilitating actions by PwT2D to keep their BG readings in-range and avoid excursions. The OneTouch Verio (OTV) Flex® blood glucose meter (BGM) provides a colour range indicator and the OTV Reflect® BGM provides a dynamic colour range indicator and Blood Sugar Mentor® feature. Both BGMs are complemented by connectivity to the OneTouch Reveal® (OTR) app. We sought to provide real-world evidence that these systems sustain improved glycemic management over an extended timeframe.

Materials and Methods: Anonymized glucose and app analytics were extracted from the LifeScan server for 63,209 PwT2D. Data from their first 14 days using the OTR app with either BGM was compared to the 14 days prior to the 1-year timepoint using paired within-subject differences. For this analysis, we present the combined data from PwT2D using the OTR app with OTV Flex and OTV Reflect BGMs.

Results: Glucose readings in-range (70-180 mg/dl) improved by +10.1 percentage points (% points; from 69.9 to 80.0%, p<0.001) and hyperglycemic readings (>180 mg/dl) reduced by -10.2 % points (from 28.6 to 18.4%, p<0.001) in 63,209 PwT2D. Mean glucose reduced by -16.1 mg/dl (from 161.5 to 145.4 mg/dL, p<0.001). Higher app engagement was strongly correlated with improved glycemia. For example, PwT2D who performed <1 app session per week improved readings in-range by +7.3 % points, whereas those performing >2 to 4 app sessions per week improved by +10.4 % points (p<0.001 for each). Encouragingly, even relatively short bursts of app interactions elicited outcome improvements. PwT2D who spent <2 mins on the app per week improved readings in-range by +7.4 % points, whereas those spending >20 to 40 mins per week improved by +11.2 % points (p<0.001 for each). Similar trends were observed for each connected meter individually when used in combination with the OTR app.

Conclusion: Real-world evidence from more than 63,000 PwT2D demonstrates sustained long-term improvement in readings in-range and lower mean glucose in those using the OneTouch Reveal® mobile app with OneTouch® connected BGMs.

Grant/Support Information: The authors are employees of LifeScan.

Cardiovascular, Renal, and Metabolic Treatment Approaches

P 01

Benefit of Dual Therapy With GLP-1 RA and SGLT2i on Renal Outcomes in Type 2 Diabetes

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Background and Aims: There is increased use of dual glucagon like peptide-1 receptor agonist (GLP-1 RA) and sodium-glucose co-transporter-2 inhibitor (SGLT2i) therapy, but real-world evidence on the renal benefit is lacking. This study aimed to compare the dual use of GLP-1 RA and SGLT2i to other dual second-line type 2 diabetes therapies with respect to renal outcomes.

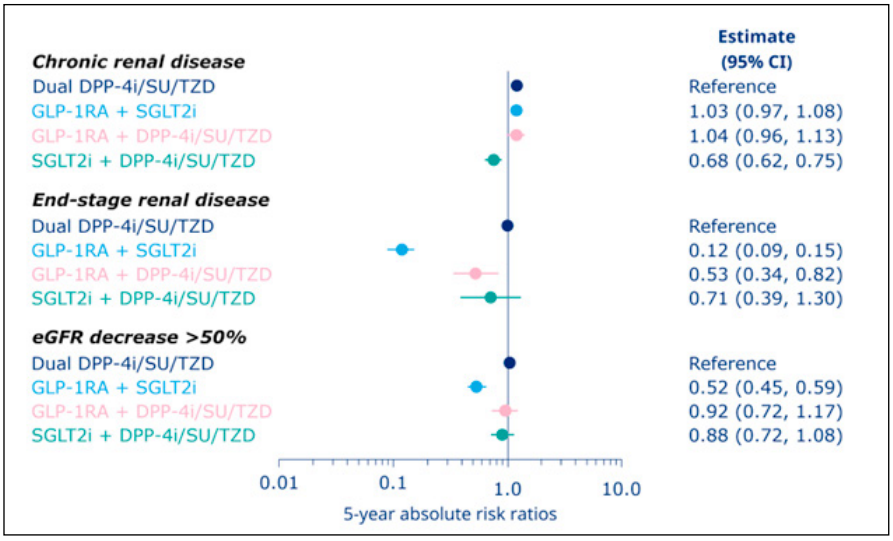
Materials and Methods: From 2010-2021, patients from the Danish nationwide registries were followed from start of dual second-line type 2 diabetes treatment. Outcomes were chronic renal disease, end-stage renal disease and >50% eGFR decrease from baseline. The estimated risk following 1 of 4 dual therapy combinations was determined using a longitudinal targeted maximum likelihood estimation assuming all patients followed one dual therapy for 5 years.

Results: In total 87,201 persons were included (GLP-1 RA and SGLT2i: 14,831, GLP-1 RA and DPP4/SU/TZD: 20,417, SGLT2i and DPP4/SU/TZD: 22,803, dual DPP4/SU/TZD: 29,150). The 5-year risk ratio (95% CI) of dual GLP-1 RA and SGLT2i therapy compared to reference (dual DPP4/SU/TZD) for chronic renal disease: 1.03 (0.97;1.08), end-stage renal disease: 0.12 (0.09;0.15) and >50% decrease in eGFR: 0.52 (0.45;0.59).

Conclusion: Dual therapy with GLP-1 RA and SGLT2i compared to other dual therapies was associated with a greater risk reduction of end-stage renal disease and eGFR decline, while dual SGLT2i and DPP4/SU/TZD was associated with a greater risk reduction of chronic renal disease.

Grant/Support Information: This study was funded by Novo Nordisk A/S.

Five-year absolute risk ratios for cardiovascular outcomes with dual therapies



P 02

Once-Weekly Subcutaneous Semaglutide in Carotid Atherosclerotic Inflammation in Type 2 Diabetes and Cardiovascular Disease: Study Methods and Baseline Results

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Background and Aims: The once-weekly (OW) subcutaneous (s.c.) formulation of the glucagon-like peptide-1 analogue semaglutide is a treatment for type 2 diabetes (T2D) that reduced major adverse cardiovascular (CV) events vs placebo in people with T2D at high CV risk in the SUSTAIN-6 CV outcomes study. This was suggested to be due to its anti-atherosclerotic effects, potentially mediated via reductions in inflammation. The ongoing phase 1, double-blind CV mode of action (MoA) study will evaluate the effects of semaglutide vs placebo on atherosclerotic inflammation and plaque morphology in participants with T2D and CV disease using positron emission tomography (PET)-magnetic resonance imaging (MRI). Here, we present the study methods and evaluate whether participants are representative of people with T2D and CV disease.

Materials and Methods: Participants ≥50 years old with established T2D (HbA1c 6.0–9.0%) and CV disease were randomised 1:1 to OW s.c. semaglutide 1.0 mg or placebo for 52 weeks. Primary and secondary endpoints are change from baseline to week 26 in target-to-background ratio of 18F-fluorodeoxyglucose (18F-FDG; a sugar analogue to assess glucose uptake) and 68Ga-DOTA-Tyr3-octreotate (DOTATATE; a ligand to assess macrophage activity), respectively, in the carotid arteries as measures of atherosclerotic inflammation. Systemic inflammation will be quantified via high-sensitivity C-reactive protein (hs-CRP) levels. Plaque morphology and burden will be analysed using structural MRI at week 52; adverse events will be collected to assess safety.

Results: At baseline, the median study population (N=101) age was 66 years (range: 50–82) and 87% were male. Mean (standard deviation) HbA1c, body weight and systolic blood pressure were 7.0% (0.7), 88.3 kg (14.1) and 140 mmHg (17), respectively. Median (range) low-density lipoprotein-C was 1.7 mmol/L (0.6–5.2) and hs-CRP 1.1 mg/L (0.2–12.8). In total, 47 participants (46.5%) had a history of myocardial infarction, 24 (23.8%) had a history of stroke, 3 (3.0%) had a history of transient ischaemic attack and 13 (12.9%) had a history of peripheral artery disease.

Conclusion: Baseline characteristics suggest participants in the CV MoA study are a representative population of people with T2D and CV disease. This

study will be the first to evaluate the effects of semaglutide on PET-measured atherosclerotic inflammation, providing opportunity to further understand the MoA of semaglutide on atherosclerosis in people with T2D and CV disease.

Grant/Support Information: This study was sponsored by Novo Nordisk.

P 03

The Role of Glucagon-Like Peptide 1 Receptor Agonists in the Metabolic Syndrome

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Background and Aims: Metabolic Syndrome (MS) is the presence of several or all of the following conditions hyperlipidemia, hypertension, obesity, and diabetes mellitus, which multiply the risk of adverse cardiovascular events. GLP-1 agonists are a group of drugs used in the treatment of patients with diabetes mellitus and obesity. The aim of this study was to evaluate the effect of GLP-1 agonists in the treatment of MS.

Materials and Methods: We looked at a case series of four patients with MS who were being treated with GLP-1 agonists. Two were already on basal insulin and two were on metformin. Four were already on statin therapy. Two were on antihypertensive therapy, and two were without therapy. The patients were monitored for 6 months in our hospital. Laboratory analyzes of venous blood were performed on a Dimension EXL200 biochemical analyzer, body weight was measured on a body scale and blood pressure was measured on a mercury manometer.

