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Historical account of diabetes - An Overview

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Abstract
History is the precursor of research and development; it also generates hypothesis. Diabetes is oldest disease since antiquity. Apollonius of Memphis possibly coined the word diabetes around 250 BC. In 1552 B.C., when Hesy-Ra, an Egyptian physician, reported repeated urination as a symptom of a mystery disease that also triggered emaciation, the first recorded mention of diabetes symptoms was. Ancient healers have noticed during this time that ants tended to be drawn to the urine of people who had this disease. Diabetes is first described in English in a medical text written about 1425 in the form of a diabetes. In Unani Medicine, Diabetes is described under the caption of Amraz-e-Gurda. According to Unani Pathophysiology, diabetes arises due to four etiological factors Viz, Zoaf-e-Gura, Sue Mizaje Gurada Haar, Sue Mizaje Gurda Barid, and Ittesa-e-Majari Gurda. There many effective drugs described in Unani Medicine for the management of Diabetes, which are safe and effective.

Keywords: Diabetes, Kidney Disease, Amraz-e-Gurda, Unani Medicine, Zalaq-ul-Kuliya, Dolabya

Introduction

Diabetes in light of Unani system of medicine: The term Ziabetus is a Greek word, means "to run through or siphon", in which there is, excessive thirst, even with excessive drinking of water, followed by micturition immediately [1]. It is characterized by hyperglycaemia, glycosuria, increased appetite, and gradual loss of body weight [2]. All philosophers and hakims have described this ailment in their valuable writings, as a disease of kidney [3, 4].

Different Names of disease: From Hippocrates to present era so many names are generated from innovation, e.g. Attasa, Barkarya, Dawwarah, Dawariya, Dayabeetus [Some Tabibs, use 'Dal' instead of 'Zal'(for Ziabetus Shakri)], Dayasqoomas,, Dolabya, IllateBarkarya, Istisqa-e-Anmas, Kasrat-ul-baul, Moattasha, Prameh (Sanskrit word), Qaramees, Silsul-ul baul, Zalaq-ul-Kuliya, Zayasqoomas [5-7].

According to Unani physicians and *tabibs*, as patient consumes water, it runs through the body and passes out through urination just like zalaqul-Am'a where the diet taken in any form excretes out soon after through the stomach and intestine. This excretion of water in form of urine is like a cycle so that it is called as Dolabyah (Dol+Aab=Container to pull water in well), Barkarya, Dawariyah, Zalaq-ul-kulya [8]. Due to similarity in clinical features, Ziabetus Shakri has been co-related with Diabetes Mellitus [9, 10].

Diabetes in light of modern medicine: It was derived from the Greek verb diabaínein (dia- "across, apart," and bainein to walk, stand). The verb diabeinein meant, "To stride, walk, or stand with legs asunder"; hence, its derivative diabētēs meant "one that straddles," or specifically "a compass, siphon." The sense "siphon" gave rise to the use of diabētēs as the name for a disease involving the discharge of excessive amount of urine [11, 12].

Diabetes mellitus is a serious chronic metabolic disorder that having impact on the health, quality of life, and life expectancy, and on the health care system of patients [13]. There are two major categories of DM: Type 1 Diabetes Mellitus (formerly known as IDDM) and Type 2 Diabetes Mellitus (formerly known as NIDDM). The overall prevalence of diabetes is approximately six percent of the population, of which 90 percent is type 2 [1, 2, 4]. Type 2 diabetes represents a syndrome with disordered metabolism of carbohydrate and fat, prominently hyperglycaemia (FPGL >126 mg/ dL, or HbA1c > 6.9%). In most patients with type 2 diabetes, the onset is in adulthood, most commonly in obese people over 40 years of age [2]. Besides Hypertension, hyperlipidaemia, hyperinsulinemia, and atherosclerosis are also associated with diabetes [3]. Now a day the accepted concept of Diabetes mellitus is that, D.M

[15]. Comprises a group of common metabolic disorders that share the phenotype of hyperglycemia. Several distend types of DM exist and are caused by reduced insulin secretion, decreased glucose usage and increased glucose production, complex interaction of genetics, environmental factors and life style choice [16].

Diabetes in the light of Unani & other systems of medicines: Our ancestors knew diabetes Mellitus since the age of ancient times, where symptoms of Ziabetus shakri were described. Many references are found in Indian, Egyptian and Greek medicines [5, 6].

