

Abstract Highlights

The following highlights spotlight several standout abstracts presented at the 58th European Association for the Study of Diabetes (EASD) Annual Meeting, covering topics such as the effects of extended overnight fasting, the incidence of congenital heart defects in the offspring of females diagnosed with pregestational diabetes, and telehealth for the metabolic control of Type 1 diabetes.

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Combination of Dietary Weight Loss and Exercise May Improve β -Cell Function

β -CELL function may be improved by dietary weight loss in patients with Type 2 diabetes (TD2); however, it is unclear whether exercise in addition to diet therapy can play a role. This new research was presented at the EASD Annual Meeting 2022 in Stockholm, Sweden.

The new study assessed β -cell function at physiological conditions, using a mixed meal tolerance test, and at supraphysiological conditions, using the hyperglycaemic clamp. The researchers randomised 82 participants, who had T2D for less than 7 years and were overweight or obese, to 16 weeks of either standard care; dietary intervention; dietary intervention with exercise three times a week; or dietary intervention with exercise six times a week. The dietary intervention aimed to reach 25% calorie deficit and weight loss, while the exercise interventions consisted of resistance and aerobic training.

Primary outcome was the change in β -cell function, which was assessed with clamp-derived late-phase disposition index. The secondary outcomes were clamp- and mixed meal-derived changes in β -cell function, insulin sensitivity from baseline to 16-week follow-up, and insulin secretion. Adherence to the diet (25–30% energy reduction) and exercise (>85%) was similar across all groups. Five participants were lost to follow-up.

All three intervention groups showed an improvement in late-phase disposition index. The mean difference from standard care was 58% for diet only, 105% for moderate volume exercise, and 137% for high volume exercise. While the high-volume exercise group showed a larger improvement compared to the diet group, there was no difference

between moderate and high volume exercise, or between moderate exercise and diet. Furthermore, there was no difference in glucose-stimulated insulin secretion between the groups. The improvements in sensitivity were similar to those observed for the disposition index, and the observations during the meal test confirmed the hyperglycaemic clamp findings.

"The combination of exercise and dietary weight loss improves β -cell function more than diet alone or standard care."

Authors concluded that the combination of exercise and dietary weight loss improves β -cell function more than diet alone or standard care. There was no significant difference between moderate and high-volume exercise, and it was mainly improved insulin sensitivity that led to the improvement in β -cell function. ●





Extended Overnight Fasting and its Effects

OVERNIGHT fasting is said to improve metabolic health; however, the mechanisms underlying these effects are inconclusive. Hepatic glycogen fluctuations, which can induce higher overnight fat oxidation, could be related to these mechanisms. For individuals with a high amount of ectopic fat accumulation, such as those with non-alcoholic fatty liver disease (NAFLD), increasing fat oxidation could be a therapeutic strategy.

Researchers from the Netherlands investigated whether prolonging overnight fasting from 9.5 to 16.0 hours reduces overnight hepatic glycogen and improves substrate metabolism in patients with NAFLD, when the total daily energy intake remains the same. The researchers recruited 11 patients with NAFLD and 10 age-matched, healthy controls. Food intake was restricted to 14.5 or 8.0 hours, recreating an overnight fasting period of 9.5 and 16.0 hours, respectively.

After a standardised lunch at 2:00 p.m. and at 6:30 a.m. the next morning, hepatic glycogen was measured in both groups with ^{13}C -MRS, with nocturnal substrate oxidation being measured with a whole-room indirect calorimetry (respiratory chamber). Metabolic response to a meal was measured through a meal test, which was performed after the overnight fast with an indirect calorimetry (ventilated hood).

Plasma metabolites were also assessed through drawing blood.

While prolonging overnight fasting led to lower nocturnal carbohydrate oxidation in all participants, hepatic glycogen levels were not affected. The researchers also noted higher fat oxidation in the patients with NAFLD and the control group. Regardless of the fasting time, individuals with NAFLD had a higher respiratory exchange ratio than the control group. However, the area under the curve for triglycerides was higher in those fasting for 16.0 hours than the 9.5-hour fast in both the NAFLD and control groups.

While no other post-prandial differences were noted during either of the fasting periods, these results suggest that extending overnight fasting can improve nocturnal substrate oxidation. The researchers concluded that changes in hepatic glycogen depletion did not mediate these improvements. ●

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Congenital Heart Defects in Children Following Pregestational Diabetes

A NATIONWIDE study carried out in France aimed to estimate the incidence of congenital heart defects (CHD) in the offspring of females diagnosed with pregestational diabetes. CHDs are the most common type of congenital issues in the children of this patient group.

The national French Medical Information System Program in Medicine, Surgery, and Obstetrics (PSMI-MCO) database was used to compare females with Type 1 diabetes (T1D) and Type 2 diabetes (T2D) to the general population. The secondary aim of the study was to investigate whether the association between CHD and maternal diabetes varied with diabetes types.

The study used a logistic model to estimate the risk factors for maternal-fetal prognostic indicators in females diagnosed with T1D and T2D. In the control population, this model was adjusted according to maternal age, prematurity, gender of the newborn, mode of delivery, and whether the infant was small or large for gestational age.

A large cohort of over 6 million mother and infant pairs was included in the study, using data recorded between 2012–2020. The rate of congenital malformations was found to be 6.2% in the control group (8.0 per 1,000 births), 8.0% in females with T1D (29.6 per 1,000 births), and 8.4% in females with T2D (27.4 per 1,000 births).