Results: After six months of therapy with GLP-1 agonists, the average reduction in systolic blood pressure was 13% (20 mm/Hg), in diastolic blood pressure 20% (20 mm/Hg), and in body weight 16% (16 kg), on HbA1c 31%, on BMI 15%, and on fasting glycemia 59% (8.7 mmol/L). There was a 9.6% increase in cholesterol levels (0.7 mmol/L) and no change in LDL cholesterol levels.

Conclusion: After six months of using GLP-1 agonists in these patients, a significant reduction in body weight was achieved as well as an improvement in glycoregulation, without a significant change in the lipid status. No adverse cardiovascular event was observed in these patients.

P 04

Investigating the Effects of Empagliflozin and Linagliptin Treatment on the Hearts of STZ-Diabetic Rats: Do They Affect Cardiac miRNAs?

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Background and Aims: Cardiac benefits of DPP-4 and SGLT2 inhibitors have been shown in several studies. miRNAs are small non-coding RNAs that regulate various biological processes through their target mRNAs. Some drugs exert beneficial effects by modulating specific miRNAs as shown in recent studies. Based on this, we aimed to explore a role for miRNAs in the cardiac effects of linagliptin, a DPP-4 inhibitor, and empagliflozin, an SGLT2 inhibitor, in an STZ-diabetic rat model.

Materials and Methods: 11-week-old male Sprague Dawley rats were randomly divided into control (C) and diabetic (D) groups. Diabetes was induced by streptozotocin (50 mg/kg, i.p.). Following 12-15 weeks, rats were administered vehicle, linagliptin (4 mg/kg/day) or empagliflozin (30 mg/kg/day) by oral gavage once daily. At the end of 8-10 weeks of treatment, rats were anesthetized under 2% isoflurane inhalation. miR-1, miR-21, miR-29a, miR-29b, miR-30a, miR-125b, miR-133a, miR-199a, miR-212, miR-221 and miR-373 expressions were investigated in left ventricular tissue. The target genes of miRNAs were identified through TargetScan or MicroRNA Target Prediction Database. Among these genes, Na+/Ca2+ exchanger (NCX1), cAMP-dependent protein kinase A catalytic subunit β (PRKACB), phospholamban (PLN), as well as β1 (ADRB1) and β2-AR (ADRB2) mRNA expression were examined. Protein expression of these genes, sarcoplasmic reticulum Ca2+-ATPase 2a (SERCA2a) and phosphorylated PLN (p-PLN) were determined. Data are expressed as mean ± SD. Due to the exploratory nature of the study, hypothesis testing analysis was not performed.

Results: Myocardial-specific miR-1 and miR-133a were downregulated in all diabetic and treated groups compared to control animals. The expression levels of miR-21, miR-29a, miR-29b, miR-30a, miR-125b, miR-199a, miR-212, miR-221 and miR-373 did not differ among groups. No major differences were found among groups for the selected target genes and β1- and β2-AR mRNA levels. SERCA2a expression was markedly decreased in the diabetic group compared to controls and did not improve with either treatment (C: 100.0±13.5%; CE: 99.8±8.8%; CL: 112.6±12.7%; D: 80.1±9.6%; DE: 68.7±11.9%; DL: 69.2±9.4%). The expression of PLN (C: 100.00±7.92%; CE: 96.46±21.22%; CL: 92.62±18.92%; D: 104.40±11.66%; DE: 95.2±11.1%; DL: 102.5±16.2%) and PRKACB (C: 100.0±27.7%; CE: 100.3±22.0%; CL: 103.3±29.8%; D: 90.8±17.4%; DE: 90.5±27.6%; DL: 95.6±17.3%) were similar among groups. Although there was a reduction in p-PLN (C: 100.0±20.4%; CE: 84.7±17.9%; CL: 83.9±16.5%; D: 68.9±22.4%; DE: 67.6±22.2%; DL: 80.2±33.2%) and p-PLN/PLN ratio (C: 100.0±21.6%; CE: 91.6±31.6%; CL: 93.9±28.7%; D: 65.7±19.7%; DE: 72.4±30.2%; DL: 78.9±32.9%) in the diabetic group, no improvement was observed after treatment. SERCA2a/PLN ratio decreased in the diabetic rats compared to controls, but this was not reversed by either treatment (C: 100.0±9.5%; CE: 109.2±29.5%; CL: 124.9±20.6%; D: 77.7±13.4%; DE: 73.6±17.4%; DL: 69.2±15.5%).

Conclusion: Our results indicate that linagliptin and empagliflozin did not normalize the altered miRNA levels in diabetic hearts, but instead decreased the expression of some miRNAs in the control heart. In addition, neither drug improved the reduced SERCA2a expression caused by diabetes. To investigate the possible beneficial effects of both drugs on diabetic hearts, taking a "prevention" rather than a "treatment" approach may be helpful.

Grant/Support Information: This

study was funded by the Scientific and Technological Research Council of Turkey (TUBITAK SBAG-119S769).

Cardiovascular perspectives

P 05

MicroRNA-320 – Role in Diabetes Mellitus-Induced Vascular Endothelial Dysfunction

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Background and Aims: The endothelium is a metabolically active organ that plays a crucial role in regulating vascular homeostasis and preventing the development of cardiovascular disease. Endothelial dysfunction in diabetes often leads to vascular complications. MicroRNAs are involved in several cardiovascular pathological processes, namely microRNA-320 is associated with numerous cellular functions, including differentiation, proliferation, migration and apoptosis. However, its role in vascular endothelial dysfunction is still poorly understood. Our study aimed to identify vascular alterations in type 2 diabetes mellitus (T2DM) and the implication of circulating microRNA-320.

Materials and Methods: T2DM was induced in adult male Wistar rats via a high-fat diet and low dose of streptozotocin. The lumen area ratio to the vessel wall of the abdominal aorta was calculated using Adobe Photoshop software, by overlaying dot grids on the sections. Total RNA was extracted from aorta samples and the relative expression of microRNA-320 was measured by PCR (TaqMan miRNA Assay).

Results: T2DM caused structural alterations of the intima-media complex, endothelial dysfunction, and decreased intraluminal diameter of the abdominal aorta. Our study revealed a significant (almost 2-fold) thinning of the abdominal aorta wall and a slight decrease in the vessel lumen, compared to the control group ($p<0.05$). We detected changes in the intima-media complex forming a homogeneous structure and thickening in T2DM. Also, other tissue components (adipose and lymphoid tissue, paraganglion) in diabetic animals were increased by 44.6%. Surprisingly, we found a 39-fold decrease in the microRNA-320 expression level in diabetic aortae compared to controls ($p<0.05$). Circulating microRNA-320 is implicated in the angiogenesis process via repressing angiogenic factors (VEGFc, IGF-1, and IGF-1R, FGF) and negatively regulates MMP-13 activity. Thus, its inhibition may correlate with vascular remodelling by activating angiogenesis, cell migration and proliferation in T2DM.

Conclusion: We revealed the eccentric type of abdominal aortic wall remodelling and vascular endothelial dysfunction in T2DM rats. We suggest that microRNA-320 is involved in the pathogenetic mechanism of this dysfunction during T2DM. In addition to its potential prognostic value, microRNA-320 may be a novel biomarker for detecting developing or progressive DM to prevent its complications.

P 06

The Effect of a High-Fat Diet on the Activity of Cardiomyocyte Mitochondria During Hypoxic Preconditioning in Rats

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Background and Aims: Mitochondria serve as a power plant for cardiomyocytes and provide them with ATP to maintain contractile function. Free fatty acids are the preferred energy substrate in the healthy adult heart, whereas other substrates such as glucose and lactate can provide additional fuel sources under a variety of physiological and pathological conditions. Insulin resistance (IR) significantly complicates the course of cardiovascular diseases and is becoming increasingly prevalent. However, mitochondrial function in this condition, especially in its early stages of development, is still not well understood. The aim of the work was to evaluate lipid metabolism and mitochondrial activity in insulin resistance and hypoxic preconditioning in normal and hypertrophied rat hearts.

Materials and Methods: Studies were conducted on mature male Wistar rats and SHR with myocardial hypertrophy. IR was modeled using a high-fat diet (HFD) for 2 weeks and confirmed by an insulin tolerance test. Hypoxic preconditioning (HP) was reproduced by "lifting" in a pressure chamber to a height of 5600 m for 3 hours. After 24 h, the activity of myocardial mitochondria was studied by the Chance polarographic method. Blood lipid composition was determined according to the instructions for the Audit Diagnostics kit. Statistical processing of the obtained data was carried out using 2-way ANOVA with post-hoc analysis by Tukey's method.

Results: Lipid metabolism during HFD was characterized by an increased cholesterol levels in SHR compared to Wistar rats ($F(3.4)=4.6$; $p=0.0074$), and HP contributed to its decrease ($F(3.4)=4.6$; $p=0.0072$). There was no significant difference in TG, LDL, VLDL, and HDL levels, which indicates that the animals did not have significant disturbances in lipid metabolism during the two weeks of HFD.

