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Morphometric Changes of the Spleen in Patients with Tumor Etiology

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Abstract: This study describes the morphometry of spleen dimensions; compare the presence of a significant difference between sex and age. The study also assesses the determinant factors of spleen dimensions. In all, 86 spleen specimens were reviewed. The presence of each marrow-derived lineage, dysplasia . Neoplastic hematopoietic proliferations in chronic myeloproliferative disorders are characterized by trilineage hematopoiesis with significant dysplasia in all cell lineages. Acute myeloid leukemia showed an increase in immature forms, which were highlighted by immunohistochemistry. Reactive extramedullary hematopoiesis showed variability in histologic features. Post-bone marrow transplant and thrombotic thrombocytopenic purpura/hemolytic–uremic syndrome spleens showed extramedullary hematopoiesis with some morphologic features of immaturity, which could simulate chronic myeloproliferative disorder.

Keywords: spleen, tumor, immune organs, morphometric changes.

Actually: Under the influence of carcinogen, there is an outbreak of several processes in the body, immune organs, leading to certain changes [Mikhailova M.N. and hammual. 2011]. The spleen plays an important role in the formation of immune defenses against tumors. The introduction of 1,2-dimethylhydrazine into the body leads to significant morphological and immunogystochemical changes in the white pulp of the spleen. The amount of small diameter lymphatic nodules increases compared to other nodules of different diameters. The diameter of the lymphatic nodules and their reproductive centers decreases. 4 months after the end of carcinogenic uptake, more clearly expressed hypoplasia of lymphoid nodules is recorded compared to the previous period. Lymphatic nodules have a significant reduction in the diameter of the Centers of reproduction and the width of the border area. Palm decreases in diameter, the number of V - and T - lymphocytes decreases [Merkulova L.M. and hammual. 2016].

Katshenko S.A. and others (2011) suggested that exposure to cyclosphane at 200 mg/kg would result in a 37.1% decrease in spleen mass on Day 7 of the experiment. As early as the first day of the action of this drug, a weakening of the V-immune reaction occurs, which is manifested by an increase in plasmocytes and a decrease in stratification [shtepa S.Yu., 2008]. Changes in the spleen's organ-specific indicators as above are also observed under the influence of hydrocortisone [Stasenko E.A., 2008].

When the animal organism is affected by bisphosphonate "Zometa", an increase in all indicators of the structure of the spleen and hyperfunctions are observed. Clearly expressed changes occur in the mantle area of lymphatic nodules, which indicates the formation of antibodies, activation of humoral immunity. Changes are noticeable on the 7th day of the experiment, reaching a maximum on the 90th day. After the 60th day of recalignment, morphometric indicator values have been observed to approach those in control [Stasenko E.A., 2009].

The question of the hormonal function of the spleen remains open. At the beginning of the last century, the German scientist o. Shtern found that spleen extract has a biologically active effect and predicted the presence of the hormone lienin in it. According to modern researchers, the spleen can produce a hormone, but its chemical nature has not yet been determined [Chadburn A., 2000].

The mechanism of thrombocytosis in the blood, the increase in the number of granulocytes after the removal of the spleen, remains unknown to this day. These changes are temporary and are usually observed for a month after the removal of the spleen [Chu H.B. et al. 2014].

At the age of old age, there is a decrease in the functional activity of the spleen, which is manifested by an increase in the number of old erythrocytes in the bloodstream. This is considered one of the reasons for the lack of gas exchange processes in the tissues during aging [Kuznesova E.P. and hammual. 2015; Ucgun F.M., Qazi S., 2010].

The effectiveness of the body's protective reactions against the action of exogenous factors often depends on the morphofunctional state of the peripheral organs of immunogenesis, in particular the spleen [Kochmar M.Yu. hammual. 2010; Cesta M. F., 2006; Melanie S. et al. 2008].

As a result of the influence of external factors, there is a decrease in the density of cells in the lymphoid structures of the spleen white pulp compared to the red pulp, while the composition of the cells changes relatively little [Chava, S.V., 2011; Evlahova, L.A., 2013].

Long-term exposure of the antigen leads to an increase in proliferative processes in the white pulp [Buccleuch yu.V., Vovkogon A.D., 2018].

A significant increase in macrophagal-proliferative and destructive processes in the functionally active areas of the rat spleen indicates the negative effects of emotional loading [Bakhmet A.A., 2014].

