

Historical note

Aretaeus of Cappadocia and the first description of diabetes

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ABSTRACT

The name Aretaeus of Cappadocia has been linked with diabetes more than that of any other physician of antiquity, his texts forming a sophisticated synthesis of the previous knowledge on this disease copiously supplemented by his own observations. Gifted with a unique faculty for observing pathologic phenomena, he was able to elaborate upon earlier texts enriching them with his own original findings and numerous thoughtful reflections. Among the many diseases he dealt with, Aretaeus has bequeathed to us an outstandingly vivid and accurate description of diabetes.

Key words: Aretaeus of Cappadocia, Diabetes, Galen, Soranus of Ephesus, Diarrhea urinosa, Dipsakon

INTRODUCTION

The first clear and complete description of diabetes was made by Aretaeus of Cappadocia, a famous physician of the late Hellenistic period. His analysis of diabetes represents, in fact, the only extensive text of Greek medical literature in existence. His medical writings are moreover unique in the history of ancient medicine for their precision and thoroughness, constituting as they do a creative synthesis of widely accepted ideas in ancient Greek medicine enhanced and augmented by the original conclusions drawn by Aretaeus by virtue of his singular capacity for observation of patients' symptoms.

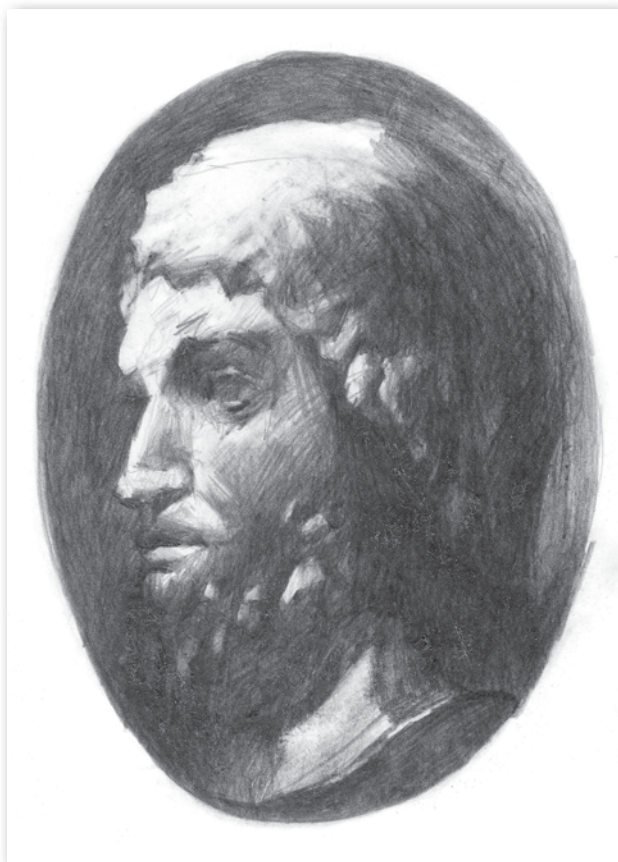
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Received 09-10-11, Revised 15-11-11, Accepted 30-11-11

ARETAEUS' LIFE AND WORK

Aretaeus, surnamed the Cappadocian, is probably the greatest physician of Greco-Roman antiquity after Hippocrates, and at least the equal of Galen. Born in Cappadocia, a region of eastern Asia Minor, he studied medicine in Alexandria and practiced in Rome.¹ Aretaeus belonged to the Eclectic School of Medicine (Greek: *Εκλεκτικοί*). Its members were so called because they selected from previous medical treatises those parts which they deemed most rational. The medical practice of Aretaeus was also based on the principles of the Pneumatic School, founded by Athenaeus of Cilicia in the 1st century AD, which believed in the vital role of both *pneuma* (air) and the qualitative characteristics of certain fundamental elements, known as the four humours (heat, coldness, moisture, dryness), in the causation of diseases.²



Sketch by Michalis Ersotelos.

His two treatises, *De causis et signis morborum acutorum et diuturnorum* (On the causes and symptoms of acute and chronic diseases) in four books and *De curatione morborum acutorum et diuturnorum* (On the cure of acute and chronic diseases) also in four books, are written in the Ionic dialect and are characterized by the clarity and simplicity of his descriptions, which very closely resemble those of Hippocrates, as well as by the soundness of the advice which he proffers in regard to the methods of treatment.³

No medical author of antiquity surpasses Aretaeus in his vivid portrayal of disease. Some examples of the many diseases he discussed in admirable descriptions are pleurisy with empyema, asthma, pneumonia, cerebral apoplexy, paraplegia, tetanus, hysteria, epilepsy, diabetes, gout, diphtheria. Furthermore, he was the earliest medical author to distinguish between conveyance of the disease by actual contact (contagion) and transmission of disease at a distance (infection).² Aretaeus enters into very meticulous

detail when he discusses the subject of diagnosis, his methods of treatment being based largely upon his own experience and generally being of a simple character. He attached great importance to a very careful regulation of the diet, muscular exercise, massage, and mild drugs without hesitating in severe cases to administer opium, emetics, cathartics, venesection, and the red-hot cautery.²

