Onomatology of an eponym: Herophilus' press (*Torcular Herophili*).

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Abstract

The term Herophilus' Press does reference to the confluence of the venous sinuses or the imprint of them in the inner table of the cranial vault ? We examine the influence that the translation of this eponymous onomatology. We also perform a briefly review of Herophilus' contribution in the field of Human Anatomy.

Keywords: Herophilus, Herophilus' press, *Torcular Herophili*, confluence of the venous sinuses, onomatology, Human Anatomy.

Introduction

The intellectual, cultural, social and political circumstancess on the city of Alexandria, Egypt in the third century B.C. provided Alexandrian physicians among them Herophilus chance to realize systematic anatomical dissections. He was thus able to make an extraordinary number of anatomical discoveries and accompanying with exact descriptions.

The objective of this paper is to perform a review of the translation of Herophilus' Press eponymous. The authors also have researched information available to write in this paper about some aspects of interest of Herophilus' works.

Herophilus' press (*Torcular Herophili*).

At the level of the internal occipital protuberance, the dural venous sinuses: superior, straight, transverse (right and left) and occipital converge. That confluence is named for the Anatomica Terminology (1) Confluence of sinusess (*confluens sinuum*, A.12.3.05.103). Confluence of sinusess erode the inner table of the skull determining grooves respectively, within the eponymous name, and a concavity. *Confluens sinuum* and concavity are intimately related but clearly represent different anatomical structures it has generated and generates a confusion of centuries (2). An older term often used as a synonym for this confluence, "*torcular herophili*", describe the veins as a gutter or channel, and honors Herophilus. According to Galen *(De Anatomicis Administationibus)* Herophilus called the bone concavity determined by the confluence of the sinuses as *Lenos*, that means *barrel*, and also *cavity* or *recess*. In any of these objects must have thought Herophilus giving that name to it. But it also means winery (olive press - wine press) and that meaning was understood during the Middle Ages when choosing Arabic word *torcula* (3). Thus Avicenna in his Canon translates the Greek word *lenos* to Arabic word *almaçara* which gave rise to the Spanish word *mill* (oil mill). Gerard of Cremona translated Avicenna's Canon of Medicine (4) .

Later Albertus Magnus, Mondino de Luzzi and Guy de Chauliac, the largest makers of anatomical words in the Latin Middle Ages, founded their books on Gerard's translations. Gerard translates *almaçara* by *torcular*. In Latin *Torcular Aris* means press, press machine, or wine press. This translation was used by almost all medieval anatomists. Alberto Magno, Mondino and Guy de Chauliac, only copy the name. However, over time this term has been used as an interchangeable incorrectly term with the confluence of sinuses.

According Olry and Haines (2), during the seventeenth century to the mid-eighteenth century anatomists as Ambroise Paré (*Les Oeuvres d'Ambroise Paré*, 1664), Lorenz Heister (*Compendium anatomicum*, 1719) and Winslow (*Exposition anatomique the structure du corps humain,* 1752) relate the Latin term *torcula*r with the French word *torquing* which means to twist. Others reserved the word *press* to describe the superior sagittal sinus (Riolan, 1672) or the straight sinus (Verdier, 1752). In the 1830s, the term gave rise to the *torcular torcularian* adjectives and *atorcularian* depending on whether the sinuses open into the confluence (such as the superior sagittal, inferior sagittal, straight, transverse, and occipital sinuses) or not. The current confluence of sinuses term was coined by Xavier Bichat in his *Traité d'anatomie descriptive* (1819): "this space, of irregular shape, does not really belong to any (...) I call it sinus confluence of sinuses .We know that the ancients referred to it as Herophilus' press." During the nineteenth century the term remains *Torcular Herophili* but alternates with that of confluens (Luschka, Henle, Kause). Aubry is the very first anatomist to have pointed out the unsuitability of both terms press and confluence of sinuses (2). Joseph Hyrtl (onomatology anatomical, 1880) criticizes sinus confluens as a term impossible, adding "when *confluens sinuum* in comparison is an entirely suitable thing". The Berna's Nomina Anatomic consecrated the name *confluens sinuum* that the following payroll respected, keeping synonymous *Torcular Herophili* in memory of whom, according to Galen, described it for the first time.

