Mini Review

Journal of Diabetes Medication & Care

Diabetes mellitus: Classification of Diabetes

Abstract

Different classes of diabetes mellitus, type 1, type 2, gestational diabetes and other types of diabetes mellitus are compared in terms of diagnostic criteria, etiology and genetics. The molecular genetics of diabetes received extensive attention in recent years by many prominent investigators and research groups in the biomedical field. A large array of mutations and single nucleotide polymorphisms in genes that play a role in the various steps and pathways involved in glucose metabolism and the development, control and function of pancreatic cells at various levels are reviewed. The major advances in the molecular understanding of diabetes in relation to the different types of diabetes in comparison to the previous understanding in this field are briefly reviewed here. Despite the accumulation of extensive data at the molecular and cellular levels, the mechanism of diabetes development and complications are still not fully understood. Definitely, more extensive research is needed in this field that will eventually reflect on the ultimate objective to improve diagnoses, therapy and minimize the chance of chronic complications development.

Dr. Kriyaza Ahamd*

Department of Medicine and Care, University of JLU, Iran

*Author for correspondence:

kriyaza.a@gmail.com

Received: 02-Dec-2022, Manuscript No JDMC-22-83482; **Editor assigned:** 05-Dec-2022, PreQC No. JDMC-22-83482; **Reviewed:** 19- Dec-2022, QC No. JDMC-22-83482; **Revised:** 26-Dec-2022, Manuscript No. JDMC-22-83482 (R); **Published:** 31-Dec-2022 DOI: 10.37532/jdmc.2022.5(6).94-96

Introduction

Diabetes mellitus is a metabolic disorder characterized by hyperglycemia (high blood sugar) resulting from defects in the production or response to insulin. The disease has two main forms: type 1 and type 2. Type 1 disease is characterized by diminished insulin production resulting from the loss of beta cells in the pancreatic islets of Langerhans, in most cases caused by immune-mediated cell destruction. Disease management entails administration of insulin in combination with careful blood glucose monitoring. Type 2 diabetes patients, mostly over 50 years old (although more and more young people develop type 2 diabetes) with additional health problems (eg, cardiovascular disease), in the early stages are often characterized by high plasmatic insulin concentration. In the fasting state, the basal insulin secretion rate increases as a function of the progressive insulin resistance [1]. Treatment of patients with type 2 diabetes mellitus includes education, evaluation for micro- and macro vascular complications, attempts to achieve near normoglycemia, minimization of cardiovascular and other long-term risk factors, and avoidance of drugs that can exacerbate abnormalities of insulin or lipid metabolism. All of these treatments and goals need to be tempered based on individual factors, such as age, life expectancy, and comorbidities. Although studies of bariatric surgery, aggressive insulin therapy, and behavioural interventions to achieve weight loss have noted remissions of type 2 diabetes mellitus that may last several years, the majority of patients with type 2 diabetes require continuous treatment in order to maintain target glycaemia[2]. Treatments to improve glycaemic management work by increasing insulin availability (either through direct insulin administration or through agents that promote insulin secretion), improving sensitivity to insulin, delaying the delivery and absorption of carbohydrate from the gastrointestinal tract, increasing urinary glucose excretion, or a combination of these approaches. For patients with overweight, obesity, or a metabolically adverse pattern of adipose tissue distribution, body weight management should be considered as a therapeutic target in addition to glycaemi [3].

Classification of Diabetes

Although classification of diabetes is important and has implications for the treatment strategies, this is not an easy task and many patients do not easily fit into a single class especially younger adults and 10% of those initially classified may require revision. The classical classification of diabetes as proposed by the American Diabetes Association

(ADA) in 1997 as type 1, type 2, other types, and gestational diabetes mellitus (GDM) is still the most accepted classification and adopted by ADA [4]. Wilkin proposed the accelerator hypothesis that argues "type 1 and type 2 diabetes are the same disorder of insulin resistance set against different genetic backgrounds". The difference between the two types relies on the tempo, the faster tempo reflecting the more susceptible genotype and earlier presentation in which obesity, and therefore, insulin resistance, is the center of the hypothesis. Other predictors of type 1 diabetes include increased height growth velocity and impaired glucose sensitivity of β cells. The implications of increased free radicals, oxidative stress, and many metabolic stressors in the development, pathogenesis and complications of diabetes mellitus are very strong and well documented despite the inconsistency of the clinical trials using antioxidants in the treatment regimens of diabetes. The female hormone 17-β estradiol acting through the estrogen receptor-α (ER-α) is essential for the development and preservation of pancreatic β cell function since it was clearly demonstrated that induced oxidative stress leads to β-cell destruction in ER-α knockout mouse. The ER-α receptor activity protects pancreatic islets against glucolipotoxicity and therefore prevents β-cell dysfunction [5-8].