Ancient Egypt (Misri) was the first sphere of influence, known to have an extensive study of Ziabetus shakri and to have left behind written records. It is proved by the innovation of the Eber's Papyrus (of 1550BC), which contains detailed descriptions of various diseases including a polyuric state resembling Ziabetus shakri Shakri [1, 3].

Ancient Indian physician's Charak and Sushrut Samhitas, written in 600B.C. and 400B.C. respectively, described diabetes mellitus [1].

The father of Medicine Buqrat (Hippocrate 460-377BC) did not specifically mentioned Ziabetus shakri in his writings, but there are records in the Buqrat's writing that consist of the sign and symptoms of Ziabetus shakri [5, 6].

In 1st century AD, Arsyatoos (Aritaeus 81-138AD) provided the first precise account of the symptoms of Ziabetus Shakri. He was the first who used the term Diabetes (Ziabetus Shakri) in link with this ailment [12].

Jalinoos (Galen 131-201 AD), the most influential medical author of all time, discussed Ziabetus Shakri as a rare, in a number of his books, since he had seen only two cases. He refers to the ailments as "Diarrhea Urinosa (Diarrhea of urine)" and "Diasakos (the thirsty Disease)" [3, 7, 10].

However, the association of polyuria with sweet tasting urine was first reported in Sanskrit literature dating from 5th to 6th century AD at the time of Sushruta and Vaghbhatta and Charaka. In this system, diabetes is described by the name Madhumeh, which comprises a variety of Prameh, (a group of twenty anomalies of urine excretion) [3]. During the same era Chinese and Japanese physicians also described Ziabetus shakri which apparently attracted the dogs [4].

During the period of Galen (2nd and 3rd century AD), Greek medicine transcended to its apotheosis but after Paul Aegina (615-690AD), Greek medicine descended to a stage of inactivity and then Traveled to Arab world, through school of Alexandria (Askandriya) and Jundishahpur of Persia, where it was preserved and nurtured [2]. In this connection, the first book was Firdaus-ul-Hikmat by AbulHasan Ali bin Rabban Tabri in 9th century AD but the writer had not mentioned any such disease, which resemble to diabetes. Zakariya Razi (Rhazes 865-925 AD), after translocation of Tibb in Arabic, was the first, used the term Ziabetus Shakri in his most popular compilation Al Hawi-fi-Tibb [5]. Following Razi, Majoosi (930-994 AD) mentioned about the disease in his famous book Kamil-ul-sina'a [6].

During the 9th and 11th centuries AD, the two prominent physicians of this era, who contributed to the knowledge of Ziabetus Shakri were Ibn-e-Seena (960-1037 AD) and Musa Bin Maymoon (1135-1214 AD) [7, 8]. Ibn-e-Sina described accurately the clinical features of the disease. While on the other hand Musa bin Maymoon claimed to have seen more than 20 cases [1, 2].

In mid of 11th century AD, Ismail Jurjani in his book Zakheera-e-Khwarezam Shahi mentioned causes of Ziabetus Shakri [6]. In the far end of 11th century, Ibn-e-Zohar (1091-1164 AD) has described the disease in his book Kitab-ut-Taiseer [10-15]. No further progress was made in the understanding of Ziabetus Shakri until the 16th century AD, when the Swiss physician Von Hohenhein (Paracelsus) reported that urine of Ziabetus Shakri patient contained an abnormal substance which remains as a white powder after evaporation, he concluded that the substance was salt and that diabetes was due to the deposition of salt in the kidneys causing thirst of the kidneys and polyuria [16-20].

Surprisingly, there is no reference in Diabetes in Chinese and Persian medicine as could be ascertained from available reference books. Diabetes is first recorded in English, in a medical text written around 1425. For more than 2000 years Ziabetus Shakri was believed to be a disease of kidney [35, 47, 49-52] but this misty era got cleared in 1674 AD by Thomas Willis (1621-1675AD) added the word mellitus, from the Latin meaning "honey", a reference to the sweet taste of the urine. He stated that the diabetes is the disease of blood not the kidney and sweetness first appears in the blood and later in the urine [19-23].

In 1682 A.D. John Conrada Bruner (1653-1727 AD) partially removed the pancreas of the dog and observed that the dog drinking plenty amount of water and passes urine frequently and gets very thirsty [20-24].

In 1776AD, Matthew Dobson found an easily breakable, smells like brown sugar, whitish granulated substance, in evaporated urine of a diabetic patient. He confirmed that the sweet taste was because of an excess of a kind of sugar in the urine and blood of people with diabetes [1-4].