In many literature, laboratory animals are found in immune organs (thymus, spleen, lymph nodes, Peyer's PIL), an anti-rabies vaccine [cousin A. V. and hammual. 2004], the drug" Immunovak VP-4 " [Lebedinskaya o. V. and hammual. 2011], Immunomodulators [Razumov A. N. and hammual. 2010] when applied, long-term consumption of silicon with drinking water [Gordova V.S. and hammual. 2013] the morphological and functional changes that occur are described in detail.

In chronic immune inflammation, proliferative processes occur in the white pulp of the spleen. The volume of white pulp, the density of cell elements in lymphatic nodules and periarterial lymphatic mucosa increases. Apoptosis and macrophagal reaction increase in spleen lymphoid structures [Klimenko N.A. and hammual. 2009].

The purpose of the study. The study of morphological and morphometric parameters of the spleen of white rats in cancer diseases

Research objectives:

1. The study of age-related normative morphological and morphometric parameters of the spleen of white rats in postnatal ontogenesis.

2. The study of morphological and morphometric parameters of the spleen of white rats with tumor diseases.

3. Comparison of morphological and morphometric changes in the spleen of white rats with tumor diseases with indicators of healthy rats.

4. Determination of morphological changes occurring in the spleen of white rats after pathogenetic treatment for tumor diseases.

The object of the study.

To simulate cancer, a complete Freund adjuvant is used in 86 white randomized rats aged 18 to 24 months in the inpatient vivarium of the Bukhara State Medical Institute. All animal experiments are conducted in compliance with the international principles of the European Convention for the Protection of Vertebrates, used for experimental and other scientific purposes, as well as in accordance with the "Rules of work using experimental animals."

The subject of the study will be histological material obtained from various parts of the spleen of experimental animals.

Research methods.

- staining of micropreparations with hematoxylin-eosin

- staining of micropreparations according to Van Gieson
- general blood test
- the method of variational statistics using Strelkov tables and the definition of the Student's t-test

Results: A total of 86 participants were included in the current study with a 100% response rate. The mean splenic length, width, thickness, and volume were 10.24 ± 1.45 cm, 4.79 ± 0.99 cm, 3.93 ± 1.05 cm, and 109.34 ± 61.68 cm^3, respectively. The mean age of the study participant was 32.28 ± 13.17 years. More than one half of the respondent were males (55.08%) and more than one third (39.3%) were between the age group of 21–30 years. Majority of participants (82.49%) had normal BMI.

The mean height, weight, BMI, and BSA were 167.56 ± 6.69 cm, 61.75 ± 8.23 kg, 21.98 ± 2.53, and 1.44 ± 0.23 respectively. Significant variations were observed in all spleen dimensions among age categories of study participants. Bonferroni test for multiple comparisons found that the change in spleen length was significantly higher for 31–40 years compared to 11–20 years old (0.62, $p = 0.002$), 11–20 year compared to > 50 years (0.87, $p = 0.001$), 21–30 years compared to 41–50 years (0.66, $p = 0.006$), 21–30 years compared to > 50 years (1.02, $p = 0.001$), and 31–40 years compared to 41–50 years (1.04, $p = 0.001$). The change in spleen width was significantly higher for 11–20 years compared to > 50 years old (0.55, $p = 0.001$), 21–30 year compared to > 50 years (0.51, $p = 0.001$), and 31–40 years compared to > 50 years (0.66, $p = 0.006$). The change in spleen thickness was significantly higher for 31–40 years compared to 41–50 years old (0.47, $p = 0.022$), 11–20 year compared to > 50 years (0.44, $p = 0.030$), and 31–40 years compared to > 50 years (0.64, $p = 0.001$). The change in spleen volume was significantly higher for 31–40 years compared to 41–50 years old (29.82, $p = 0.009$), 21–30 year compared to > 50 years (23.34, $p = 0.025$), and 31–40 years compared to > 50 years (39.75, $p = 0.001$)

Conclusion:

This study describes the morphometry of spleen dimensions; compare the presence of a significant difference between sex and age. The study also assesses the determinant factors of spleen dimensions. The sonography assessment of spleen dimensions provides essential inputs for clinicians in daily clinical practice for the proper diagnosis of splenomegaly. This study provides estimates of spleen to help radiologist for the diagnosis of diseases related to splenomegaly and atrophy also used for haematologist and immunologist for the diagnosis of various gastrointestinal and haematological diseases in addition to forensic studies.

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