HP caused an increase in the rate of oxidative phosphorylation (OP) in complex I of the electron transport chain (ETC) with palmitoyl substrate in Wistar rats ($F=10.8$; $p=0.0072$), which indicates a positive adaptive effect of HP. HFD led to a decrease in respiratory control (RC) with the substrate glutamate both in Wistar rats ($F=47.5$; $p<0.0001$) and in SHR ($F=6.2$; $p=0.025$), indicating dysfunction of NAD-dependent enzymes in IR. Additionally, the concomitant effect of HFD+HP caused a decrease in RC in the 1st ETC complex with a glutamate substrate in Wistar rats compared to rats without HP ($F=13.1$; $p=0.0019$), suggesting disturbed protective mechanisms of HP in IR. However, there was an increase in the rate of OP with pyruvic acid substrate in Wistar rats ($F=5.3$; $p=0.044$). Regarding oxidation of the substrates, RCs in SHR were significantly lower compared to Wistar rats, which may indicate insufficient compensatory capacity of hypertrophied hearts.

Conclusion: A high-fat diet for 2 weeks did not cause significant disturbances in lipid metabolism, but was sufficient to induce insulin resistance. At the same time, we observed a dysfunc-

tion of electron transport systems, especially NAD-dependent complexes, and a partial reversal of the protective effects of hypoxic preconditioning in Wistar rats and SHR with insulin resistance. Myocardial hypertrophy also worsened mitochondrial function, suggesting insufficiency of compensatory systems.

Grant/Support Information: I received a grant on the topic "Research works of young scientists of the National Academy of Sciences of Ukraine in 2023-2024".

P 07

Left Ventricular Function and Survival in Ischemic Cardiomyopathy: Implications for Surgical Ventricular Restoration

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Background and Aims: This pilot study evaluates the association of relative wall thickness (RWT) on survival in patients with ischemic cardiomyopathy (ICM). We hypothesize that patients with preserved relative wall thickness (RWT) may be better candidates for surgical ventricular restoration than those with thinner RWT.

Materials and Methods: Echocardiography was performed in 165 consecutive patients (58.2±14.7 years) divided into 2 groups based on RWT values. Group 1 had patients with preserved RWT and Group 2 had patients with reduced RWT.

Results: There were 120 (72.7%) patients with hypertension and 112 (67.8%) patients had diabetes mellitus. Group 1 (preserved RWT) had significantly more patients with hypertension and diabetes. The patients with decreased RWT (Group 2) were in a significantly higher NYHA functional class and had a significantly greater incidence of anterior wall myocardial infarction. The entire cohort was followed over 24 months (Group 1: N=117; Group 2: N=48). The overall all-cause mortality in Group 1 (preserved RWT) was 7 (5.9%) and in Group 2 (reduced RWT) 35 (72.9%; p<0.0001). When re-admission for congestive heart failure was analyzed, Group 2 patients with lower RWT (p<0.0001) had an increased rate of re-admissions for heart failure.

Conclusion: In ischemic cardiomyopathy patients, a lower RWT indicative of 'dilated' LV remodeling was associated with increased mortality and re-admission for heart failure. The RWT may be a simple benchmark of viable or contractile myocardium in ICM. It can be hypothesized that patients with preserved RWT may benefit from surgical ventricular restoration.

P 08

Characteristics of Phenotypes of Patients With Type 2 Diabetes Mellitus and Myocardial Infarction

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Background and Aims: Cardiovascular (CV) diseases are the main cause of death in patients with diabetes mellitus. Different phenotypes may predispose people with diabetes to these diseases. The aim of this study was to identify phenotypic characteristics in patients with type 2 diabetes mellitus (T2DM) and their impact on the development of myocardial infarction (MI).

Materials and Methods: We examined 231 patients with T2DM with and without MI. The mean age of the patients was 61.6±0.9 years, and the mean duration of diabetes was 8.6±0.6 years. The mean HbA1c level was 7.8±0.1%, with a mean systolic blood pressure of 134.9±1.0 and a mean diastolic blood pressure of 82.0±0.7 mm Hg. Depending on the presence or absence of MI, patients with T2DM were divided into 2 groups. Accordingly, there were 59 patients with T2DM and MI and 172 patients without MI. For all patients, BMI, creatinine level, albuminuria and the albumin/creatinine ratio in the urine to diagnose chronic kidney disease (CKD) were calculated. All patients received antidiabetic, antihypertensive, and statin therapy. We analyzed the effect of age, BMI, duration of T2DM, HbA1c, and CKD on the development of MI in patients with T2DM.

Results: Patients with T2DM without MI were significantly younger, their age was 62 [53-69] years, the duration of diabetes was significantly less than 6 [2-11] years compared to patients with T2DM with MI with a mean age of 65 [61-72] years, and the duration of diabetes was 10 [2-17.5] years. BMI was significantly higher in the group of patients with T2DM without MI, at 32 [28.1-36.2] kg/m^2 compared to 30 [28-34.3] kg/m^2 in patients with T2DM with MI. HbA1c did not differ significantly between the groups of patients with T2DM with or without MI. The risk factor of CKD III-IV was present in 21 of 172 patients without a history of MI and in 31 of 59 patients with MI and T2DM. The odds ratio for developing a heart attack in the presence of CKD was 2.24 [1.21-4.13], p=0.008.

Conclusion: We identified an influence of age and duration of diabetes mellitus on the development of MI in patients with T2DM.

P 09

Impact of Bariatric Surgery on Ventricular Ejection Fraction in Patients With Severe Obesity and Type 2 Diabetes

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Background and Aims: Obesity cardiomyopathy is heart failure primarily due to the underlying metabolic disease of severe obesity and is different from ischemic, familial, hypertensive, or diabetic heart failure. The spectrum of obesity cardiomyopathy continues from asymptomatic diastolic dysfunction to end-stage left ventricular (LV) dilation with reduced systolic function. Obesity cardiomyopathy may comprise more than 50% of heart failure diagnoses in severely obese individuals. The risk of heart failure increases by 30–100% in obese individuals. The duration of morbid obesity increases the risk of heart failure development and is positively associated with higher LV mass and impaired diastolic and systolic function. Bariatric surgery significantly improves cardiac geometry, function, and symptoms related to obesity cardiomyopathy. The mechanisms for the improvement of cardiac failure after bariatric surgery are

unknown but likely include the effect of significant body mass reduction on cardiac workload, inflammation, and metabolism as well as positive weight-loss-independent alterations in the entero-cardiac axis.

Materials and Methods: A retrospective study was conducted on male patients with a 6-years history of type 2 diabetes mellitus (T2DM) and a mean age of 38 years who underwent sleeve gastrectomy. The patients were on two different groups of oral antidiabetic agents as well as on spironolactone, torasemide, perindopril, moxonidine, and aspirin. Short-term outcomes of bariatric surgery were examined in patients with obesity and T2DM, and oral antidiabetic drugs, glycosylated hemoglobin (HbA1c) levels, lipid profile, blood pressure, pulse, EF, body mass index were compared prior to surgery and after 6 months.

Results: Bariatric surgery in obese T2DM patients was associated with a significant reduction in amounts of oral hypoglycemic drugs after 3 months and cessation of drugs for heart failure after 6 months. HbA1c level decreased from 10.2% to 7.1% after 6 months. A marked decrease in BMI was documented 6 months after the bariatric surgery, from 41.5 kg/m^2 to 37.8 kg/m^2 and in LVEF from 50% to 56%. Heart rate decreased from 90 to 76, and E/A increased from 0.7 to 1.3. There was a significant decrease of LDL and triglyceride levels and increase of HDL 6 months after surgery. The surgery was also associated with a statistically significant reduction in systolic and diastolic blood pressure.

Conclusion: Bariatric surgery enables a significant reduction in body mass index (BMI) in patients with obesity and T2D. As measured by cardiac ultrasound (CUS), cardiac function may also benefit from bariatric surgery in patients without cardiac history, eventually resulting in improved left ventricular function (LVF) and diminished left ventricle mass (LVM). There was a significant decrease of LDL and triglyceride levels and increase of HDL after 6 months. An improved lipid spectrum after gastric sleeve is associated with an improvement in the cardiovascular risk profile. T2DM remission involves significant weight loss, improved glucose sensitivity and also increased levels of glucagon-like-peptide-1 (GLP-1) and peptide YY along with high rates of postoperative cessation of antidiabetic therapy.

Kidney Disease – Diagnosis and Treatment

P 10

Effect of Orally Administered Insulin vs. Subcutaneous Insulin on Diabetic Nephropathy

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Background and Aims: One of the most significant complications of diabetes is nephropathy. In diabetic patients, chronic hyperglycemia and elevated lipid levels contribute to renal damage by inducing oxidative stress and inflammation. While traditional subcutaneous insulin treatment effectively regulates hyperglycemia, it does not prevent diabetes complications such as diabetic nephropathy. In a previous study, we demonstrated the efficacy of oral insulin encapsulated in gastro-resistant nanoparticles in regulating hyperglycemia. In this study, we aimed to assess the efficacy of orally administered insulin compared to subcutaneous insulin in preventing diabetic nephropathy.

