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The Biophysiscal Modeling of the Perturbations in the Living System

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1. Abstract

A classic example of the symbiosis of structural and functional perturbations is vascular occlusion due to atherosclerosis. Narrowing of the blood vessel is already a serious danger, because very often the formed elements in the blood coagulate as blood clots – larger structural formulas. These block the narrowed blood vessel, which results in a heart attack. The most classic example of the symbiosis of these two perturbations is the aging of the body. The aging process affects the structures and functions of the organism simultaneously. Another large and well-known group of erroneous perceptions are auditory perturbations, that is, hallucinations, mis-hearing, or sensations that occur without external auditory stimuli, which are the sensations that arise in intensified mental states in mentally ill patients. They mostly occur at a young age, but they can occur at any age, and even periodically several times and in different forms and with different content. Disorders of willful action are not independent, but the motor manifestations of spiritual events, the consequences of these. Personality perturbation, a disorder of intellectual development affects the development of the whole personality.

2. Introduction

In this era, personal authority often led to misconceptions and speculative tendencies, which manifested themselves in the absolutization of laws and consequences. Instead of exploring the inter-relationship of phenomena, they opted for a scientific conceptual treatment, and therefore the classificatory and explanatory methods became predominant. The development of each discipline is twofold: one direction is the study of its own set of questions under the influence of changes in internal factors (which dominated until

the end of the XIXth century), the other is the development under the influence of external factors, i.e. to answer questions closely related to other disciplines. We can thus observe two opposite trends in the development of the sciences themselves: on the one hand, the initial high degree of differentiation within the existing disciplines, the emergence of new scientific disciplines dealing with a very narrow set of phenomena – and on the other hand, the one we will discuss in detail below. [1]

If we want to examine this issue, we must first clarify what we mean by science.

“... science is a system of laws of nature, society and thought.” In this framework, specific findings of fact are permanent in the given circumstances and within the limits of the given accuracy, while the hypotheses and theories based on them are historical and subject to change over time.

Ultimately, science can be said to be an objective, neutral, impartial system of thought, but where these elementary requirements of scholasticism are violated, it is stripped of the dignity of scholasticism.

3. Symbiosis of Structural and Functional Perturbations

In living organisms, the relationship between structure and function is reciprocal: the structure defines the function, and the function reacts to the structure, modifies and develops it, which again enables a higher level of function and activity.

A classic example of the symbiosis of structural and functional perturbations is vascular occlusion due to atherosclerosis. In the endothelium (intima) of the vessel wall, there is primarily lipid

deposition, as a result of which the intercellular stock loosens, then the cells gradually become fat and a large amount of crystalline cholesterol is deposited in their environment, and the intima thickens above it [2]. In addition to vascular wall lesions, recurrent wall clots due to fibrin deposits (plaque formation) that gradually narrow or lead to the complete occlusion of the blood vessel are significant as the process progresses. The blood flow will be unable to perform its function, it will not be able to supply oxygen to the locally confined area.

Narrowing of the blood vessel is already a serious danger, because very often the formed elements in the blood coagulate as blood clots – larger structural formulas. These block the narrowed blood vessel, which results in a heart attack. Failure to intervene quickly enough will lead to the death of the organism. According to international health statistics, cardiovascular diseases are considered the number one cause of death, accounting for almost 50% of deaths [3].

Many long-lasting structural perturbations result in functional perturbations and similarly, long-lasting functional perturbations result in structural perturbations. Such examples include hypersecretion (gigantism) or hyposecretion (nanism) of the growth hormone [4].

The most classic example of the symbiosis of these two perturbations is the aging of the body. The aging process affects the structures and functions of the organism simultaneously. With aging, both in terms of changes in structures and functions, there is a new quality shift in structures and functions, when it requires the physician to consider advanced age when diagnosing disease. The symbiosis of these two perturbations is true for every organ of the human body and for all senses, and their combined effect creates the process we experience as we age.

