Diabesity Digest

Diabesity Digest summarises recent key papers published in the area of coexistent diabetes and obesity – diabesity. To compile the digest a PubMed search was performed for the 3 months ending August 2015 using a range of search terms relating to type 2 diabetes, obesity and diabesity. Articles have been chosen on the basis of their potential interest to healthcare professionals involved in the care of people with diabesity. The articles were rated according to readability, applicability to practice, and originality.

Type ? diabetes

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Diabetes used to be so simple. There was only type 1 and type 2 – now there's surgically induced; gestational and drug-induced iatrogenic diabetes; and maturity-onset diabetes of the young (MODY); latent autoimmune diabetes (LADA); and schizophrenia-associated diabetes – things have become complicated. Dementia experts have described Alzheimer's disease as type 3 diabetes (de la Monte and Wands, 2008) without realising that we're almost in double figures already without their help. This column has discussed "double diabetes" (Haslam, 2103) following on from a DCCT (Diabetes Control and Complications Trial) follow-up study (Purnell et al, 2013), which demonstrated that people with type 1 diabetes are having metabolic syndrome thrust upon them because of insulin-related weight gain, the subsequent insulin resistance rendering insulin control for diabetes management more troublesome. Obesity has been linked with type 1 diabetes before (Verbeeten et al, 2011), prompting further calls for improved obesity prevention measures. Many commentators are convinced that type 1 and type 2 diabetes are merely different manifestations of the same condition, separated by speed of onset alone. Terry Wilkin (2012) recently declared, as part of his "accelerator hypothesis", that "It seems likely that type 1 and type 2 diabetes lie at different points of the same spectrum, separated by the misunderstanding that one belongs to childhood and the other to adulthood. The spectrum is that of tempo – the rate at which beta-cell function is lost over time. A combination of beta-cell up-regulation (insulin demand, largely determined by obesity) and the genetically determined immune response to it ('autoimmunity') determines tempo, ranging from slow to fast with every variant in between". Now the boundaries are becoming more and more blurred. Two articles published over recent months have further stirred the muck. In a study of over 1.25 million people, the paper by Hussen et al (summarised on the next page) reached a completely counter-intuitive conclusion: in their own words – "The risk of type 1 diabetes was increased in offspring of parents with any type of diabetes regardless of parental ethnicity. High first trimester maternal BMI was associated with increased risk of type 1 diabetes only in offspring of parents without diabetes". So type 2 diabetes in parents and high BMI in mothers increase the risk of type 1 diabetes in kids! This phenomenon requires a lot more research before we can entirely embrace the concept of type 1 and type 2 being so closely linked, but evidence such as this is certainly thought provoking.

The second paper, a French study by Robert et al, summarised on the next page, is a very small study, which observed the effect of intentional weight loss by bariatric surgery in people with type 1 diabetes compared to those with type 2 diabetes. It demonstrates an improvement rate of 90% (but no remission), improvement of insulin resistance, reduction in the number of units of insulin required, and a high rate of remission of hypertension and dyslipidaemia in the type 1 diabetes group. Therefore, there is a considerable reduction in the burden of the components of metabolic syndrome – partly caused by the anabolic effects of insulin – and a reduction in the amount of insulin, which caused the problem in the first place.

So whether or not we believe Terry Wilkin's theory that the same illness affects us in different ways, it is notable at least that type 1 diabetes and type 2 diabetes are mentioned in the same breath with regard to aetiology and treatment. ■

de la Monte SM, Wands JR (2008) Alzheimer's disease is type 3 diabetes – evidence reviewed. *J Diabetes Sci Technol* **2**: 1101–13

Haslam D (2013) DCCT/EDIC update: What are the real causes of diabetes complications? *Diabesity in Practice* **2**: 78–9

Purnell JQ, Zinman B, Brunzell JD et al (2013) The effect of excess weight gain with intensive diabetes mellitus treatment on cardiovascular disease risk factors and atherosclerosis in type 1 diabetes mellitus: results from the Diabetes Control and Complications Trial/Epidemiology of Diabetes Interventions and Complications Study (DCCT/EDIC) study. *Circulation* **127**: 180–7

Verbeeten KC, Elks CE, Daneman D, Ong KK (2011) Association between childhood obesity and subsequent Type 1 diabetes: a systematic review and meta-analysis. *Diabet Med* **28**: 10–8

Wilkin TJ (2012) The convergence of type 1 and type 2 diabetes in childhood: the accelerator hypothesis. *Pediatr Diabetes* **13**: 334–9

Diabetologia

Increased T1D rate due to maternal obesity?