In endocrinology, apart from the aforementioned impressive description of diabetes, his elucidations concerning semen, which he identified as being the basis of male characteristics, are also notable. He stated: "For it is the semen, when possessed of vitality which makes us to be men, hot, well braced in limbs, hairy, well voiced, spirited, and strong to think and act, as the characteristics of men prove. For when the semen is not possessed of its vitality, persons become shriveled, have a sharp tone of voice, lose their hair and their beard and become effeminate as the characteristics of eunuchs prove".⁴ Nevertheless, the manner in which Aretaeus succeeded in attaining such a high level of accuracy in describing these pathological conditions remains unknown.

Little is known about his personal life and even the exact century of his birth is uncertain, most scholars agreeing on the 2nd century AD but with a few suggesting the early 3rd century AD.^{5,6} According to the former hypothesis, Aretaeus will have been contemporaneous with his main sources. The latter, on the other hand, to which we incline to adhere, explains the physician's rich medical knowledge. With respect to the last, it should be borne in mind that, considering the relatively small number of clinical cases with which ancient physicians were confronted, the wealth of experience that they accumulated about any pathological affliction is remarkable. In this article, we will discuss the description of diabetes based on the second, slightly unorthodox hypothesis.

DIABETES BEFORE THE ADVENT OF ARETAEUS' WORK

In the age of Aretaeus, limited background knowledge existed on diabetes. Physicians such as Rufus of Ephesus⁷ (c. 1st century AD), Galen (130 - c.201),⁸ and Pseudo-Galen⁹ were the only direct ancient Greek medical sources of that period. Unfortunately, the

chapter on diabetes from Caelius Aurelianus' Latin translation of the work by Soranus of Ephesus (c.98-138) *On Acute and Chronic Disease* has been lost. The same fate has befallen the authentic ancient Greek text.¹⁰

In all these sources a fundamental idea was constantly repeated, namely that diabetes provoked incessant thirst and immoderate loss of urine (polyuria), which conduced to the emaciation of the human body, sometimes leading to death. These authors paralleled diabetes with *leienteria*, a condition that, according to Pseudo-Galen's *Definitiones medicae*, is characterized by the passage of undigested food in the faeces.¹¹

They also pointed out that the imbalance of humours could be ascertained by the colour and the odour of the urine. These specific clinical features, essential for diagnosis, mainly appeared during an advanced stage of the disease, contributing to the common belief in ancient times that diabetes was a rare affliction. On the other hand, it must be underlined that the latter view was additionally due to the fact that the ancient Greeks followed a low fat diet that was also low in sucrose and rich in fibers, and moreover engaged in intense physical exercise. It was hence a way of life that discouraged development of diabetes, consequently resulting in its being regarded as an uncommon disease.

The eminent Greek physician Galen subsequently enriched this framework by adding to it the previously acquired knowledge, describing the disease by means of a well-defined terminology: he thus harked back to ancient Greek medical approaches, constructing terms that directly related to the basic symptoms. Therefore, the great loss of urine led Galen to name the disease *diarrhea of the urine* (diarrhea urinosa). In his turn, he mentioned the rarity of the disease, stating: "For my own part, I have seen the disease till now only twice; the patients suffered from an inextinguishable thirst which forced them to drink enormous quantities".⁸ This excessive thirst inspired the term *dipsakon* (ardent thirst).

Galen rejected the theory that diabetes involved the stomach, conjecturing that it should be principally located in the kidneys.⁸ Pseudo-Galen did not modify Galen's view. In his brief account on diabetes, he

elaborates on the terminology and the characteristics of the urine.⁹ Prior to them, Rufus of Ephesus is credited with having coined the term *pancreas* (pan=all, kreas= flesh), but he did not connect the organ with diabetes, believing that its purpose was to protect the main vessels of the posterior abdominal wall.⁷

ARETAEUS' LANDMARK DESCRIPTION OF DIABETES

Years later, Aretaeus described diabetes and introduced the term into medical nomenclature. The term stems from the Greek verb *διαβαίνω* (diabaino) which means "to go or run through".¹²

