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A FEW FACTS OF HISTORICAL INTEREST RELATING TO DIABETES MELLITUS

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Diabetes mellitus is a disease of world wide distribution. It has been estimated that there are about 200 million diabetics in the world. Like obesity and thyroid disorder it is the third most common metabolic disorder. Knowledge of diabetes is important because of its high prevalence. This paper deals with the gradual evolution of the knowledge of Diabetes mellitus from Vedic to modern period.*

It is a known fact that Vedas are the oldest literature of civilization. *Atharvaveda*, latest among the Vedas, is very close to medical science. It shows rudiment of knowledge about diabetes. There are various opinions about the date of Vedic literature. Winternitz (1962) considered its beginning in 2000 or 2500 B.C. and the end in 750 to 500 B.C. This literature provides us with a brief account of the culture of the period, and also a birds eye view of the medical system of that time.

In *Kauśika Sūtra* of *Atharvaveda* there is a reference to *prameha* (*Kau. Sūt.*, 26.6.10). In Vedic literature two terms were denoted *i.e. āsrāva* and *prameha*. The term *āsrāva* has been interpreted in various ways. This term is formed from Ā+SṚ, meaning "to flow". Winternitz interpreted this as flux and Grifiths (1962) as morbid flow. Sāyaṇa and Keśava, commentators of Vedic works included mūtrātisāra *i.e.* excessive urination, which throws light on the existence of reference to a state of *prameha* in Vedic period. The *mantras* 6.44.3 of *Atharvaveda* and Sāyaṇa's commentary on it indicate in *āsrāva* a medicine known as *Visānaka*, and traces the etiological factors of *āsrāva* in ancestors. The commentary also indicates

*Before going to the detailed history of Diabetes mellitus, it should be made clear that the term Diabetes mellitus is not mentioned in Indian medical system. There is mention of *madhumeha* under *Vātika prameha* and the characteristics of *madhumeha* are very similar to those of Diabetes mellitus. Therefore, *madhumeha* is being considered here as Diabetes mellitus.

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the *vātika* nature of this disease which was further extended by Ātreya in *Caraka Saṃhitā*.

Kauṭilya, the father of diplomacy of 321—296 B.C. mentioned a method to produce diabetes in his book *Arthaśāstra* in the chapter dealing with the means to injure the enemies. According to him, the burnt *kṛkalāsa* (chameleon) and lizard combined with intestines of frog and honey, if administered to a subject, cause diabetes. This evidently points to the existence of diabetogenic techniques in ancient time (*Arthaśāstra*, 14.177).

After Vedic period facts about Diabetes mellitus were further explored by Ātreya which are recorded in *Caraka Saṃhitā*, considered to be a complete treatise of medical science of its era. It is supposed to have been written in about 600 B.C. (although some people believe it to be older). The book explains various factors of etiology including heredity, pathogenesis, symptomatology, complications and methods of treatment in details. Regarding etiology of diabetes *Caraka Saṃhitā* described over-nutrition and lack of exercise as the main causative factors. On the other hand under-nourishment with excessive labour has also been considered as a causative factor (*Ca. Nid.*, 4.5-26). Inherited diabetes is considered as incurable by Caraka (*Ca. Ci.*, 6.57). About pathogenesis of diabetes, Caraka emphasized upon derangement in *meda*, *māṃsa*, and *kleda*. Disturbances in function of *mūtravaha srotasa* have also been considered (*Ca. Nid.*, 4.9). It is a point of historical importance that the book mentions of the loss of sweet substance in urine (*Ca. Nid.*, 4.37), though the credit has been given to others like Ibn Sīnā, 980—1037 A.D. (Striker, 1961).

Bhela Saṃhitā, which is contemporary to *Caraka Saṃhitā*, describes two types of diabetes *i.e. prakṛti prabhāva* (congenital) and *svārakta* (acquired) (*Bhel. Sam. Nid.*, 6.1-4).