The risk of CHD was found to be 2.07 times higher with T1D (95% confidence interval: 1.91–2.24; $p < 0.001$), and 2.20 times higher with T2D (95% confidence interval: 1.99–2.44; $p < 0.001$). Caesarean section, premature birth, and small and large gestational age were associated with a higher risk of an infant having CHD.

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The study concluded that a diagnosis of pregestational diabetes is a risk factor in the development of CHD in infants. It also found that there was no significant difference in cases of CHD regarding the type of diabetes the mother has. The final recommendation was that the modifiable risk factor of metabolic control could be harnessed in order to reduce the risk of CHD in infants. ●



Multimorbidity and Mortality in Patients with Type 1 Diabetes

PATIENTS with Type 1 diabetes (T1D) are at an increased risk of multimorbidity, which is associated with a decreased quality of life and an increased mortality. Patients with T1D are often affected by other chronic conditions at a young age, and these conditions lead to an increased risk of depression and severe hypoglycaemic episodes. Current data on multimorbidity, the coexistence of two or more chronic conditions or diseases, in patients with T1D is scarce, which is why a research team at the University of Helsinki, Finland, decided to study the prevalence of multimorbidity, and its impact on mortality in patients with T1D.

The study included 4,069 adult participants with T1D and analysed data from clinical records, registers, and questionnaires. Researchers defined the accumulation of diseases based on the number of chronic conditions at baseline from a list of 32 conditions, which were grouped into three subcategories: autoimmune disorders, vascular comorbidities, and other conditions.

At baseline, the prevalence of multimorbidity was 60.4% (n=2,458) and it increased with age; it was 31.1% in those under 30 years, 59.8% in those from 30–40 years, 74.8% in the 40–50 age group, 84.3% in the 50–60 age group, and 93.2% in those older than 60 years. Notably, there was no difference between males and females. Autoimmune disorders were observed in 12.7%, while vascular comorbidities were observed in 49.2%, and other conditions in 19.8%. The median follow-up was of 16.7 years, during which 784 (19.3%) participants died. Mortality was significantly increased by multimorbidity.

The study concluded that prevalence of multimorbidity is high and increases with age in patients with T1D. Due to vascular comorbidities and other chronic conditions, mortality is also increased; however, autoimmune disorders do not increase the risk. ●

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Telehealth as Effective as In-Person Care for Metabolic Control of Type 1 Diabetes

INCREASING evidence shows that telehealth (TH) is not inferior to in-person care for metabolic control of patients with Type 1 diabetes (T1D). The usage of TH has advantages such as decreasing time spent travelling and increasing accessibility, allowing for more frequent visits. This has been especially important since the COVID-19 pandemic, and in rural zones.

A new study aimed to compare the changes in HbA1c between in-person visits and TH after 6 months. Secondary objectives were comparison of hypoglycaemic events, glucometric parameters, direct and indirect costs, EsDQoL questionnaire, and patient satisfaction. The researchers carried out a randomised, controlled study. The 55 participants were split into two groups: a conventional group (29 subjects), submitted to standard in-person visits in an outpatient clinic, lasting 30 minutes, at baseline, 3 and 6 months; and a TH group (26 subjects), submitted to a teleconsultation of 10 minutes in months 1, 2, 3, and 4, as well as an in-person visit at baseline and 6 months.

After 6 months, the mean change in HbA1c was -0.05% in the TH group, versus 0.2% in the conventional group. The conventional group spent 93.2 minutes $+12.0$ with the endocrinologist, versus 102.9 minutes $+7.6$ in the TH group. Furthermore, 46% of participants preferred a combination of both in-person and TH visits. The researchers did not detect any severe hypoglycaemia.

Authors concluded that TH is comparable to in-person visits when it comes to HbA1c levels, with a significant improvement in EsDQoL and time in range. While TH implies increased costs for the national care system, it leads to a decrease in direct and indirect costs for the patients. More research is needed to determine efficient timings of visits, as well as long-term cost analysis. ●



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SARS-CoV-2 Increases Risk of Type 1 Diabetes in Children and Adolescents?

NEW research has revealed that there could be an increased risk of developing Type 1 diabetes (T1D) following severe acute respiratory syndrome virus 2 (SARS-CoV-2) infection in children and adolescents.

A research team, led by Hanne Løvdal Gulseth, Norwegian Institute of Public Health, Norway, analysed data obtained from the Norwegian preparedness register for 1,202,174 children and adolescents to evaluate the link between SARS-CoV-2 infection and risk of developing T1D in response to several case reports indicative of the link between the two. The individuals enrolled were followed-up from the COVID-19 pandemic outset on 1st March 2020 until the first of either a diagnosis of T1D, their 18th birthday, death, or the 22nd of March 2022.

The study used a full population cohort and a test-negative design and utilised Cox regression analysis, with SARS-CoV-2 PCR positivity as a time-dependent exposure to estimate unadjusted hazard ratios (HR) and HRs adjusted for age, geographical area, non-Nordic country of origin, sex, and socio-economic status. Separate analyses were performed if a diagnosis of new onset T1D was made

≤30 days or ≥31 days following SARS-CoV-2 infection.

Of the 1,202,174 children and adolescents enrolled, 424,354 experienced SARS-CoV-2 infection, with 990 incident diagnoses of T1D. The full population cohort adjusted HR for T1D diagnosis ≥31 days following SARS-CoV-2 infection was 1.57 (95% confidence interval: 1.06–2.33) compared 1.63 (95% confidence interval: 1.08–2.47) for the test-negative cohort.

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These results highlight the association between SARS-CoV-2 infection and the increased risk of developing T1D in children and adolescents. The researchers recommend that further studies are required and should include assessment of different SARS-CoV-2 variants, as well as longer-term follow-up. ●