Materials and Methods: Wistar rats were randomly assigned to four groups: Group 1 (control), Group 2 (oral insulin), Group 3 (subcutaneous insulin), and Group 4 (untreated diabetic rats). We compared the effects of these treatments on renal structure (histopathology) and function (urea and creatinine levels).

Results: The results of this study revealed that diabetes had a detrimental effect on renal function and histopathology. Subcutaneous insulin administration failed to ameliorate these alterations, while oral insulin administration demonstrated significant improvements in both renal function and structure.

Conclusion: In conclusion, our study highlights the superior efficacy of oral insulin administration in mitigating renal complications associated with diabetes compared to subcutaneous insulin. These findings underscore the importance of considering the route of insulin administration as a crucial factor in diabetes management to prevent and alleviate diabetic nephropathy.

P 11

The Association Between Diabetic Kidney Disease and Heart Failure in Patients With Type 2 Diabetes Mellitus

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Background and Aims: A growing body of evidence suggests that type 2 diabetes mellitus (T2DM) may contribute to the development and deterioration of heart failure (HF) with either reduced or preserved ejection fraction. On the other hand, diabetic kidney disease (DKD) is associated with a high risk and worse outcomes of HF. However, the relationship between DKD and various types of HF has not been fully investigated. The aim of this study was to assess the association between the signs of DKD and different types of HF in patients with T2DM.

Materials and Methods: Three groups of patients with T2DM were examined. The first group included 20 patients with T2DM and no HF (age 62.6±10.0 years, mean diabetes duration 3.9±2.5 years, HbA1c 7.0±1.2%, creatinine 99.0±19.0 µmol/L, estimated glomerular filtration rate (eGFR) 64.0±16.0 mL/min/1.73m^2, albumin/creatinine ratio (ACR) 25.0±21.0 mg/g, ejection fraction (EF) 58.0±4.0%; data are presented as mean ± SD). The second group included 15 patients with T2DM and HF with reduced EF (HFrEF; age 66.0±7.0 years, mean diabetes duration 4.0±2.0 years, HbA1c 6.9±0.7%, creatinine 122.0±26.0 µmol/L, eGFR 48.0±9.0 mL/min/1.73m^2, ACR 76.0±73.0 mg/g, EF 34.0±10.0%). The third group included 15 patients with T2DM and HF with preserved EF (HFpEF; age 67.0±9.0 years, mean diabetes duration 5.0±2.0 years, HbA1c 7.0±2.0%, creatinine 130.0±52.0 µmol/L, eGFR 48.0±18.0 mL/min/1.73m^2, ACR

115.0±110.0 mg/g, EF 55.0±3.0%). ACR in urine and eGFR were recorded and compared among the three groups using Student's t-test.

Results: We found that the eGFR levels were significantly lower in patients with T2DM and HFpEF compared to patients without HF and patients with HFrEF (48.0±18.0; 64.0±16.0; 48.0±9.0, respectively, p<0.05). Also the ACR was significantly higher in patients with T2DM and HFpEF compared to patients without HF and patients with HFrEF (115.0±110.0; 25.0±21.0; 76.0±73.0, respectively, p<0.05).

Conclusion: We found that the signs of DKD were the most pronounced in the group of patients with T2DM and HFpEF, which could suggest an important role of DKD in the pathogenesis of HFpEF in patients with T2DM.

P 12

Prevalence of Proteinuria in Healthy Algerian Young Adults: a Cross-Sectional Pilot Study

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Background and Aims: Early detection of proteinuria is a cost-effective method of assessing individuals with and without risk factors for chronic renal disease. The prevalence of proteinuria, a potential indicator of renal dysfunction, remains underexplored among healthy Algerian young adults. This cross-sectional pilot study aimed to determine the prevalence of proteinuria in this specific demographic and provide initial insights into its occurrence.

Materials and Methods: A total of 150 young adults were included in the study, and their urine samples were analyzed using morning proteinuria-creatinine ratio (MPCR) and urine dipsticks. Additionally, serum creatinine, fasting blood glucose, urea, and uric acid levels were measured, and glomerular filtration rate was estimated using the 4-parameter Modification of Diet in Renal Disease (MDRD) formula.

Results: We enrolled 150 young adults most of whom were female (57%), young (64%; 18-39 years), and had a professional occupation (52%). The prevalence of proteinuria (14%; 95% confidence interval [CI] 7-19%), hypertension (34%; 95% CI 31-47%), and impaired fasting glucose (14%; 95% CI 9-20%) were high in this study population. Proteinuria was most prevalent among sedentary young subjects with prolonged seated job positions and among those who reported a history of non-steroidal anti-inflammatory drugs (NSAIDs) and corticosteroids use.

Conclusion: The study revealed a high prevalence of proteinuria in Algerian young adults, accentuating the necessity for in-depth exploration of potential underlying factors and the implications for renal health within this specific population.

P 13

Kidney Disease as a Comorbidity in Retinal Phlebothrombosis

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Background and Aims: Retinal phlebothrombosis is the most common cause of retinal vascular pathology after diabetic retinopathy, with potentially life-changing complications. Although recognized in the 19th century, there are still gaps in the understanding of the etiology and pathogenesis of this disorder, necessitating continued research in this area in the light of an ageing global population.

Materials and Methods: The study was a clinic-based case-control study including 408 patients with a clinical diagnosis of central retinal vein occlusion (CRVO) and 566 controls, all aged 21 years and older. A person was considered a control if he/she was free of retinal vascular diseases. Multivariate logistic regression analysis was used to test for potential interactions between the different variables.

Results: The mean values of systolic and diastolic blood pressures and the frequency of hypertension and kidney disease were higher in subjects with CRVO than in subjects without CRVO. Systemic hypertension and kidney disease were significantly associated with CRVO in the screening analyses. After adjusting for age and sex, higher systolic blood pressure (odds ratio (OR) 8.49, 95% confidence interval (CI) 4.81 to 15.13), diastolic blood pressure (OR 9.37; 95% CI 6.34 to 13.89), and proteinuria (OR 2.39; 95% CI 1.01 to 5.60) were significant risk factors for the development of retinal phlebothrombosis. On multivariate analysis, kidney disease (OR 59.4, 95% CI 7.7-455.8) remained an independent significant risk factor for CRVO.

Conclusion: The results of this case-control study provide important evidence for a link between kidney disease and retinal phlebothrombosis, and suggest that kidney disease affects the ocular circulation, supporting the potential value of medical treatment of the underlying medical condition in preventing the occurrence of retinal phlebothrombosis.

Liver diseases – Characteristics and Treatment Strategies

P 14

Liver Fibrosis is Associated With Cardiovascular Disease Burden Amongst Patients With Non-Alcoholic Steatohepatitis: the unCoVer-NASH Longitudinal Cohort Study

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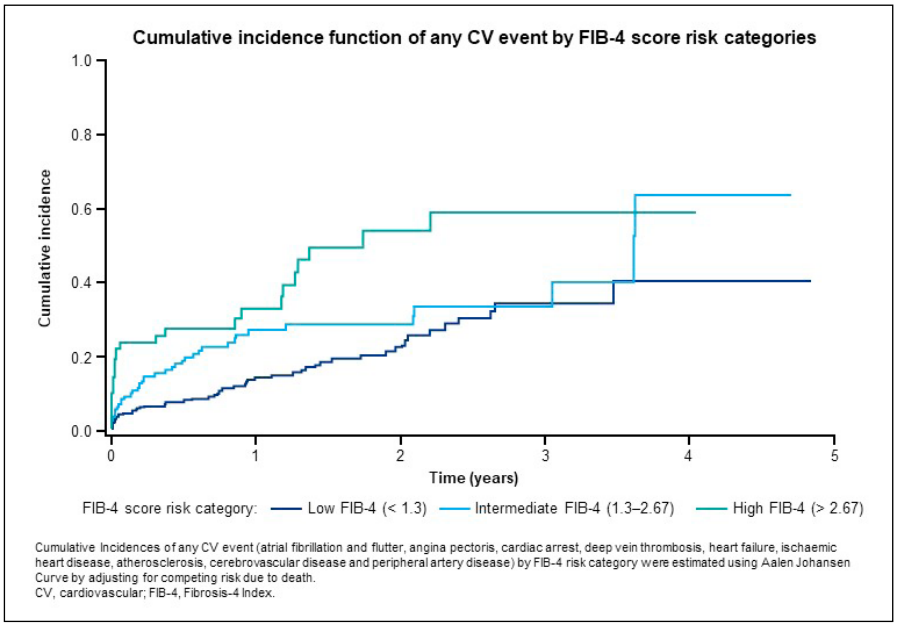
Background and Aims: Cardiovascular (CV) disease (CVD) burden in patients with non-alcoholic steatohepatitis (NASH) is incompletely understood. The unCoVer-NASH longitudinal cohort study assessed baseline prevalence and incidence of CV events in patients with NASH stratified by Fibrosis-4 Index (FIB-4) using real-world de-identified US healthcare data from a federated network (TriNetX).

