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Galen and the neurosciences

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Editorial

Galen of Pergamon (129AD -200/216 AD) is one of the greatest authorities in Medicine. After the great contribution of Hippocrates in the foundation of the scientific medicine, in classic Greek Era,[1] Galen contributed substantially in shaping the profile of modern medicine,[2] in Hellenistic Era, six centuries later.

Galen by his extensive scientific work[3,4] introduced in medicine

a. The anatomical observation,

b. The topographic diagnostic approaching of the diseases and

c. The experimental investigation.

He was more analytic than Hippocrates in his dissertations, concerning the description of the diseases and pathological conditions, attempting to associate the clinical medicine with the experimental investigation.[5] Galen as an author was very productive. His extensive work covered almost every scientific and philosophical field. He composed more than five hundred dissertations on anatomy, medicine, philosophy, medical ethics, logic and grammar. In his numerous dissertations on Medicine, Galen tried to incorporate all the existed theories in Medicine and Philosophy, giving emphasis in his personal observations, theories, ideas, concepts and doctrines. He attempted to harmonize the Hippocratic medical pragmatism[6] with the Platonism, Stoicism and Neo-Platonism, accepting at the same time the majority of the Aristotelian doctrines,[7,8] given that he lived under the special philosophical and literary atmosphere of Hellenistic World.[9,10]

According to Galen the physician must be philosopher, intellectual, with good knowledge of logic, good theoretical background, enough experience and high moral standards in order to become beneficial to his patients, respecting, protecting and healing their soul and body.[11] Many years of clinical practice are needed for the best beneficial contribution of a physician. According to Galen the physician as thinker should avoid dogmatism and much skepticism, since everything is flexible and changeable. However, experience and high medical education may offer the right solution of medical problems.

In the field of Neurosciences Galen was an eminent authority, who radiated through centuries. He traced new ways in brain anatomy and physiology,[12,13] describing also numerous neurological disorders, with emphasis on the structural and functional background of the diseases and the etiology of the pathological processes. Galen characterized his scientific methods as proving "αποδεικτικάς", given that they are based on objective, detailed observation and sufficient relevant experimental verification.

Galen supported the encephalocentric theory of the human body, in contradiction to cardio-centric aspect of Aristotle and Stoics. According to Galen the brain is the "hegemonicon", the principal organ which rules and controls all the functions and the activities of the human body. Brain is the organ of cognition, volition, memory, fantasy, sensation, emotion, thinking, understanding and motor control. Brain is the seat of intelligence, the organ of the psychic expression.[14] Among the first authors who introduced the encephalocentric theory were Alcmaeon from Croton and the Pythagoreans, Anaxagoras, Hippon from Samos, Philolaos. Hippocrates and later Erasistratus and Herophilus.[15]

In the field of Neuroanatomy, Galen described cranial nerves, the corpus callosum, the tectum, the formix, the epiphysis or pineal body, the sympathetic chain, the anterior and posterior roots of the spinal nerves. He described the great vein of the brain (Galen's vein),[16] the recurrent laryngeal nerve, characterizing it as vocal nerve or nerve of the speech.[17] Galen described the ventricular system of the brain and considered it as the seat of the psychic spirit.[18]

In the field of neurophysiology Galen studied the function of the spinal cord and the structure of the spinal column.[19] He made very important observations on the traumatic lesions of the spinal cord. He noticed that on transverse sectioning of the spinal cord total paralysis and anesthesia are induced below the level of the section. Experimentally, Galen proceeded to transverse sectioning of the spinal cord at various levels in pigs, apes and other animals and described the distribution of the motor and sensory loss in the body under the level of the lesion.[20] Galen noticed that on transverse semisection of the spinal cord the voluntary motion is abolished under the level of the section ipsilaterally and the perception of the pain and temperature is lost in the body and limps contralaterally. He noticed also that in cases of hemiplegia, associated with ipsilateral facial palsy the causative factor is located in the brain. In the contrary, in cases of hemiplegia without involvement of the cranial nerves the lesion is in the spinal cord. Galen claimed that the posterior part of the brain, which is more solid than the anterior, plays an important role in the life and the vegetative functions of the man.

In cases of traumatic lesions of the brain Galen applied trepanation for draining the intracranial hematomas and decreasing the intracranial pressure.[21]

In the field of mental disorders Galen described phrenitis, delirium (παραφροσύνη) paraphrenia, mania, melancholy, coma, Carus (κάρος), lethargus, catalepsis, epilepsy, which are conditions affecting the "hegemonicon" and disturbing the soul-body relationship. Dementia according to Galen consists of decline in memory, judgment and learning, and it is a serious disorder of the "hegemonicon". Dementia

may exists in melancholy, which in that case is reversible. Loss of memory and reason and loss of understanding (σύνεσις) appear in a mental disorder that Galen called morosis (μώρωσις). Loss of memory and reason occurs, as a rule, in lethargy and karos. Phrenitis is a psychic disorder characterized by an acute fever and delirium. Among the main symptoms of phrenitis he underlined insomnia, visual hallucinations, rapid breathing (tachypnoia), weak pulse and abnormal movements. The fever differentiates phrenitis from mania and agitated melancholy, which may have also a continuous delirium. For the physician, the symptoms of the disease and the clinical condition of the patient are valuable criteria for the choice of the proper treatment.[22]

According to Galen health is the result of the homeostatic equilibrium of the psychosomatic entity of the human being. Moreover, an individual disposition (diathesis, διάθεσις) exists, which may be responsible for the health or the morbidity of the human being.

Galen claimed that in addition to mental disorders, there are other conditions which are the consequences of passions and errors of the man.[23,24] Errors arise from a false opinion, and passions from the irrational way of life. The man by philosophical culture and wisdom may recognize the importance of the self-knowledge, self-control and self-discipline. He may also recognize and control the errors and passions of his soul, since it is very important for the man to liberate himself from his passions. Any passion of the soul must be cut out promptly, otherwise it would become incurable. Reason, which is the most precious gift to human being, must be trained every day in order to control the irrational and erroneous thoughts and establish the inner peace. The efficacious treatment of the passions is their total and complete eradication, which demands a continuous fight and persistence. For each human being needs a continuous culture and training, in order to follow the way of the truth and become a perfect man.

The psychopathologic analysis of the passions by Galen has many similarities with the approaches of the modern psychopathology. However Galen's psychotherapeutic technique associated philosophy and medicine[25,26] harmoniously in order to help the man to eradicate the passions and obtain his interior peace and psychological stability.

Galen is one of the first Neurophilosophers, who attempted to associate neurosciences with philosophy in a harmonious unity.

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Conflicts of interest

None.

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