It is pertinent at this point to quote a passage of his text: "Diabetes is a remarkable affliction, not very frequent among men... The course is the common one, namely, the kidneys and the bladder; for the patients never stop making water, but the flow is incessant, as if from the opening of aqueducts... The nature of the disease, then, is chronic, and it takes a long period to form; but the patient is short-lived, if the constitution of the disease be completely established; for the melting is rapid, the death speedy. Moreover, life is disgusting and painful; thirst, unquenchable; excessive drinking, which, however, is disproportionate to the large quantity of urine, for more urine is passed; and one cannot stop them either from drinking or making water. Or if for a time they abstain from drinking, their mouth becomes parched and their body dry; the viscera seems as if scorched up; they are affected with nausea, restlessness, and a burning thirst; and at no distant term they expire. They thirst, as if scorched up with fire ... But if it increases still more, the heat is small indeed, but pungent, and seated in the intestines; the abdomen is shriveled, the veins protuberant, and there is general emaciation, when the quantity of urine and the thirst have already increased; and when, at the same time, the sensation appears at the extremity of the member, the patients immediately make water. Hence, the disease appears to me to have got the name diabetes as if from the Greek word *διαβήτης* (which signifies a siphon), because the fluid does not remain in the body, but uses the man's body as a ladder, whereby to leave it. They survive not for long, for they pass urine with pain, and the emaciation is dreadful; nor does any great portion

of the drink get into the system, and many parts of the flesh pass out along with the urine".⁴

His full text on diabetes can be divided into three parts. In the first part, all the common signs and symptoms of the disease are presented, following the same pattern as previously employed without providing any new insights or information in the content. The etiology is attributed to moisture and coldness, reflecting Aretaeus' attachment to the Pneumatic School. The emphasis on the role of the kidneys and the bladder indicates a similarity with Galen. He mentions characteristically: "...in diabetes, the flow of the humour from the affected part and the melting is the same (as in dropsy), but the defluxion is detrimental to the kidneys and bladder... In the latter disease (diabetes), the thirst is greater; for the fluid running off dries the body...".⁴ The only substantial difference is to be detected in their respective styles, since Aretaeus' description of the loss of weight and the thirst is achieved in a much more elaborate and vigorous way.

In the second part of Aretaeus' text, where the patient's symptoms are intricately but eminently clearly analyzed according to the stages of disease progression, valuable new information is presented which is missing from other physicians' medical texts.

It is however interesting to note that this mode of description by evolutionary stages is that of Soranus of Ephesus (a Greek physician from Ephesus active between the 1st and 2nd century AD), as this is revealed not only through Caelius Aurelianus' Latin translation but also via study of the surviving texts of Soranus of Ephesus himself. Soranus' influence on Aretaeus' treatise on diabetes is thus obvious, even though Soranus' actual chapter on the disease is no longer available either in the original or in the Latin translation.¹³ One may further substantiate this assumption by comparing other diseases that were presented in a similar way by Aretaeus and Soranus. Epilepsy is one such an illustrative example because its symptoms have an analogous graduated appearance, this factor aiding in the comparison. We can therefore perceive that Aretaeus fully adopts Soranus' classification for the stages of epilepsy by applying the same approach.¹⁴

In the final part of his manuscript on diabetes Aretaeus presents even more novel particulars and insights. On the one hand, he hypothesizes a correlation of diabetes with other diseases, this leading to the conclusion, probably original in conception, that a series of events occur in the organism that manifest the onset of the disease. On the other hand, he discusses differential diagnosis, citing the fact that snakebite may provoke excessive thirst (*dipsada*).⁴ The text clearly reveals Aretaeus' great capacity for observation and interpretation of the symptoms of diabetes, which far surpassed those of any other ancient Greek physician.

Therapeutically, he suggests cataplasms, cereals, groat, wine, and milk in the diet and the theriac, the cure-all remedy of antiquity: "For the thirst there is need of a powerful remedy, for in kind it is the greatest of all sufferings; and when a fluid is drunk, it stimulates the discharge of urine and sometimes as it flows off it melts and carries away with it the particles of the body. Medicines, then, which cure thirst, are required, for the thirst is great with an insatiable desire of drink, so that no amount of fluid would be sufficient to cure the thirst.

We must, therefore, by all means strengthen the stomach, which is the fountain of the thirst. When, therefore, you have purged with the hiera, use as epithemes the nard, mastic, dates, and raw quinces; the juice of these with nard and rose-oil is very good for lotions; their pulp, with mastic and dates, form a cataplasm. And the mixture of these with wax and the nard ointment is good; or the juice of acacia and of hypocistis, both for lotions and cataplasms. But the water used as drink is to be boiled with autumn fruit. The food is to be milk, and with it the cereals, starch, groats of spelt (*alica*), gruels. Astringent wines to give tone to the stomach and these but little diluted, in order to dissipate and clear away the other humours; for thirst is engendered by salty things. But wine, which is at the same time astringent and cooling, proves beneficial by inducing a change and good temperament; for to impart strength, sweet wine is like blood, which also it forms. The compound medicines are the same, as that from vipers, the Mithridate [theriac], that from autumn fruit, and the others which are useful in dropsy".⁴

CONCLUSION

Aretaeus' treatises, well known in his time, were not translated into Latin and remained unknown in the West until the middle of the 16th century when, in 1552, the first Latin edition was published in Venice. His text on diabetes stands out for its exemplification of his breadth of knowledge, soundness of judgment, and elegance and precision of writing.

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