In 1784AD**,** Mathew Dobson of America verified the observation of Willis and confirmed that, sweetness of urine in DM is due to sugar, which is excreted from blood stream [1].

In 1798AD John Rollo a surgeon of royal artillery first reused the term mellitus to distinguish it from other polyuric conditions in which glycosuria is absent he also described the cataract and acetone ODOR in breath in advance cases of diabetes [25].

In 1822 AD, Adolf Kussmaul a German, described a peculiar type of breathing associated with diabetic acidosis now named after him "Kussmaul's air hunger" [2, 26].

In 1857 AD**,** Claude Bernard (1813-1878 A.D) described starch like substance, glycogen, was a product of glucose metabolism in the liver and propounded the concept that the altered glucose metabolism in the liver is the cause of diabetes [2, 27].

In 1869 AD, Paul Langerhans a medical student described in dissertation about an unknown small group of duct less cells in pancreas [1, 28].

In 1890AD, the discovery of a role for the pancreas in Diabetes is generally ascribed to Joseph Von Mering and Oskar Minkowski, who in 1889 found that dogs, with removed pancreas developed all the signs and symptoms of Diabetes and died shortly afterwards [1-5, 29].

In 1893 AD after 24 years of Langerhans's experiment, Edovard Laguesse coined the term "Islets of Langerhan's" to these small groups of duct less cells in the Honor of Langerhans and suggested that these cells might be the endocrine tissue of pancreas [2, 30].

In 1901 AD, Eugene Undsay Opie's study on Diabetes Mellitus revealed that any lesion or injury of the pancreas, which mainly destroys the Islets of Langerhans, causes Diabetes Mellitus [31, 32].

In 1909 AD, Jean de Meyer bestowed the term insulin to the secretion of the Islets of Langerhans [1, 33].

In 1910AD, Sir Edward Albert Sharpey-Schafer suggested that people with diabetes were deficient in a single chemical that was normally produced by the pancreas. He proposed calling this substance insulin, from the Latin insula, meaning island, in reference to the insulin-producing islets of Langerhans in the pancreas [2, 34].

The endocrine role of the pancreas in metabolism, and indeed the existence of insulin, was not further clarified until 1921, when Sir Frederick Grant Banting and Charles Herbert Best repeated the work of Von Mering and Minkowski, and went further to demonstrate they could reverse induced diabetes in dogs by giving them an extract from the pancreatic islets of Langerhans of healthy dogs [3, 35].

The first patient was treated in 1922; Banting, Best, and colleagues (especially the chemist Collip) went on to purify the hormone insulin from bovine pancreases at the University of Toronto-insulin injections. For this, Banting and laboratory director MacLeod received the Nobel Prize in Physiology or Medicine in 1923 [1-4].

In 1926 JJ Abel, crystallized the insulin in two chain of 51 amino acid linked by disulphide bridge, who later on in 1955 got noble prize for his work [1, 2, 36].

In **1936**, the distinction between type 1 and type 2 Diabetes was first clearly made by Sir Harold Percival Himsworth, and published in January [2, 37].

Other landmark discoveries include

- **1942:** Identification of the first of the sulfonylureas [1, 3].
- **1956:** Biguanide – was introduced [2, 4].
- Reintroduction of the use of Biguanides for Type 2 diabetes in the late 1950s. The initial Phenformin was withdrawn worldwide (in the U.S. in 1977) due to its potential for sometimes-fatal lactic acidosis and metformin was first marketed in France in 1979, but not until 1994 in the US [36, 37].
- The radioimmunoassay for insulin, as discovered by Rosalyn Yalow and Solomon Berson (gaining Yalow the 1977 Nobel Prize in Physiology or Medicine) [2, 38].
- In 1980, U.S. biotech company Genentech developed human insulin. The insulin is isolated from genetically altered bacteria (the bacteria contain the human gene for synthesizing human insulin), which produce large quantities of insulin. Scientists then purify the insulin and distribute it to pharmacies for use by diabetes patients [3, 39].
- **In 1983:** Human insulin was prepared by cloning of DNA in E. coli by Frank and Chance. This has now been to practical use in the treatment of Diabetes Mellitus [1-4, 39].
- **In 1988:** Dr Gerald Reaven's identification of the constellation of symptoms now called metabolic syndrome [2, 40].
- Identification of the first thiazolidinedione as an effective insulin sensitizer during the 1990s.
- **1990:** Human Insulin prepared by Genetic Engineering [29].
- **1990:** Use of Glitazones – Pioglitazones and Rosiglita zones [29].

