

Comparative Study of Neurologic Critical Care in Avicenna Canon and New Medicine

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Abstract

Background and Aim: The ancient medical books are rich in scientific doctrines and those reviews continue to amaze the reader after several years. One of the advanced sciences of the modern era is the neuroscience. Avicenna has dealt with various aspects of neuroscience in Canon, including the care of critically ill patients. The present study explores the hidden aspects of this field of medical science in Avicenna's Canon.

Materials and Methods: This study was a descriptive review with a comparative approach. First, neurologic subject were extracted from the Canon book and the related new articles and books were searched; then the contents of the Canon book matched with those from the new medicine resources given.

Results: A comparative study of the topics discussed in the field of brain anatomy, signs of neurologic diseases, diagnosis and treatment of headache, seizure, meningitis, stroke, traumatic brain injury and spinal cord injury, reveals many accordance with the modern knowledge, especially in the field of care for patients with head injury.

Conclusion: The Canon of Avicenna, like many of the ancient medical books, is still full of novelty and nearness to reality after centuries. It contains many useful recommendations for critical care of neurological patients.

Keywords: *Avicenna's Canon Of Medicine; Neurosciences; Nervous System Diseases; Critical Care; Brain Injuries*

Introduction

The ancient medical books are rich in scientific doctrines and those reviews continue to amaze the reader after several years, so the clinical delicacies of the physicians of ancient lands are a source of pride for our generation. One of the most prominent ancient physicians is Avicenna, whose Canon book is still fascinating to read after more than a thousand years. So far, many descriptive studies have been conducted on the various fields of medical science with the focus of Canon book.

One of the advanced sciences of the modern era is the neuroscience, which has been applied in various fields, including the diagnosis and treatment of neurodegenerative diseases, which has led to many innovations and development of this field. Avicenna has dealt with various aspects of neuroscience in Canon, including the care of critically ill patients, so far less research has been done on Avicenna's intended intensive care for these patients. The present study explores the hidden aspects of this field of medical science in Avicenna's Canon.

Materials and Methods

This study was a descriptive review with a comparative approach. First, the subject related to the brain and the nerves and their diseases were extracted separately from the Canon book and the related articles (over the last three years) and books were searched through the Google browser; then the contents of the Canon book matched with those from the new medicine resources given.

Results and Discussion

The book of Canon consists of 65 neurological topics, of which 45 were relevant for this study. Searching through the Google search engine, revealed hundreds of related titles, of which 4 new books and 15 related articles selected for comparative review. The results of this comparative review are as follow.

Brain anatomy: Avicenna considers the brain to have three main parts, including membranes, marrow and cavities [1], which are the same as the meningeal membranes, brain tissue and the ventricles and the ducts containing the cerebrospinal fluid [2]. He also believed that blocking these pathways can cause illness [1], which is well known as obstructive hydrocephalus in modern medicine [3].

Symptoms of brain disease: Some neurologic signs and symptoms are mentioned by Avicenna including: sensory and motor problems and cognitive functions (memory, thinking, imagination, illusions and delusions). The size of head, the condition of eyes and small tongue, and function of organs, those are under the brain control (stomach, uterine, and urinary bladder). If their functions are normal, indicate normal brain function, and if impaired, indicate brain dysfunction [1].

Avicenna has described sensory symptoms including visual, olfactory, auditory, taste and tactile disorders and has emphasized that a sensory disorder may be from sensory organ damage or brain injury, as motor impairment may be related to the same organ or brain disorders [1].

Avicenna also mentions mental symptoms such as hallucinations, delusions, madness and amnesia as symptoms of brain diseases [1] that are well known today [4].

Some symptoms of brain disorder occur in other organs, and Avicenna discussed these symptoms such as: blinking, eye movement problems, staring, exophthalmia, dysphagia, nausea, vomiting, deep or superficial breathing, shortness of breath and noisy breathing [1].

Headache: Avicenna believed the causes of headache may be in the brain (cerebrum, meningeal membranes, vasculatures, cerebrospinal fluid) or out of brain (stomach, uterus, liver, spleen, diaphragm, limbs or waist) [1]. He mentioned traumatic head injury and opioid withdrawal as probable causes of headache [1]. These are known causes of headache in modern medicine [5].

Canon recommended the elimination of causative agent, as the main treatment of headaches [1].

Cerebral trauma: Dissection between brain structures (brain cortex, cerebellum and cerebral arteries) is another of the brain injuries that Avicenna referred to as head injury. He has divided the mechanism of head injury to blunt (falling, direct impact to head) and penetrating (sharp and winning things insertion) [1], which is in line with modern science [6].

Surprisingly, in the care of patients with brain injury, there are some interesting points in the Canon book that are fully justified by the modern resources [7].

Avicenna has described the necessity of pain and agitation avoidance in traumatic brain injury [1], nowadays, prescription of sedatives is a routine method of reducing intracranial pressure [8].

The Canon book states well that the fever and drowsiness after a brain injury are warning signs of meningitis [1].

