COMMENTARY

NUTRITION IN TYPE II DIABETES MELLITUS – THE ELEPHANT IN THE ROOM

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Type II (insulin resistant) diabetes was revealed within 10 years of the discovery of insulin[1]. It occurred generally in older people who were obese. Although not generally producing ketosis, it was liable to the same complications as type I insulin dependent diabetes mellitus although at a slower rate but still inexorably progressive[2]. Often high doses of insulin were required and although glucose control was imperfect – hypoglycemia was produced. In such older patients the warning signs of sympathetic response were often absent. For this reason, the nutritional management was very similar to type I diabetes and has continued to the present time i.e. a daily nutrition of 25–30 kcals / kg of adjusted body weight with modification of energetic components, although many obese patients in Pakistan prefer 30 kcals / kg leading to a daily caloric intake of over 2000 in these usually overweight patients[3]. Nutritional advice is usually dietetic and based on taste particularly[4].

Medical treatment of hypoglycemia has advanced rapidly with the introduction of many agents. Metformin is the initial drug of choice but added drugs are often metabolic activators and have health advantages although there is a limited effect on blood sugar[5]. Consequently, with a blood sugar control (glycemic) approach to diabetes management, insulin is soon resorted to in many patients. Lifestyle balances caloric intake with physical activity and exercise but this all too often plays a minor part of management in the present day world, although exercise costs nothing and is virtually always effective, particularly in high energetic flux. With people living longer, health is important and both obesity and insulin are associated with increased deaths and disabilities in type II diabetes[5]. Metformin, because of its action on the canonical AMPK (AMP-activated protein kinase) metabolic pathway, is now being tested against healthy ageing[5-7]. Surprisingly, glucagon and its receptors have not been considered in the diabetogenic process[8,9]. Same is the case with the other newest hypoglycemic agents, which despite of a modest effect on blood glucose level also have positive effects on the weight, cardiovascular disease, and even cancer.

The elephant in the room is therefore clearly over nutrition in type II diabetes. The nutritional approach is significantly influenced by custom and taste with many food fads and "magic bullets" being applied serially. Gluten sensitivity has however turned out to have a place although not strictly related to diabetes.

The young science of nutrition has had a major impact on the disease. Bariatric surgery is now recognized as having a major role in the management of type II diabetes by all the international diabetic groups. It should be remembered that the effects of bariatric surgery diminishes to some extent with time as a mechanism. In a long-running Swedish study[10], the effects last for up to 15 years although the cause was not treated. It has also been shown recently and convincingly that a rigid lifestyle intervention focused largely on diet is more effective than medical management in both normalizations of type II diabetes as well as metabolic control[11,12].

A study has shown that a diet of 800–1200 kcalories with suitable micronutrient addition can reverse insulin resistance and cure type II diabetes[13]. This is possible due to a better knowledge of the metabolic transition in the present day worldwide obesity

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epidemic which is now affecting younger and younger subjects[12]. Perhaps the most significant discovery has been the insulin-producing β-cells of the pancreas do not apoptosis and die under the metabolic bombardment of glucose triglycerides and insulin, they simply revert to the mesenchymal precursor and are hence capable of having function re-established nutritionally at least early in the disease process[13].

Patients often get despondent about the difficulty in losing weight by dieting and preventing early regain of lost weight. This is easily explained by the ontogeny of human weight. It is so difficult to lose weight and keep it off and why there is no homeostatic mechanism for an upper limit to the amount of fat deposition? Logically our forefathers that survived to beget present-day humans were favored for surviving famine, drought and other catastrophes if they could store fat for stressful times[14]. The opposite would apply to the present day with plentiful nutrition albeit of an unhealthy type and limited physical activity. This also explains the difficulty in culturing insulin producing β-cells without going through α-cells with glucagon likely the canonical pathway with SNP's (single nucleotide polymorphisms) to deposit fat and few to metabolize fat (e.g. adiponectin)[15].

The importance of ontogeny is further stressed by intrauterine programming[16,17]. In times of social catastrophe such as Holland in world war II, the separation of the Indian subcontinent in 1947–48 and the famine in China during Chairman Mao's Initiative in 1959–61. All of these lead to the later development of hypertension and diabetes as a genomic intrauterine adaptation which persists and continues for generations implying that even today Pakistanis have to put more effort into preventing diabetes than other more favored nations.

The 21st century with the Sustainable Development Goals is moving inexorably towards prevention of noninfectious diseases such as diabetes. This starts long before the currently favored first 1000 days[18] and is directly countered by the international food industry. It is now realized worldwide like tobacco that the food industry will have to be more directly regulated by governments. And above all, the general public and dieticians will have to relearn the correct nutrition in the modern world as food is the most powerful drug for good or bad with the average person eating some 20 tons of food in their lifetime, particularly as our way of life, is contrary to a long healthy life[19,20].

It is clear that the management of type II diabetes followed an incorrect path due to the circumstances of its discovery. To correct this would require a massive correction at the population and individual level of nutrition and lifestyle dominated management as well as exploring the glucagon receptor[21,22] rather than glucose and insulin concentration[23.]

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CONFLICT OF INTEREST
The author declares no conflict of interest.

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