Changes in the Morphometric State of the Lymphoid Tissue of the Spleen Under the Condition of Polypragmasia

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ABSTRACT

The spleen is one of the most complex peripheral organs of the immune system. The paucity and inconsistency of information regarding the structure of the spleen is due to the fact that the study of its structure is mainly carried out in various types of laboratory animals, followed by extrapolation of the data obtained to humans. Single studies performed using histological material of the human spleen do not fully reflect all aspects of the morphometric study of the size of the organ pulp compartments and the state of its cellular composition [Silva J.S., Andrade A.C., Santana C.C., 2012]. The article presents a review of the literature on the morphometric state of the lymphoid tissue of the spleen in the condition of polypharmacy.

Keywords: spleen, polypharmacy, lymphatic tissue, morphometry.

Relevance. In connection with the development of immunology, the interest of morphologists has increased in the study of both primary and secondary organs of the immune system, the main function of which is the production of lymphocytes, which, together with other cells of the immune system, participate in the body's defense reactions. To date, numerous studies have been carried out on the structure, peripheral organs of immunogenesis, which provided detailed information on the structure of the palatine (Nazarov D.R., 1984), pharyngeal (Ivanov A.I., 1988), tubal (Muragzamova G.M., 1989); lingual (Chilingaridi S.N., 1990), tonsils, spleen (Ambartsumyan E.F., 1991), etc.

The spleen is one of the most complex peripheral organs of the immune system. The paucity and inconsistency of information regarding the structure of the spleen is due to the fact that the study of its structure is mainly carried out in various types of laboratory animals, followed by extrapolation of the data obtained to humans. Single studies performed using histological material of the human spleen do not fully reflect all aspects of the morphometric study of the size of the organ pulp compartments and the state of its cellular composition [Silva J.S., Andrade A.C., Santana C.C., 2012].

The known results of measurements of the structural components of the white pulp (BP) and red pulp (CP) in the norm are most often scattered and do not represent a systematic substantiated material for possible use in the analysis of reactive changes reflecting the dynamics of immune processes [Zaitsev V.B., et al. , 2013]. The explanation for this, apparently, lies in the insufficient development of the methodology for organ morphometry, which has zones in its structure with different structures and functions, including subpopulations of cellular elements that differ in immunophenotype, which predetermines specific intercellular interactions. At the same time, cells in the spleen actively move in certain directions to perform their functions [Matsuno K., Ueta H., Shu Z., 2010].

Of great importance for practical medicine is the study of changes in lymphoid tissue under experimental conditions, simulating the effect of various types of anti-inflammatory substances used in production.

The immune system, which is the most dynamic and labile, actively reacts with structural and functional changes to antigenic influences and the actions of anti-inflammatory drugs. The impact of anti-inflammatory drugs of various nature leads to peculiar changes in the microstructure and microtopography of the organs of the immune system, which depend on the type of active substance, its concentration and duration of action. It has been established that various anti-inflammatory drugs can lead to inhibition of DNA synthesis in the cells of lymphoid organs, as well as to a decrease in the number of small lymphocytes, mitotically dividing cells, macrophages in the tissues of the organ and an increase in destructive processes.

The spleen, as an organ of the immune system, occupies a special position and plays an important role in the formation of protective reactions of the body in response to the intake of anti-inflammatory drugs in the body. It is in the spleen that antigens present in the blood "can activate appropriately determined lymphocytes to transform into immunocompetent cells" (Sapin M.R., Etingen L.E., 1996). To date, sufficiently detailed data have been obtained on the macro and microscopic structure, age-related features of lymphoid formations in the spleen of humans and some animals (Samoilov M.V., 1987; Ambartsumyan E.F., 1991; Sapin M.R., Etingen JI. E., 1996; Motalov V.G., 2004).

Considering that the spleen plays an important role in maintaining the immune status in the body, the study of the relationship and dynamics of the development of lymphoid tissue under the influence of high concentration anti-inflammatory drugs is of great theoretical and practical importance.

During the COVID-19 pandemic, excessive polypharmacy was allowed to improve the condition of infected patients, lower body temperature, improve breathing, help with sputum discharge, relieve bone pain, etc., the causes of disability are also the result of unreasonable use of drugs. A one-sided approach to drug prescribing is a major cause of death and disability.