Materials and Methods: Patients were identified using the International Classification of Diseases code (ICD-10-CM) for NASH from October 2015–June 2022 and required ≥1 FIB-4 measurement(s) calculated from data obtained 180 days prior to, or 30 days after, NASH diagnosis (index date) and ≥12 months of data prior to index



Cumulative Incidences of any CV event (atrial fibrillation and flutter, angina pectoris, cardiac arrest, deep vein thrombosis, heart failure, ischaemic heart disease, atherosclerosis, cerebrovascular disease and peripheral artery disease) by FIB-4 risk category were estimated using Aalen Johansen Curve by adjusting for competing risk due to death.
CV, cardiovascular; FIB-4, Fibrosis-4 Index.

date (baseline period). FIB-4 score categories were low (<1.3), intermediate (1.30–2.67) and high (>2.67). Exclusion criteria included baseline evidence of cirrhosis, viral hepatitis, human immunodeficiency virus, liver-related complications, hepatic and late-stage cancers, and alcohol use disorder. Baseline characteristics, CVD prevalence and risk of CV events(s) during follow-up (index date to end of enrolment, death or study end) were analysed. For CV risk, patients were excluded if they had CV events at baseline. Hazard ratios (HRs) were calculated using Cox proportional hazard models (crude and adjusted for CV risk factors [age, sex, type 2 diabetes (T2D), chronic kidney disease, obesity, hyperlipidaemia, and hypertension]).

Results: Of 717 patients included, 102 had high, 201 had intermediate, and 414 had low FIB-4. Mean age was 60, 57, and 44 years, respectively, T2D prevalence was 50%, 45% and 36%, respectively, and most were female (71%, 54%, and 57%, respectively). The most prevalent CVD phenotypes in all FIB-4 groups (high, intermediate and low FIB-4, respectively) were ischaemic heart disease (18%, 17%, 11%), cerebrovascular disease (16%, 7%, 8%) and heart failure (10%, 9%, 6%). Cumulative incidence of any CV event increased with FIB-4 score (Figure). Incidence rates for any CV event were 24.6, 17.2 and 10.4 per 100 person-years for high, intermediate and low FIB-4, respectively. Crude HRs (95% confidence interval) for high and intermediate vs low FIB-4 were 3.43 (2.21, 5.31); p<0.0001 and 1.53 (1.01, 2.29); p=0.04 and remained significant for high vs low FIB-4 after adjustment for CV risk factors, similar to results for individual CV events.

Conclusion: CVD prevalence and incidence in patients with NASH was associated with baseline FIB-4 score, indicating higher CV burden as fibrosis worsens.

Grant/Support Information: This study was sponsored by Novo Nordisk A/S.

P 15

Safety Profile of Semaglutide in Patients With Metabolic Dysfunction-Associated Steatohepatitis: Post-Hoc Analysis of Data From Two Phase 2 Studies

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Background and Aims: Semaglutide, a glucagon-like peptide-1 receptor analogue approved for treatment of type 2 diabetes (T2D) and overweight or obesity, is being investigated as a potential treatment for patients with non-alcoholic steatohepatitis (NASH). Here, we present safety data from two phase 2 trials of subcutaneous semaglutide in patients with NASH with or without compensated cirrhosis.

Materials and Methods: This was a post-hoc analysis of two trials: NCT02970942 (320 patients with fibrosis stage F1–3 randomized 3:1 to once-daily semaglutide 0.1, 0.2 or 0.4 mg [n=80, 78 and 82] or placebo [n=80] for 72 weeks) and NCT03987451 (71 patients with compensated cirrhosis randomized 2:1 to once-weekly semaglutide 2.4 mg [n=47] or placebo [n=24] for 48 weeks). Patients received diet/lifestyle advice in both trials. Safety data were analyzed descriptively.

Results: In NCT02970942, 18 patients discontinued semaglutide due to adverse events (AEs), with a similar proportion of patients discontinuing in the semaglutide 0.4 mg (5%; 4/82) and placebo arms (5%; 4/80). In NCT03987451, three patients from the semaglutide arm (6.4%) discontinued due to AEs. In both trials, gastrointestinal (GI) disorders were the most common AEs with semaglutide (64–77% vs 33–45% with placebo); most GI AEs with semaglutide were non-serious and mild (55–71%) or moderate (22–36%). The proportion of patients with GI AEs with semaglutide in the NASH trials (63.8–76.9%) was similar to that seen in the weight management program STEP (63.5–82.8%), but higher than in the T2D development program SUSTAIN (34.4–52.0%).

There were no reported cases of acute pancreatitis. Overall, the proportion of patients with hepatic AEs (most frequently reported [in 0–3 patients per arm]: blood bilirubin increased, alanine transaminase increased, hepatic enzyme increased, international normalized ratio increased, transaminases increased, ascites) was 8–11% with semaglutide versus 4–14% with placebo. Few gallbladder-related AEs were reported. Four cholelithiasis events occurred in the semaglutide arms in the two trials; three were serious, of which two led to cholecystitis or cholangitis. All three serious events resolved with cholecystectomy. No cases of drug induced liver injury were reported. Throughout the trials (up to 72 weeks), three patients in the semaglutide group reported malignant neoplasms (breast cancer, endometrial adenocarcinoma and peripheral T-cell lymphoma) vs none with placebo; all events were judged as unlikely to be related to semaglutide.

Conclusion: Data from two phase 2 trials indicate that semaglutide is generally well tolerated in patients with NASH, including those with compensated cirrhosis. No new safety concerns were identified, and the safety profile was similar to that in patients with T2D and overweight/obesity. Data from the ongoing phase 3 trial (NCT04822181) will provide further knowledge about the safety of semaglutide in patients with NASH.

Grant/Support Information: This study was sponsored by Novo Nordisk A/S.

P 16

Semaglutide and Kidney Function: Analysis of Three Randomised Trials in Non-Alcoholic Fatty Liver Disease

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Background and Aims: Chronic kidney disease is a common comorbidity in non-alcoholic fatty liver disease (NAFLD). Semaglutide is being investigated in non-alcoholic steatohepatitis (NASH), a severe form of NAFLD. This post-hoc analysis pooled data from three randomized, placebo-controlled, phase 1 or 2 NAFLD trials to investigate the effects of semaglutide on kidney function.

Materials and Methods: Data from NCT03357380 (semaglutide 0.4 mg once daily [OD] for 72 weeks in NAFLD), NCT02970942 (semaglutide 0.1, 0.2, or 0.4 mg OD for 72 weeks in NASH with fibrosis stage 1–3), and NCT03987451 (semaglutide 2.4 mg once weekly [OW] for 48 weeks in compensated NASH cirrhosis) were included. Placebo arms were pooled, as were the semaglutide 0.4 mg OD arms in NCT03357380 and NCT02970942, and the semaglutide 2.4 mg OW arm in NCT03987451 (NCT02970942 semaglutide 0.1 and 0.2 mg OD arms were excluded). Annual slope of change in estimated glomerular filtration rate (eGFR) was analysed for semaglutide vs placebo. Results were analysed by baseline eGFR: <75 and ≥75 mL/min/1.73m^2.

Results: Baseline characteristics were comparable for semaglutide (n=163) and placebo (n=137). In eGFR <75 mL/min/1.73m^2, semaglutide appeared to have a beneficial effect on eGFR (annual slope semaglutide 5.91 mL/min/1.73m^2 [n=19], placebo –1.53 mL/min/1.73m^2 [n=19]; difference 7.45 mL/min/1.73m^2 95% confidence interval [CI] 3.12, 11.74). In eGFR ≥75 mL/min/1.73m^2 there was no treatment difference (semaglutide n=144, placebo n=118; difference 0.40 mL/min/1.73m^2 95% CI –1.12, 1.92). The test for interaction between the <75 and ≥75 mL/min/1.73m^2 groups was significant (p=0.0026). Semaglutide did not affect annual change in eGFR vs placebo in the overall population (difference 1.19 mL/min/1.73m^2 95% CI –0.24, 2.62). The difference in slopes was primarily driven by the positive slope in the eGFR <75 mL/min/1.73m^2 group.

Conclusion: A potential protective effect of semaglutide on eGFR was seen in patients with NAFLD and eGFR <75 mL/min/1.73m^2. Although this post-hoc analysis had a small sample size, the results support further studies of semaglutide in NAFLD with low eGFR, irrespective of diabetes status.

Grant/Support Information: This study was sponsored by Novo Nordisk A/S.

P 17

Cardiovascular Complications and Disorders of Thyroid Gland Function – Accompanying Conditions in Metabolic Dysfunction-Associated Steatotic Liver Disease

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Background and Aims: Since June 2023, non-alcoholic fatty liver disease (NAFLD) has been called metabolic dysfunction-associated steatotic liver disease (MASLD). This type of MASLD is closely related to obesity, insulin resistance, and cardiovascular disease. To date, it is relevant to find out the pathogenetic chains of the formation of MASLD. Many studies in recent years consider hypothyroidism as a condition specifically associated with MASLD. The purpose of the study was to evaluate the relationship between thyroid gland function and the level of adipokines, the degree of obesity and insulin resistance in patients with MASLD.