Statements and description of Ziabetus Shakri in Unani medicine: It is difficult to produce a single complete definition for Diabetes Mellitus because of the different Etiologies and varying combinations [5-10].

- Ziabetus Shakari is a disease in which the consumed water is passed out through the kidney immediately after intake by the patient. It is similar to Zalaq-ul-Meda walama` in which the food passed rapidly through the stomach and intestine without proper digestion [5-8, 41, 42].
- Ziabetus Shakari is a disease in which the thirst is prolonged and even when the patient consumes plenty of water there is no enough irrigation, and the patient passes the urine mediately and not enough metabolic change take place in the consume water [6].
- Ziabetus Shakri is a disease in which water excretes out after a while in the same form in which it was consume, without any alternation in it [37, 41].
- **In Ayurveda:** Sushruta, Vaghbhatta, and Charaka described the urine of Madhumeh patients, having a taste like honey, being sticky to touch, and yellow white in color and strongly attract to the ants [12-41]. In Sushrut Samhita, the descriptions contain Ziabetus shakri of two types' congenital or late onset [2, 39, 42].

Statements and description of diabetes mellitus in modern medicine

- As per the WHO, Diabetes Mellitus is a heterogeneous metabolic disorders characterized by common feature of chronic hyperglycaemia with disturbance of Carbohydrate, fat and protein metabolism [2, 44].
- Diabetes mellitus is a serious chronic metabolic disorder that has a significant impact on the health, quality of life, and life expectancy of patients, as well as on the health care system [2, 3, 12].
- Diabetes Mellitus comprises a group of common metabolic disorders that share the phenol type of hyperglycaemia. Type 2 Diabetes Mellitus is a heterogeneous group of disorders usually characterized by variable degree of insulin resistance, impaired insulin secretion, and increased glucose production. Distinct genetic and metabolic defects in insulin action and / or secretion give rise to the common phenol type of hyperglycaemia in type 2 Diabetes Mellitus [2, 4, 38, 44].
- Diabetes Mellitus is a syndrome with disordered metabolism and in appropriate hyperglycaemia either, due to, a deficiency of insulin secretion or combination of insulin resistance and inadequate insulin secretion to compensate [4, 44, 45]. Type 1 diabetes is due to pancreatic islets B cell destruction predominantly by an autoimmune process, and these patients are prone to ketoacidosis. Type 2 diabetes is the most prevalent form and results from insulin resistance with a defect in compensatory insulin secretion [32, 46-48].
- Diabetes Mellitus is a chronic disorder of carbohydrate, protein, and fat metabolism. A defective or deficient insulin secretory response, which translates in to impaired carbohydrate (glucose) use, is a characteristic feature of Diabetes Mellitus, as is the resultant hypoglycaemia [49].
- Diabetes Mellitus is a chronic disorder characterized by the impaired metabolism of Glucose and other energy-yielding fuels as well as by the late development of vascular and neuropathic complications [50]. Diabetes comprises a group of disorders involving distinct pathogenic mechanisms, for which hyperglycaemia is the common denominator [51]. Regardless of its cause, the disease is associated with a common Hormonal defect,

namely, Insulin deficiency, which may be absolute or relative in the context of coexisting insulin resistance [52] Insufficient Insulin effect plays a primary role in the metabolic derangements linked to Diabetes; hyperglycaemia in turn plays an important role in disease related complications [53].

- Type 2 diabetes represents a syndrome with disordered metabolism of carbohydrate and fat. The most prominent clinical feature is hyperglycaemia (FBS > 126 mg/ dl, or HbA1c > 6.9%) [54].
- Diabetes Mellitus is a chronic disorder of carbohydrate metabolism characterized by hyperglycaemia and glycosuria and resulting from in adequate production or utilization of insulin. It is classically associated with symptoms, excessive thirst, increased urine volume and if sever enough, weight loss [55].
- Diabetes Mellitus is a common metabolic and endocrine disorder, characterized by chronic hyperglycaemia and disturbance of carbohydrate, fat and protein metabolism associated with absolute or relative deficiency of insulin secretion and or insulin action [3, 55].

Conclusion

The Ancient Egyptians identified clinical features similar to diabetes mellitus 3000 years ago. Aratus of Cappadocia (81-133AD) coined the term "diabetes" in the first place. The tradition of early diabetes accounts highlights the importance of studying and documenting medical conditions as human development progresses. Early physicians used everything they could to seek knowledge, expertise and diagnosis of diabetes with polyuria, tiredness, polydipsia, and polyphagia.

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