In the modern world, the creation and introduction of a large number of medicines is rapidly growing, which, on the one hand, can cure and / or improve the patient's condition, and on the other hand, seriously harm health. The desire to increase the effectiveness of treatment, to help the patient get rid of all the diseases that have developed in him, inevitably leads to the intake of a large number of drugs (PM) - polypharmacy. Polypharmacy is a serious public health problem, as it is clinically manifested by a decrease in the effectiveness of pharmacotherapy and the development of serious adverse reactions (AEs), as well as a significant increase in healthcare costs.

Anti-inflammatory drugs are one of the most commonly used drug groups in medicine. Their advantage is a complex action (antipyretic, anti-inflammatory, thinning and analgesic), as well as a wide range of indications for which they can be used, and especially during a coronavirus pandemic. An analysis of the literature data on clinical experience in the management of patients with SARS associated with SARSCoV and MERSCoV coronaviruses allows us to identify several groups of drugs that were used by patients in combination, such as antibiotics, antiviral, anti-inflammatory, antiplatelet agents, anticoagulants, cytostatics. However, the currently available information on the results of therapy with these drugs does not allow us to draw an unambiguous conclusion about their effectiveness or inefficiency, as well as the development of side effects, not to mention polypharmacy with these drugs. At the same time, it is known that damage can be localized in almost any part of the spleen, despite the relatively rare discussion in the literature, it occurs much more often than is commonly believed. So, situations are by no means rare when it is damage to the spleen induced by taking anti-inflammatory drugs that causes the development of life-threatening conditions, a decrease in the body's immune response (M.A. Evseev, 2015).

Currently, the question of the widespread use of anti-inflammatory drugs in order to mobilize the body's natural defenses, the formation of physiological and immunobiological reactions for the prevention and treatment of all types of diseases remains relevant.

Statistics show that PVP polypharmacy is common and can be handled by any medical specialist. This is especially true during the COVID-19 pandemic.

In order to improve the simultaneous use of drugs in unreasonable combinations, the study of morphometric changes in the kidneys during polypharmacy for the rational use of drugs is still relevant (Kuzmenko Yu.Yu., 2009).

In the developed countries of the world, mortality from the side effects of drugs ranks 4th-5th among the deaths of the population. The above statistics indicate that polypharmacy of anti-inflammatory drugs is common and can be used by any medical specialist (Avtandilov G.G., 2012).

In the developed countries of the world, mortality from the side effects of drugs ranks 4th-5th among the population. The presented statistics show that PVP polypharmacy is common and can be used by any medical specialist. In practice, the high sensitivity of the kidney to various factors has already been proven, the ability of the first in the body to respond positively with adaptive changes in cellular architecture and morphological regeneration [Tyaglova I.Yu., 2013].

Reactive morphological and functional changes in the kidneys, observed under the influence of damaging factors in the body, make it possible to determine the nature and severity of the adaptive response of the spleen to this effect. An objective assessment of changes in the structural and functional state of the spleen allows the use of morphometric research methods that meet the modern requirements of evidence-based medicine [Volkov V.P., 2015; Klyushin D.A. et al., 2008].

Of particular interest is the morphological study of the structure and state of the spleen under the influence of anti-inflammatory drugs, since a fairly objective quantitative and qualitative assessment of these interactions is possible, reflecting the state of the barrier-protective function of the spleen and the whole organism.

The fundamental approach to assessing and understanding the features of the structure of the spleen, the size of its functional areas and the distribution of immunocompetent cells in the norm was the recalculation of morphometric parameters, taking into account the mass of the organ. As a result of histological, immunohistochemical and morphometric studies of spleen samples of persons who did not have a history of diseases of the hematopoietic system and other pathologies, the minimum and maximum values of the relative (%) and absolute values of the mass (g) of the white pulp and its compartments, the size of the red pulp, and also the content of cellular elements in these functional areas. It has been established that the characteristics of the parameters of the white and red pulp depend on the migratory properties of immunocompetent cells, the degree of activity of immune processes occurring in different compartments of these zones. In accordance with the data obtained, it seems to us possible to distinguish three stages in the course of immunoreactive processes in the functional areas of the spleen. Similar patterns expand the understanding of the immunomorphological features of this secondary lymphoid organ. The presented parameters may be of fundamental importance for the analysis of the morphology of the spleen in the interpretation of its changes in the diagnosis of diseases with damage to the organs of the immune system [Zaitsev V.B., et al., 2018].

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