Materials and Methods: 162 MASLD patients with excess body weight and obesity were examined, 66 of them with excess body weight (BMI 25-29.9 kg/m^2), 30 with obesity of the first degree (BMI 30-34.9 kg/m^2), and 24 with second degree obesity (BMI 35-39.9 kg/m^2). 43 patients had a normal body weight (BMI 18-24.9 kg/m^2). Among the examined were 96 women (59.3%) and 66 men (40.7%). 22 virtually healthy persons were also enrolled. The age of the examinees ranged from 28 to 67 years, with a median of 55 years (interquartile range Q1-Q3 40 to 61 years). We determined the level of inflammatory mediators (TNF-α, IL-1, IL-6), markers (high-sensitivity C-reactive protein, fibrinogen), and the homeostasis model assessment index (HOMA-IR) to assess insulin resistance (IR) in all patients. An anthropometric examination was carried out, the levels of AST, ALT, GGT, and the degree of liver fibrosis using elastography (FibroScan), ECG and echocardiography were determined. The ratio between the content of adiponectin and leptin was presented in the form of a decimal logarithm (log A/L). Statistical processing of the obtained results was carried out using the STATISTICA 8 program of the company Statsoft using parametric and non-parametric methods of evaluating the obtained results.

Results: Correlation analysis revealed a direct correlation between HOMA-IR and leptin concentration (r=0.8, p=0.0017) and an inverse correlation between HOMA-IR and adiponectin concentration (r=-0.66, p=0.0033) and logarithmic index A/L (r=-0.71, p<0.0001). The decrease in adiponectin concentration with a parallel increase in leptin content increased IR. A comparative analysis of the level of the inflammatory marker hs-CRP in obese patients showed a direct relationship with HOMA-IR (r=0.58, p=0.05), glucose (r=0.44, p=0.0045) and insulin (r=0.66, p=0.0001) in the blood. Positive correlations were found between alanine aminotransferase (ALT) and FT3 (r=0.333, p=0.008), and negative correlations were noted between TSH and BMR (r=-0.731, p<0.010). After

adjusting for all factors, insulin, FT4, and TSH were identified as significant independent risk factors for MASLD in univariate analysis.

Conclusion: Elevated leptin, decreased serum adiponectin, hypothyroidism, and hyperinsulinemia were associated with increased body mass index, insulin resistance, elevated hs-CRP, and increased cardiovascular disease in MASLD patients.

Neurological and Behavioral Aspects

P 18

Diabetic Cardiac Autonomic Neuropathy: Possible Link Between Sleep Disorders, Insulin Resistance, Disturbed Blood Pressure Patterns, and Arterial Stiffness

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Background and Aims: Disrupted circadian rhythms, especially in the case of type 2 diabetes mellitus (T2DM), are associated with a greater risk of cardiac autonomic neuropathy (CAN), all-cause mortality, and cardiovascular mortality. The link between sleep quality, arterial stiffness, and heart rate variability (HRV) is underinvestigated. The aim of this study was to investigate the association between arterial stiffness, insulin resistance (IR), melatonin (MET) levels, and sleep quality.

Materials and Methods: The study involved 138 people with T2DM, with 69 of them having a definite stage of CAN and the other 69 not having CAN. The diagnosis of CAN was based on the results of five standard cardiovascular tests and time- and frequency-domain HRV. Glycated hemoglobin A1c, glucose, immunoreactive insulin levels, and the homeostasis model assessment IR (HOMA-IR) were measured. An enzyme-linked immunosorbent assay (ELISA) measured the amount of MET in saline (nocturnal). Holter-ECG ("The EC-3H" (Labtech, Hungary)) was performed and arterial stiffness parameters were examined using the TensioMed™ arteriograph (monitor BP "ABPM-04" (Meditech, Hungary)). The Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality. Statistics: ANOVA.

Results: The mean PSQI among people with T2DM and CAN was 5.2±2.6. The development of CAN was associated with a decrease in MET levels (13.6±0.9 pg/ml vs. 19.4±1.1 pg/ml, $p<0.001$) and an increase in HOMA-IR (5.96±0.9 vs. 3.4±0.6, $p<0.01$). Persons with poor sleep quality tended to be depressed, evening-types, and obese. The development of CAN was characterized by a significant inhibition of the power in the high frequency (31.4% ($p<0.001$)) and low-frequency bands (19.3%, $p<0.01$). The development of a definite CAN was characterized by increased arterial stiffness parameters. The daily value of pulse wave velocity (PWV) was normal in 19.1%, elevated in 48.5%, and pathological in 32.4% of cases. A disturbed diurnal BP profile was found in 63.7% of the participants, namely the diurnal profiles of "non-dippers" in 44.9% and "night-peakers" in 18.8%. High PWV was correlated with poor sleep quality in a model adjusted for several other lifestyle factors.

Conclusion: Disrupted circadian rhythms, poor sleep quality, and decreased melatonin levels are associated with increased arterial stiffness in patients with T2DM and CAN.

P 19

The Level of Physical Activity and Barriers to Being Physically Active in Patients With Diabetes

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Background and Aims: Undertaking physical activity (PA) requires motivation and time, but can be limited by many factors. Knowledge of these factors will help in choosing the appropriate form of PA. The aim of this study was to assess the level of PA and identify the most common limitations in patients (pts) of working age with diabetes mellitus (DM).

Materials and Methods: Between January and August 2023, pts with DM aged 18-65 years from two diabetes centers were recruited to fill out two questionnaires: the IPAQ-International Physical Activity Questionnaire to assess the level of PA and a second questionnaire to assess demographic/epidemiological circumstances and PA limitations. Respondents were assigned to one of three activity categories: insufficient, sufficient, or high. For variables in ratio scales, basic descriptive statistics were calculated. Frequency tables with percentages were established for nominal variables. The relationships between variables on nominal scales were assessed using the non-parametric Pearson chi-square test and correspondence analysis. In order to determine the correlation between continuous variables, Pearson's r linear correlation coefficients and Spearman's non-parametric correlations were calculated. Their statistical significance was determined using the t-test. The parametric Student's t-test or the non-parametric Mann-Whitney U-test was used to statistically assess the correlation between dichotomous and continuous variables. The parametric ANOVA or the non-parametric Kruskal-Wallis ANOVA was used to assess the statistical correlation between nominal and continuous variables.

Results: We analyzed 81 cases: 37 (45.7%) women, 44 (54.3%) men; mean age: 52.7 (SD: 9.1; women: 53.2; SD: 8.9); mean BMI: 30.5 (SD: 5.4) kg/m^2 (women: 30 (SD: 5.9)). 17.3% lived in a village, 82.7% in a city; 18.5% had primary, 56.8% secondary, and 24.7% higher education; and 72.8% were in a relationship. The most common comorbidities were hypertension (59.2%), gastro-intestinal and musculoskeletal system diseases (each 17.3%), thyroid disease (14.8%), and varicose veins (12.3%). 22% declared to have no other disease. The mean HbA1c available from 35 pts was 7% (SD: 1.2). The insufficient, sufficient and high level of PA rated subjectively and on IPAQ was: 56.8%/14.8%; 35.8%/35.8%; and 4.9%/40.7%, respectively. The correlation for METS and subjective rate of PA was $p=0.005$. 83.9% pts declared willingness to increase their activity. Those of lower level of PA in IPAQ wanted to be more active ($p=0.004$). Pts with venous disease were less ($p=0.02$) but those with thyroid disease were more

active (p=0.04). No other assessed factors had an impact on the desire to be more active. The age of pts who preferred in-home activity was 57.1 years (SD: 3.7) compared to 48.8 years (SD: 9.9) of those who preferred outdoor activity or 51.8 years (SD: 9.9, p=0.02) of those who had no preference. The most common barriers to PA were no time due to work (40.7%), tiredness from everyday duties (29.6%), and no motivation (21%).

Conclusion: More than half of pts had insufficient PA and wanted to change it. The biggest barrier to increasing PA was fatigue from work and everyday duties. Pts who preferred to be active at home tended to be older than those who preferred to be active outdoors.

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P 20

Post-Traumatic Stress Disorder is Associated With Newly Diagnosed Type 2 Diabetes Mellitus

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Background and Aims: Due to the war in Ukraine, the incidence of post-traumatic stress disorder (PTSD) is increasing. PTSD is a significant social problem, as it is a serious risk factor for depression, suicide, and functional dysregulation of internal organs, which can lead to social inadaptation. PTSD has no effective treatment, and the best clinical practices rarely reach an efficacy of 50%. This study aimed to analyze the results of a questionnaire and the clinical and paraclinical manifestations of PTSD.