Readability	✓✓✓
Applicability to practice	✓✓✓
Originality	✓✓✓✓

1. The aim of the study was to investigate if maternal overweight/obesity during the first trimester of pregnancy increases this risk of T1D in the offspring.
2. The Swedish cohort comprised 1 263 358 children born between 1992 and 2004. They were followed from birth until T1D diagnosis, death, emigration or the end of follow-up in 2009. By the end of the follow-up, 5771 children were diagnosed with T1D.
3. The risk of T1D was increased in the offspring of parents who had any type of diabetes regardless of parental ethnicity. However, the highest risk of T1D was noted in offspring of parents with T1D.
4. High first trimester maternal BMI was associated with an increased risk of T1D only in offspring of parents without diabetes (incidence rate ratio 1.33; 95% confidence interval, 1.20–1.48).
5. The authors conclude that T1D in children whose parents do not have diabetes may be partially explained by an increasing prevalence of maternal overweight/obesity during pregnancy.

Hussen HI, Persson M, Moradi T (2015) Maternal overweight and obesity are associated with increased risk of type 1 diabetes in offspring of parents without diabetes regardless of ethnicity. *Diabetologia* **58**: 1664–73

Surg Obes Relat Dis

Metabolic surgery for morbidly obese people with T1D?

Readability	✓✓✓✓
Applicability to practice	✓✓
Originality	✓✓✓✓

1. Morbidly obese people with T1D underwent a biliopancreatic diversion (BPD) or a sleeve gastrectomy. The cohort were matched with obese people with T2D who required insulin and who also received a form of bariatric surgery to compare outcomes and effectiveness.
2. Prospectively collected data from 10 people with T1D and 20 people with T2D was analysed retrospectively.
3. Mean post-surgery follow-up was 55.1 months and there was a trend for mean excess BMI loss to be greater in the T1D group than the T2D group (P=0.14). There was no remission of T1D after surgery, but there was a 90% rate of improvement. Remission rates of hypertension and dyslipidaemia were similar for the T1D and T2D groups.
4. Insulin requirements were significantly reduced in both groups after surgery. Metabolic surgery may improve insulin sensitivity and other comorbidities for morbidly obese people with T1D who are at high cardiovascular risk.

Robert M, Belanger P, Hould FS et al (2015) Should metabolic surgery be offered in morbidly obese patients with type 1 diabetes? *Surg Obes Relat Dis* **11**: 798–805

Diabetologia

Body changes after GD influence T2D incidence

Readability	✓✓✓
Applicability to practice	✓✓✓
Originality	✓✓✓

1. The authors aimed to examine the effect of adiposity and weight changes after pregnancy in women who have experienced gestational diabetes (GD) to measure their influence on the long-term risk of developing T2D.
2. The American study cohort included 1695 women who had incident GD over a 10-year period and they were followed for 7 more years. Over the total 18 years of follow-up, there were 259 incident cases of T2D.
3. After analysis, the adjusted hazard ratios (HR) of T2D associated with each 1 kg/m^2 increase in BMI were 1.16 (95% confidence interval [CI], 1.12–1.19) for baseline BMI (when GD was first reported) and 1.16 (95% CI, 1.13–1.20) for most recent BMI.
4. In regards to weight, each 5 kg increase in weight gain after GD was associated with a 27% higher risk of T2D.
5. Women who had a baseline BMI ≥30 kg/m^2 and gained ≥5 kg after GD had the highest risk of developing T2D (HR, 43.19; 95% CI, 13.60–137.11) compared to women who had a baseline BMI <25 kg/m^2 and gained <5 kg after GD.

Bao W, Yeung E, Tobias DK et al (2013) Long-term risk of type 2 diabetes mellitus in relation to BMI and weight change among women with a history of gestational diabetes mellits: a prospective cohort study. *Diabetologia* **58**: 1212–9

"Metabolic surgery may improve insulin sensitivity and other comorbidities for morbidly obese people with T1D who are at high cardiovascular risk."

Diabetes Care

Obesity and T2D rates: Pima Indians

Readability	✓✓✓
Applicability to practice	✓✓
Originality	✓✓✓

1. Mexican Pima Indians are believed to have a high genetic predisposition to T2D. The prevalences of T2D and obesity in Pima Indians and their non-Pima neighbours were compared over a 15-year period when they transitioned from a traditional to a more modern lifestyle. A modernisation index was assigned, which represented the number of modern technological features an individual had access to.
2. In total, 259 Mexican Pimas and 251 non-Pimas were tested for T2D, impaired fasting glucose, impaired glucose tolerance and obesity in 1995 and 2010 using the same methods.
3. Age-adjusted prevalence of obesity increased significantly in both ethnic groups and in men and women. Diabetes prevalence increased in Pima women and non-Pima women, but remained unchanged in Pima men and increased in non-Pima men.
4. While the prevalence of obesity has increased across all groups, the prevalence of T2D has increased in non-Pima men and to a lesser extent in both female groups. These changes can be linked with the changes in environment to a more modernised lifestyle.

Esparza-Romero J, Valencia ME, Urquidez-Romero R et al (2015) Environmentally driven increases in type 2 diabetes and obesity in Pima Indians and Non-Pimas in Mexico over a 15-year period: the Maycoba Project. *Diabetes Care* **38**: 2075–82