4. Psychic Perturbations

Sensual illusions are not explicitly classified as perturbations of perception. A kind of false reflection, stimuli are misinterpreted as a result of general mental states. Another large and well-known group of erroneous perceptions are auditory perturbations, that is, hallucinations, mishearing, or sensations that occur without external auditory stimuli, which are the sensations that arise in intensified mental states in mentally ill patients. In many cases, the distinction between right and wrong perception fails [5]. Correct perception of the perceptual process, but incorrect inadequate interpretation is what creates them. Sensory organs are healthy, but the interpretation (information processing) is flawed. Synesthesia, murmurous vision, colored hearing may occur even in healthy people. This is nothing more than the spread of an excitatory stimulus attacking the central nervous area of the analyzer to the central area of another analyzer. This is called the interaction of analyzers, discovered by Mechnykov in the 19th century [6]. Here are some examples from literature: “Franz Liszt: talks about purple sounds;

Ady Endre: „It is the hum of sunbeams that I hear”, „And my eyes behold the holy thunder”, „Thy name is tasting sweet within my mouth” (Gyula Nyírő). Eidetics have unusually strong imaginations. Eidetism is the brain functioning of a normal human.

In contrast, auditory or visual hallucinations are already caused by incorrect connections and appear as falsification of judgment. In a healthy person, a vivid world of fantasy, pareidolia exists, but it is usually a product of the sick person when they highlight certain features of different things and objects, find uniquely interpretable properties, and their conscious knowledge is unable to analyze them properly, on the basis of prior knowledge. For a normal person, it is clear and unambiguous that this is a game of imagination, the sick person does not have the ability to correct. [7] The definition of hallucination is clear: pathological perception without stimulus, independent of the will, experiencing it passively, and being alien to the personality. Pseudo-hallucination are vivid sensual images without external stimuli, lacking objective reality.

Hallucinations cannot be deduced from the normal functioning of the brain, but in addition to damage to the sensory organs, we can also talk about disorders of vegetative, proprioceptive changes and psychic functions. It is localized to cortical fields, but damage may also have occurred in the structure of the sensory organ (e.g. damage to the brainstem may cause visual hallucinations).

Psychopathological processes can be discovered in the confusion of ideas and concepts, just as in the case of perceptual distortions. Abnormally overestimated ideas are the groups of notions that are given a primary role in the patient’s life and are far more important than they would deserve in terms of their content [8]. These obsessions are also misconceptions. Obsessions, regardless of consciousness, always come back. These obsessions can become so powerful that they inhibit action. The obsessions intruding the consciousness, which is already accompanied by feelings of fear, can also turn into phobia; being anxious about doing something, although the action must be repeated several times, the fear does not disappear (going through an open square – agoraphobia; staying in a closed place – claustrophobia; fear of infection – nosophobia, etc.) Compulsions surprise a person suddenly and can occur several times during their life. It is considered a type of neurosis. Delusion stems from an abnormal source of fallacy. Its content is always the under- or overestimation of the “self”: megalomania, bigoted religiosity, inventory delusion, and so on [9].

Associations are influenced by mood, good humor speeds up association skills, while sadness slows it down. Of course, it also depends on knowledge and practice. Acceleration is noticeable in maniac patients when we may also discover a content confusion (a plethora of rhyming and incoherent thoughts in speech). All this in an elevated mood can be caused by delusions caused by sensory disappointments.

Healthy associations are mundane (e.g. table – furniture), while

in the case of the patient these are conspicuous, unusual and bizarre, so maniacs are characterized by rhyming association (knife-wife), epileptics have egoistic associations due to character change (apple-eating), and in case of dementia, associations stick [10]. Content confusion occurs in incoherence, in which sometimes the excitement spreads to the motor fields, the actions become incoherent, and then the strange picture may develop, based on which the connection between the content message and the expressive movements of the pantomime is broken, out of sync.

Obsessions sometimes last for a short time, other times over years, decades, they can attack suddenly and develop slowly. They mostly occur at a young age, but they can occur at any age, and even periodically several times and in different forms and with different content.