Materials and Methods: A total of 172 people were evaluated, and 40 patients with PTSD were included in the study. Patients were aged 40–50 years with a BMI of 28.1±0.4 kg/m^2. Glycated hemoglobin A1c, glucose, and immunoreactive insulin levels were measured. The homeostasis model assessment of insulin resistance (HOMA-IR) was calculated as: fasting glucose (mmol/L) x fasting IRI (mcIU/mL)/22.5. "CARDIOLAB" (Kharkiv, Ukraine), a digital ECG device with software to analyze heart rate variability (HRV), was used to record short-term ECGs (5 minutes in the supine position and 6 minutes in the orthostatic test). These were used to figure out the time-domain and frequency-domain parameters of HRV.

Results: According to the obtained data, a high level of anxiety was recorded in 11 respondents (27.5%), an average level in 8 patients (20.0%), a moderate level in 9 people (22.5%), and a minimal level among 12 respondents (30.0%). The pattern of HRV changes shows that the parasympathetic branch of the autonomic nervous system is suppressed (-11.9%, p<0.05), there is low overall spectral power, and the ratio of low-frequency to high-frequency bands goes up (+7.6%, p<0.05). This means that the sympathetic branch of the autonomic nervous system is more dominant in people with PTSD. Patients with PTSD were characterized by higher HOMA-IR indices (5.1±0.7 vs. 2.4±0.6, p<0.01). Eight people with PTSD manifested newly diagnosed type 2 diabetes mellitus (T2DM).

Conclusion: PTSD is characterized by a disturbed HRV, an increased sympathetic response of the autonomic nervous system, insulin resistance parameters, and an increased incidence of T2DM development. The obtained results provide insights into the mechanisms underlying the systemic consequences of PTSD.

P 21

Theoretically Based Randomised Controlled Trials for Cardiac/Diabetes Management

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Background and Aims: Cardiac patients with type 2 diabetes have higher readmission rates than those without diabetes (22% vs 6%), which leads to poor health-related quality of life, and results in increasing economic burden to the health care system. A theoretical framework is crucial to specify the fundamental elements that guide development of an intervention program and appropriate outcomes. Without explicitly knowing the theoretical basis for the intervention elements, it is difficult to replicate a particular intervention, thus reducing fidelity to and effectiveness of the intervention.

Materials and Methods: This paper presents findings from our two randomised controlled trials which demonstrate how a self-efficacy theory can be used in developing the main components of an intervention program [1].

Results: Significant improvements in knowledge, self-efficacy and self-care behaviour in both control and intervention groups were found. Our intervention program incorporating technology showed improved self-efficacy results [2]. The addition of peer support to the use of telehealth in cardiac-diabetes self-management programs demonstrated the improvements in knowledge in intervention group [3].

Our investigations revealed a clinical-effective approach for motivating and supporting patients to successfully take a more active role in their own health care and improve adherence to treatment. In addition to participant health benefits, the effective implementation of these interventions has potential to reduce healthcare service burden for patients with comorbidities.

Conclusion: Result of our studies demonstrate theoretically-based, self-management programs having individual and service impacts. Using this model also ensures greater homogeneity of design which assists when analysing effects of multiple programs.

Grant/Support Information: These trials were supported by a government and university research grants in Australia.

P 22

Children's Screen Addiction in Pandemic Conditions

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Background and Aims: The COVID-19 pandemic in 2019 was accompanied by many new laws and restrictions that led to a peak in the population's attachment to digital devices. The situation was es-

pecially complicated by the transition of the educational process to the online mode and the restriction of social distance. Our study aimed to determine the statistical rate of this problem in our country and its correlation with pediatric and psychological diseases.

Materials and Methods: A retrospective, cohort study was conducted by posting a closed questionnaire on an online platform. The study investigation began on 5/6/2022 and ended on 12/6/2022. The questionnaire consisted of two parts. The first part consisted of general questions, the second consisted of a test from Kimberly Young, a professor of psychology, adapted for children. It determined the attitude, in particular, from lack of interest in the internet to dependence on it. The questionnaire consisted of 20 questions. Possible answers were: never (1 point), rarely (2 points), sometimes (3 points), regularly (4 points) and always (5 points). The maximum score of the mentioned test was 100, where 20-49 points controlled the duration of time spent on the internet. 50-79 is an internet user for an excessive amount of time. 80-100 indicates that the individual is completely addicted to digital devices and cannot imagine life without them (Zalewska et al., 2021). A total of 142 minors were interviewed. 51.3% of them lived in cities, and 48.7% lived in rural areas. We received the following data according to age categories: <10 years 11%, 10-15 years 46.8%, and 15-18 years 42.2%. In addition to the mentioned questionnaire, we studied several clinical cases, which are described below.

Results: Our research revealed that 23 of the 142 respondents were found to be visually impaired. Most of them were between 15-18 years of age, spent more than 4 hours in front of the screen and the sleep interval was 6-8 hours or less than 6 hours.

Obesity is a risk factor for diabetes and cardiovascular diseases. Of the 142 respondents, 63 children confirmed that they gained weight after the pandemic. It turned out that 37 of them live in the city, and 26 live in the countryside. In addition, most children were under the age of 10-15 and the average sleep duration was 6-8 hours. Regarding sports activities, it was revealed that about 60% of 63 children did not go to sports circles and most of them spent more than 3 hours in front of digital screens. One of the complications developed as a result of screen addiction is psychological disorder, namely depression, which manifests itself in different forms in children. The results of the study showed that 142 randomly interviewed children had the following grading indicators according to the Kimberly Young test: 20-49 points (52%, 74 children), 50-79 points (44%, 63 children), and 80-100 points (3%, 5 children).

Conclusion: Our research revealed that many minors in Georgia are dependent on digital devices. According to Kimberly Young's test, 48% of respondents could not control the length of time spent in front of the screen. Visual impairment was found in 16% of the interviewed individuals, and 44.4% gained weight after the pandemic. It was revealed that the parents of 75% of the surveyed children were average and active internet users. Thus, based on our research, it was confirmed that screen addiction can cause both therapeutic (in our case, pediatric) and psychological problems.

Gluco-Metabolic Results and Others

P 23

Antioxidant Properties of PGC-1 in Hypoxic Preconditioning and Insulin Resistance

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Background and Aims: Mitochondrial activity inevitably generates toxic byproducts such as reactive oxygen species (ROS), which can lead to heart failure, atherosclerosis, and diabetes. Excessive production of ROS in the myocardium is the main cause of oxidative stress, resulting in myocardial damage. PGC-1 plays a key role in the regulation of mitochondrial biogenesis and metabolism in the heart, regulating almost all aspects of mitochondrial energy transformation. However, the participation of PGC-1 in the antioxidant protection of cardiomyocytes is still poorly understood in insulin resistance and hypoxic preconditioning (HP).

Materials and Methods: Experiments were performed on adult male Wistar rats that received a high-fat diet (HFD) for 2 weeks. Insulin resistance was confirmed by the insulin tolerance test. HP was modeled by "lifting" in a pressure chamber to a height corresponding to 5600 m for 3 h per day before ischemia/reperfusion (IR), which was reproduced by the Langendorff isolated heart method. The degree of oxidative stress of cardiomyocytes was assessed by biochemical methods based on the content of active products of 2-thiobarbituric acid (TBA-RS) in the mitochondria, and antioxidant protection was assessed by the activity of mitochondrial superoxide dismutase (SOD) and catalase, and the content of reduced glutathione (RG). The level of PGC-1 protein expression was determined by Western blotting and calculated using ImageJ software. Statistical analyses were performed using 2-way ANOVA and correlation analysis.

Results: TBK-RS increased under the influence of HP ($F=60.7$; $p<0.0001$) and HFD, but the simultaneous effect of HFD+HP led to a decrease in this indicator ($F=60.8$; $p<0.0001$). It also decreased when combining the effects of IR and HP ($F=6.2$; $p=0.031$), IR and HFD ($F=25.3$; $p=0.0005$), and IR and HFD+HP ($F=60.1$; $p<0.0001$). RG levels increased with HFD without IR ($F=366.1$; $p<0.0001$), HP or HFD+HP with IR ($F=953.4$; $p<0.0001$ and $F=1.1$; $p=0.31$, respectively) and HP or HFD+HP without IR ($F=1054$; $p<0.0001$ and $F=659.5$; $p<0.0001$, respectively), which indicates a broad activity under the influence of various damaging processes. When IR is combined with HFD, RG levels decrease ($F=10.2$; $p=0.0071$). The activity of SOD decreases with HP ($F=37.8$; $p=0.0003$) and HFD+HP ($F=0.89$; $p=0.37$) in rats that were not exposed to IR, and with HFD ($F=2.9$; $p=0.15$) and HP ($F=2.5$; $p=0.17$) in animals with IR, which may indicate the effective operation of other protective systems or, on the contrary, at elevated levels of TBC-RS, an incomplete balance of pro- and antioxidant processes in the mitochondria of cardiomyocytes. Catalase activity increases with

HP (F=9.8; p=0.020) and HFD (F=8.6; p=0.027), as well as with a combination of IR with HFD (F=140.9; p<0.0001) and HFD+HP (F=53.9; p<0.0001), which reflects the active participation of this enzyme in protective processes.