Herophilus of Chalcedon

Herophilus (335 - 280 B.C.) was born in Chalcedon, now Kadiköy (Turkey). It was an ancient maritime town of province of Bithynia, approximately in 335 B.C. His professors were Praxagoras and Chrysippus of Cnido, physicians that gave classes in the medical school of the Greek island of Cos. He traveled to Alexandria, Egypt, where he taught and practiced anatomy and medicine (5). The systematic dissection of human cadavers is thought to have begun in Alexandria in the 3rd century before Christ. Animals had previously been dissected by Aristotle among others, in the 4th century before Christ, by Galen in the 2nd century A.D. and others later systematically dissected numerous animals (6). Herophilus was among the first physicians to systematically perform dissections of human cadavers and is deemed one of the first to compare human and animal morphology. He performed anatomical dissections in public. Herophilus dissected over 600 cadavers during a brief period of time in the Greek history of medicine of around 30-40 years, until the ban on human dissection was lifted (7).Herophilus introduced the notion of conventional terminology, as opposed to use of "natural names", using terms he created to describe the objects of study, naming them for the first time. Many of the terms he used are still valid today. He described and named the duodenum, studied the liver extensively as well as he established a distinction between arteries and veins and described and gave the hyoid bone its name (8). He knew of the existence of the lymphatic system but ignored its function. He described the prostate, the sperm canal, the epididimus, the uterus tubes, the ovaries, the parotid and the submandibular glands. Through dissections, Herophilus was able to deduce that veins only carried blood and not a mixture air and water as his peers believed it. After studying the flow of blood, he was able to differentiate between arteries and veins. Herophilus noticed that the blood flowing through the vessels with rhythm and developed the standards to measure the pulse, for which he used a water clock.

He made important contributions to medicine, by developing the theory of the value of pulse diagnostics (9). He differentiated the brain from the cerebellum. Herophilus proposed that the brain housed the intellect rather than the heart, as proposed by Aristotle, disputing the opposing beliefs of his peers.

Herophilus studied the encephalous by dissecting human cadavers and through research on animals, describing the meninges, the choroidal plexus, the fourth ventricle and the confluence of cerebral venous sinuses, thereafter known as Herophilus´ press, giving rise to the eponymous Torcular Herophili (10). He also describes the calamus scriptorius which he believed was the seat of the human soul. Through his dissection of the eye, he discovered: the cornea, the retina, the iris, and the choroid coat. Herophilus also studied the network of nerves located in the cranium. He was the first to distinguish nerves from tendons as well as to describe the optic nerve and the oculomotor nerve and to distinguish betweenthe motor and sensory nerves. He sustained the doctrine of the four humors as the basis for treatment, using bloodletting and purges to evacuate the plethora of humors and also recommended proper diet and exercise as good habits. For him, the disease occurred when an excess of one of the four humors impeded the pneuma from reaching the brain (11). For Herophilus; prognosis was derived from the symptoms, and for this reason, symptoms must be clearly recognized. He is one of the founders of the scientific method and the one who introduced the experimental method in medicine. Herophilus considered it essential to found knowledge on empirical bases, for that he was criticized by Galen for whom the experimental method contradicted rationality.

Discussion

He wrote at least nine papers, including a treaty on anatomy, a treaty on obstetrics and a book for midwives and the causes of sudden death. All these texts were unfortunately lost with the destruction of the Ancient Library of Alexandria. Herophilus died approximately in the year 280 before Christ, his teachings and research in the field of human anatomy were lost in the course of the years. However his anatomical findings lived on in the works of other important physicians, notably Galen.

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