In this tradition, Suśruta (600 B.C.) followed the same classification with the term *sahaja* and *apathyaja* and also described that *sahaja* (congenital) was caused by defect in *bīja* (reproductive units *i.e.* spermatozoon and ovum) of parents and *apathyaja* (acquired) was due to heavy diets and luxurious living habits. The most notable contribution of Suśruta was to give separate chapter on the treatment of Diabetes mellitus (*Su.Ci.*, 13). He also described a separate chapter for the management of carbuncles (*Su. Saṃ. Ci.*, 12). He mentioned some specific preparations of minerals and vegetables.

After Suśruta, a great contributor to Indian medicine was Bhāgbhaṭṭa. He compiled the existing knowledge and added some new ideas in his text. The date of Bhāgbhaṭṭa is considered to be the beginning of 7th century (P.V. Sharma, 1975). He mentioned two types of diabetes on the basis of pathogenesis, one is

dhātukṣaya janya and the other is *āvaraṇa janya*, which points towards thin and obese diabetes (*Aṣṭāṅga Hṛdaya Nid.*, 10–18).

The medieval period in the history of Indian medicine is known as the period of commentaries. So, most of the books of this period are recollection of thoughts of previous authors or commentaries on previous books.

Mādhavakara in 9th century A.D. in his book *Roga Viniścaya* compiled the thoughts of previous authors without adding anything new to the knowledge of diabetes.

Gayādās (11th century A.D.) commentator on *Suśruta* in his *Nyāya Candrikā* commentary on Suśruta (*Su. Nid.*, 6.6), elucidated that *ābilatā* (turbidity or density) of urine in diabetes was due to the presence of some *dūṣya* components *i.e. meda, māṃsa,* and others. In the same period Cakrapāṇidatta also commented on *Caraka Saṃhitā*. He also wrote a book known as *Cakrādatta,* but the contribution is not significant in reference to diabetes. He merely recommended medicines prescribed by Suśruta.

Bhāvamiśra in 16th century A.D. contributed to the history of diabetes by adding some new vegetable and metallic preparations for the management of diabetes (*Bhāvaprakāśa, Madhya Kāṇḍa,* 38).

After Bhāvamiśra, development of Indian system of medicine had been stagnated. Indian culture and Aryan civilization had been very much affected by foreign rulers and their policies to abolish the Aryan civilization.

During the British rule India had lost a lot regarding its originality in approach to science and philosophy due to forceful impact of western education. The renowned schools for Indian medicine were replaced by western system. The whole events resulted into a big stagnation and gap in the evolution of this system.

As regards the modern medical system it was evolved with Chinese medical system which mentions of a syndrome of polyphagia, polydipsia and polyuria. Areteus (*c.* 70 A.D.) described the disease and referring to polyuria gave its name which comes from a Greek root meaning to run through. The study of chemistry of diabetic urine was initiated by Paracelsus in the 16th century. Some 100 years later Thomas Willis described the sweetness of the diabetic urine "as if imbued with honey (mellitus)" which Dobson proved to be sugar. This led to a rational dietary approach introduced by Rolla 29 years later. Morton (1686) noted the hereditory character of diabetes. Paul Langerhans, working in Berlin, reported in 1868 a type of cells in the pancreas which lie together in considerable number and these were later named Islets of Langerhans and are still known by this name.

The careful work of clinicians such as Bouchardt, Naunyn, Von Noorden, Allen and Joslin led to a significant therapeutic success with diet. Von Mering and Minkowski carried out their studies in 1889, demonstrating that dogs could be made diabetic by pancreactomy. However, it took more than 30 years before Banting and Best were able to prepare an extract from dog pancreas capable of reducing an elevated blood glucose level.

In 1939, the first long acting insulin was introduced by Hagedorn. The chemical structure of ox insulin was established by Sanger in 1953. Nicol and Smith described the chemical structure of human insulin in 1960. In 1964, Katsoyannis in the United States and Zahn in Germany completed the synthesis of both the A and B chains of insulin and were able to continue both the chains into biologically active materials. In 1967, Steiner described a large proinsulin molecule which as such exhibits only little biologic activity, but is converted by enzymatic cleavage into the smaller biologically active insulin. The experimental work of Loubatiers in France and the accidental discovery of the hypoglycemic action of carbutamide by Franke and Puchs in Germany in 1955 initiated the use of oral hypoglycemic agents of the sulphonylurea type. Recently the long term safety of these oral agents has been questioned.

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