In the correlation analysis, it was established that an increase in TBK-RS levels was positively correlated with the level of this protein without IR (r=0.80) and negatively with IR (r=-0.71). RG content increased with increasing PGC-1 expression both with and without IR (r=0.42 and r=0.57, respectively). Catalase activity increased with the level of protein expression (r=0.90) and decreased with IR (r=-0.72). Correlation was observed mainly with protein expression in the right ventricle of the heart. It can be assumed that PGC-1 contributed to the activation of antioxidant systems such as RG and catalase.

Conclusion: The combination of several injury factors led to the involvement of a greater number of antioxidant systems of rat cardiomyocytes. The most active were reduced glutathione and catalase. We observed an imbalance of pro- and antioxidant processes in mitochondria. Accumulation of TBC-RS increased PGC-1 protein expression, but this effect was lost when combined with ischemia/reperfusion. PGC-1 has also been shown to have cardioprotective properties by activating reduced glutathione and catalase.

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P 24

Evaluating the Effect of Fecal Microbiota Transplantation on Glycemic Status: a Systematic Review and Meta-Analysis

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Background and Aims: Glucose disorders are on the rise along with their predisposing factors and adverse outcomes. As gut microbiota dysbiosis plays an important role in the development of this disease, fecal microbiota transplantation (FMT), which alters the bacterial composition of the gut, has been hypothesized to improve glycemic indices. We performed a systematic review and meta-analysis to evaluate the impact of FMT on the glycemic status and gut microbiota composition of patients with at least one cardiometabolic problem.

Materials and Methods: This is a systematic review and meta-analysis in which eligible studies were searched through PubMed, Web of Science, and Scopus databases until December 2022. The Cochrane risk of bias tool was used to assess the methodological accuracy of the studies, and the random effects model was used to conduct the meta-analysis.

Results: Eighteen studies were included in our systematic review, of which eleven were included in the meta-analysis. When we considered all eleven studies, insulin showed a significant decrease of 24.7 pmol/l (WMD: -24.8, 95% CI: -48.7, -0.8) after short-term (less than 12 weeks) follow-up. FBS decreased by 0.03 mmol/l (WMD: -0.03, 95% CI: -0.2, 0.1) and HbA1c increased by 1.5 mmol/mol Hb (WMD: 1.5, 95% CI: -2.3, 5.3), but were not statistically significant. Three articles evaluated patients with type 2 diabetes mellitus, among them one article reported significant decrease in fasting blood glucose and hemoglobin A1c, but the other two articles did not find significant changes in glycemic parameters.

Conclusion: Although there are some articles demonstrating beneficial effects of FMT on glycemic indices, we found only its significant effect on insulin. In addition, the information regarding the appropriate donor and the best method to induce FMT is not yet well studied, which should be considered along with means to prevent potential harm.

P 25

Influence of Glucose Levels in Patients With Diabetes Before and During Infection on the Severity of COVID-19 and the Development of Complications

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Background and Aims: The COVID-19 pandemic has dramatically changed the lives of people around the world. Diabetes is one of the most important causes for mortality in COVID-19 patients. The aim of this study was to investigate the influence of glucose levels before and during the COVID-19 pandemic on the course of infection in patients with diabetes.

Materials and Methods: A retrospective analytical cross-sectional study using a special questionnaire was selected as the research design. The survey was mailed to 278 physicians – 38 endocrinologists, 159 family doctors, and other doctors who worked with infected patients. According to the respondents, 83.4% of the patients with diabetes were infected with SARS-CoV-2. Of these, 45.9% were referred and/or hospitalized, 18.7% were treated in a COVID hotel, 12.6% were treated at home, and 63.5% of the reported patients with diabetes died of COVID-19. The course of infection was mild requiring no oxygen in 13.9% of patients with diabetes, moderate requiring oxygen in 70%, and severe requiring intubation in 16.1%.

Results: We compared the course of infection in patients with diabetes. When blood glucose was within 140 mg/dl to 250 mg/dl during the course of infection, 41.1% had moderate, 6.1% had severe and 7.5% had mild infection. When blood glucose was above 250 mg, 17.3% had moderate and 5.1% severe infection; the difference was statistically significant (p<0.001). Regarding acute complications, hyperglycemia was developed in 5.5% of patients with mild infection, 42.0% of moderately and 8.7% of severely infected people. Hypoglycemia was found in patients with moderate infection severity more often (11.9%) than in those with severe infection (4.1%; χ^2=23.2, p=0.001).

The distribution of the frequency of subsequent complications of diabetes according to the severity of infection was as follows: in patients with mild infection, hypertensive crisis developed in 3.6%, stroke in 2.7%, myocardial infarction in 1.8%, and heart failure in 0.5%. 13.8% of patients with mod-

erate severity had no complications, 21.9% had hypertensive crisis, 10.7% had myocardial infarction, 11.2% had renal failure, and 6.3% had heart failure. In "severe" patients, the incidence of myocardial infarction was 4.5%, hypertensive crisis and renal failure were 3.6% (χ^2=26.4, p=0.003). The frequency of death of patients with COVID was higher during the course of moderate severity of infection and amounted to 46.6% compared to 13.9% of patients with severe infection, but a fairly high percentage was observed in patients with mild course and amounted to 4.5% (χ^2=30.6, p<0.001).

Conclusion: The study showed that during the COVID-19 pandemic, the fluctuation of the glycemic profile in the range of 140-250 mg/dl and above 250 mg/dl determined the course of moderate severity with the need for oxygen during infection, which is associated with a high risk of developing acute and chronic complications of diabetes and increases mortality due to COVID.

Grant/Support Information: The research (PHDF-22-2943) has been supported by Shota Rustaveli National Science Foundation (SRNSF).

P 26

Impact of Nutritional and Metabolic Status During Pregnancy on Maternal-Fetal Outcomes: an Algerian Cohort Study

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Background and Aims: Pregnancy represents a critical period during which maternal nutritional and metabolic status can exert profound effects on both maternal well-being and fetal growth. Emerging evidence underscores the need to comprehensively evaluate these factors and their implications for perinatal outcomes. This cohort study aims to explore the complex interplay between maternal nutritional and metabolic parameters and their impact on maternal-fetal outcomes.

Materials and Methods: A cohort of 445 pregnant women was enrolled, recruited from the Department of Gynecology-Obstetrics, IBN ROCHD University Hospital, Annaba, during the period from November 2018 to March 2021. Their nutritional and metabolic profiles were assessed during different trimesters, involving the following examinations: blood glucose, triglycerides, total cholesterol, blood creatinine, urea, amylase, AST, ALT, CRP, uric acid, LDH, direct and total bilirubin, albumin, pre-albumin, total proteins, serum iron, ferritin, serum calcium, and blood phosphorus levels. Sociodemographic, anthropometric, and clinical data were collected using an information sheet. Fetal outcomes including birth weight, gestational age, and incidence of adverse perinatal events were monitored. Statistical analyses were conducted to establish associations between maternal nutritional/metabolic markers and maternal-fetal outcomes.

Results: Among the pregnant women in this cohort, the most frequently encountered metabolic abnormalities during pregnancy were as follows: iron-deficiency anemia (40%), gestational diabetes (35%), and preeclampsia (30%). Additionally, the assessment of nutritional status revealed that 57.5% exhibited hypoproteinemia, while 67% displayed hypoalbuminemia. Remarkably, 45% of the pregnant women had pre-albumin levels below 30 mg/l, indicating a state of malnutrition.

Conclusion: The findings of this cohort study highlight the critical role of maternal nutritional and metabolic status during pregnancy in affecting maternal-fetal outcomes. The observed associations between maternal BMI, glucose levels, anemia, malnutrition, and perinatal outcomes emphasize the need for targeted interventions to optimize maternal health during pregnancy.

P 27

The Association of Hypertension With Body Mass Index and Waist Circumference in Older Adults

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Background and Aims: Hypertension is a global health challenge, and multiple factors seem to contribute to its development. The purpose of this study was to investigate the association between body mass index (BMI) and waist circumference (WC) with hypertension in a sample of Iranian elderlies.

Materials and Methods: This is a cross-sectional study in which data from the first wave of Birjand Longitudinal Aging Study (BLAS) was used. We included 1364 individuals and measured their anthrobometric indices, hypertension (HTN), and systolic and diastolic blood pressure (SBP & DBP). Then, analyses were conducted using binary logistic regression and receiver-operating characteristic curves (AUC) analysis.

Results: 59.3% of the population were overweight/obese according to BMI. The best predictors of HTN were WC and BMI (AUC=0.6 and 0.62, respectively). Being overweight/obese based on BMI as a binary variable, increased the odds ratio of HTN by 0.99, and for WC, HTN increased 2.24 times. One unit rise in BMI as a quantitative variable increased the odds ratio of HTN by 0.08, and for WC, HTN increased by 0.04 after adjusting for confounders.

Conclusion: The result of this study show that BMI and WC can be used as predictors of HTN, and WC as a binary variable is highly associated with HTN.

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