Eating chicken brain has been suggested by Avicenna for traumatic brain injury [1]. Today, It is known that it contains a useful ingredient called chicken brain derived neurotrophic factor (BDNF), which has been shown to be useful in brain and heart damage [9,10].

Laxatives such as almond oil, castor oil, soaked plum and enema have been suggested for these patients [1]; laxatives are nowadays recommended to prevent constipation-induced increased intracranial pressure [11].

Hospitalization of all neurologic patients is recommended in a quiet setting without severe visual and auditory stimuli [1] to have a restful sleep [1]. Avicenna is reluctant to prescribe opium and wine for such patients, because those can be dangerous by further lowering the level of consciousness and suppressing respiration [1].

Today, Physiotherapy of the limbs and chest is an important part of the care of these patients, and Avicenna has recommended the exercise of all organs except the head, skin massage using olive oil, and warming the muscles with the use of dry cupping [1].

Avicenna's Canon recommends exercise before dinner for critical patients [1]; now we know, physical activity plus nutritional support are very effective in weight gain and muscle strength [12].

Proper room lighting, talking to the patient, calling the patient and listening to a soft music are recommended by Avicenna [1], which is very effective in reducing delirium.

Avicenna considered to keep the neurologic patients thirsty and hungry for more survival [1], perhaps due to lack of facilities such as airway management and tube feeding, the only possible choice for preventing gastric content aspiration, was starvation. Also, excessive fluid intake in these patients can lead to exacerbation of brain edema. Obviously, following the treatment and reaching a partial recovery stage, increasing the patient's intake of food is recommended by Avicenna [1].

Avicenna considered sweet liquids as too harmful to nervous tissue [1]. Control of blood sugar is recommended in neurologic patients because hyperglycemia may worsens the outcome [13].

Diluted Urination and death in the near future have been reported as a complications of brain disorders [1], which appears to be the disorder known as Diabetes Insipidus as a relatively common complication of brain disorders.

One of the most common complications in these patients is urinary retention, which Avicenna recommends placing a hot towel on the bladder, because the lack of bladder catheterization facility at that time [1], this traditional method is still common in most medical centers.

Spinal cord injury: Avicenna stresses that the most common cause of spinal cord injury is spondylolisthesis and it does not improve if the paralysis is due to severe injury of spinal cord but may be remedied if it is due to swelling and infection of surrounded structures. Avicenna emphasizes that, spinal cord injury may induce hemiplegia, paraplegia or quadriplegia [1] and this is completely consistent with new medicine [14].

Weakness and irregularity of the patient's pulse have been reported as other complications of spinal cord injury [1]. Today, hypotension and bradycardia due to vasodilatation and involvement of cardiac accelerators in spinal cord above the fourth thoracic level are known complications of spinal cord injury [14].

Seizures: Avicenna has referred to seizure as epilepsy and cites intracerebral or extracerebral causes for it. He emphasizes that seizures caused by cerebral disease, usually occurs after the age of 25 and are more severe than epilepsy and are not easily treated [1].

The persistent epilepsy, known in the Canon as a deadly disease, is now named as status epilepticus [1].

Avicenna referred to a type of epilepsy that is found in pregnant women and resolved by childbirth [1] and is now known as eclampsia.

Stroke: A stroke is defined as a concurrent sensory and motor function [1] that is consistent with the facts. He enumerated transient ischemic attack (TIA) as a transient type of stroke [5].

The severity of stroke is divided by the degree of respiratory disturbance, as well [1].

Meningitis and encephalitis: Avicenna described inflammation and swelling of the brain curtains and considered it a deadly disease that exposes the skull to open (intracranial pressure is high). He mentioned, the meningitis sometimes originates from pneumonia [1]. Today, these are well-known: meningitis induce increase in intracranial pressure and a common source of meningitis and lung infection is pneumococcus [15].

Avicenna ignored the fever during the first three days after brain injury or stroke, if it occurred later, it has to consider complications such as meningitis [1]. In new medicine, early fever in neurologic patients considered as consequence of release of interleukins into the bloodstream and does not necessarily means infection [16]. Delirium is one of the signs of meningitis, it is not a bad sign if it is reduced by fever control, but if it continues to be raised in spite of fever diminution, it is a sign of a worsening illness [1].

Avicenna mentioned another disease that resembles meningitis but has no fever [1] and is now known as meningismus. It has various causes, including subarachnoid hemorrhage (SAH) [17] and pituitary inflammation [18].

The results of this research and similar researches [19], clearly revealed the amazing ingenuity of ancient scientists to understand the structure and function of the human body and to diagnose and treat neurological diseases, without any current diagnostic and therapeutic facilities.

The major limitation of this study was traditional base of Avicenna's Canon that is difficult to match with the new medicine.

Conclusion

The Canon of Avicenna, like many of the ancient medical books, is still full of novelty and nearness to reality after centuries. It contains many useful recommendations for critical care of neurological patients.

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Conflict of Interest

The author reports no conflict of interests. The author alone are responsible for the content and writing of this article.

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