Error and delusion coincide in that both are false inferences from erroneous assumptions. The error can be corrected unlike delusion, which creates a stubborn adherence. The delusion of grandeur expands the patient's self, they overestimate themselves, and it includes inventory delusion (inventor, scientific), religious delusion (prophet, savior), erotic delusion (claiming a relationship with high-ranking, well-known people), which includes love affair, performance and the belief of special beauty [11].

5. Emotional State

Emotion – the pathologies of the senses are varied and difficult to group. Desire is a modified emotion. Emotion itself does not have any purpose, but only biological expediency. The tension of desire strives for a stronger, definite goal, so it is more enduring and directed, which also determines thinking and willful activity. Passion directs our actions, it is not a concept of collecting (hobby) in the ordinary sense, but like a drug, it is overcoming the consciousness [12]. Impulse is a sudden increase in emotion that fills the consciousness, in a common sense, it is loud anger. Impulse can be deliberately inflated. It is polarized. Fury, anger and fear are sticky in nature, act for a long time (inversely proportional to consciousness), and consciousness narrows. Fear is an ancient regression phenomenon. Fear is the accompanying element of a situation, and it is abnormal if it is disproportionately greater than the cause and can even be followed by a fall in consciousness. Depression and waiting tension can lead to an impulse of fear. Fear can turn into terror. Objectless fear, the one without reason and content is anxiety (tension of awkward waiting is sometimes associated with delusion) [13].

Disorders of willful action are not independent, but the motor manifestations of spiritual events, the consequences of these. The increased movements of agitation in a larger mass will follow each other at a higher rate, actions may become incoherent (this is movement incoherence). Impediment is a manifestation of stupor. Secondary symptoms should be seen in the pathology of the will. Lack of will, weak will, strong will can be pathological.

Disorders of actions are characterized by the fact that they take place in a powerful manner even under the influence of a weak stimulus. They are constantly active, they talk a lot, they do nothing, it can escalate into the incoherence of actions, when it becomes rambling and the action ends with an aimless storm of movement, a hysterical great stroke [14].

Personality perturbation, a disorder of intellectual development affects the development of the whole personality. Under pathological conditions, the development of the personality may be disturbed, the already formed personality may show pathological development in other directions under specific circumstances, and the personality may decline (becoming almost destroyed) with age. For example, during puberty, a goal is not developed, as a result of which they would be able to control their personality themselves. The lack of goals is manifested in a weakness of adaptation, and integration into the community is abnormal.

Severe personality perturbation occurs when a seemingly completely healthy person takes on a leading position in society. By appointing or electing a leader, they take on responsibility, but as leaders they never observe this because their opinion is that they are protected by law and are characterized by a state of leadership and hidden irresponsibility. From a moral point of view, the leader is an irresponsible person, the embodiment of dioecism, a turncoat, the exploiter of moral "stalemates". The roots of hidden irresponsibility can be found both in the moral formula of individuals and in the structural deficiencies of society [15].

Scientific research has revealed the surprising and unexpected phenomenon according to which irreversible changes in personality occur when someone occupies a leadership position for an extended period of time. When a person becomes a leader, regardless of the form of becoming a leader, the personality that was previously thought to be very solid is transformed "in an instant". This can only happen when a person unexpectedly possesses and becomes the possessor of a quality that they did not have before. This new quality is power. Power means empowering a leader to make decisions without accountability and relevant competence, and even to force their decisions on other people through the environmental structure. Possession of power is the most serious "psychological contagious disease" because whoever is infected cannot be cured. The moment a person becomes a leader, their voice, tone, facial expressions in relation to their co-workers, friends, acquaintances and relatives, change because the image of a superior person invade their personality that they become convinced from that moment that they know everything better than their subordinates, because due to the leadership position the intellectual workshops of argumentative debates are lost, listening to the opinion of others is invalid and the leader usually does not participate in practical work, so they have no information on how the activity in their community is concretized. We can state that becoming a leader creates a regressive distortion of the personality, which results in

irreversible changes in the structure of the personality and in the rest of their life, the person holding the leading position is unable to change.

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