Result

This paper presents the work performed in the context of the REACTION project focusing on the development of a health care service platform able to support diabetes management in different healthcare regimes, through clinical applications, such as monitoring of vital signs, feedback provision to the point of care, integrative risk assessment, and event and alarm handling [9,10]. While moving towards the full implementation of the platform, three major areas of research and development have been identified and consequently approached: the first one is related to the glucose sensor technology and wear ability, the second is related to the platform architecture, and the third to the implementation of the end-user services. The Glucose Management System, already developed within the REACTION project, is able to monitor a range of parameters from various sources including glucose levels, nutritional intakes, administered drugs, and patient's insulin sensitivity, offering decision support for insulin dosing to professional caregivers on a mobile tablet platform that fulfils the need of the users and supports medical workflow procedures in compliance with the Medical Device Directive requirements.

Different types of diabetes

There are some types of diabetes

Type 1 diabetes: This type is an autoimmune disease, meaning your body attacks itself. In this case, the insulin-producing cells in your pancreas are destroyed. Up to 10% of people who have diabetes have Type 1. It's usually diagnosed in children and young adults (but can develop at any age). It was once better known as "juvenile" diabetes. People with Type 1 diabetes need to take insulin every day. This is why it is also called insulin-dependent diabetes.

Type 2 diabetes: With this type, your body either doesn't make enough insulin or your body's cells don't respond normally to the insulin. This is the most common type of diabetes. Up to 95% of people with diabetes have Type 2. It usually occurs in middle-aged and older people. Other common names for Type 2 include adult-onset diabetes and insulin-resistant diabetes. Your parents or grandparents may have called it "having a touch of sugar."

Prediabetes: This type is the stage before Type 2 diabetes. Your blood glucose levels are higher than normal but not high enough to be officially diagnosed with Type 2 diabetes.

Gestational diabetes: This type develops in some women during their pregnancy. Gestational diabetes usually goes away after pregnancy. However, if you have gestational diabetes you're at higher risk of developing Type 2 diabetes later on in life.

Conclusion

Diabetes mellitus is the epidemic of the century and without effective diagnostic methods at an early stage, diabetes will continue to rise. This review focuses on the types of diabetes and the effective diagnostic methods and criteria to be used for diagnosis of diabetes and prediabetes. Evidently, diabetes is a complex disease with a large pool of genes that are involved in its development. The precise identification of the genetic bases of

diabetes potentially provides an essential tool to improve diagnoses, therapy (more towards individualized patient targeted therapy) and better effective genetic counseling. Furthermore, our advanced knowledge of the association between medical genetics and the chronic complications of diabetes will provide an additional advantage to delay or eradicate these complications that impose an immense pressure on patient's quality of life and the significantly rising cost of health-care services. Type 1 diabetes, Type 2 diabetes, Prediabetes.

Acknowledgement

None

Conflict of Interest

None

References

1. Schellenberg ES, Dryden DM, Vandermeer B *et al*. Lifestyle interventions for patients with and at risk for type 2 diabetes: a systematic review and meta-analysis. *Ann Intern Med.* 159: 543-551 (2013).
2. Schwingshackl L, Hoffmann G, Lampousi AM, *et al*. Food groups and risk of type 2 diabetes mellitus: a systematic review and meta-analysis of prospective studies. *Eur J Epidemiol* 32: 363-375 (2017).
3. Reynolds A, Mann J, Cummings J *et al.* Carbohydrate quality and human health: a series of systematic reviews and meta-analyses. *Lancet.* 393: 434-445 (2019).
4. Mannucci E, Giaccari A, Gallo M *et al.* Self-management in patients with type 2 diabetes: Group-based versus individual education *a systematic review with meta-analysis of randomized trails. Nutr Metab Cardiovasc Dis.* 32: 330-336 (2022).
5. Emdin CA, Rahimi K, Callender T, *et al.* Blood pressure lowering in type 2 diabetes: a systematic review and meta-analysis. *JAMA.* 313: 603-615 (2015).
6. Webster MW (2011) Clinical practice and implications of recent diabetes trials. *Curr Opin Cardiol.* 26: 288-93 (2011).
7. Makam AN, Nguyen OK An Evidence-Based Medicine Approach to Antihyperglycemic Therapy in Diabetes Mellitus to Overcome Overtreatment. *Circulation.* 135: 180-195 (2017).
8. Davis N, Forbes B, Wylie-Rosett J *et al.* Nutritional strategies in type 2 diabetes mellitus. *Mt Sinai J Med* 76: 257-268 (2009).
9. Feinman RD, Pogozelski WK, Astrup A *et al.* Dietary carbohydrate restriction as the first approach in diabetes management: critical review and evidence base. *Nutrition.* 31: 1-13 (2015).
10. Muley A, Fernandez R, Ellwood L *et al.* Effect of tree nuts on glycaemic outcomes in adults with type 2 diabetes mellitus: a systematic review. *JBI Evidence Synthesis.* 19: 966-1002 (2021).