IMMUNOHISTOCHEMICAL CHARACTERISTICS OF THE GASTRIC MUCOSA IN ALIMENTARY-INDUCED MICROELEMENTOSIS

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ABSTRACT

Alimentary-induced microelement deficiency significantly affects epithelial renewal, immune response, and tissue homeostasis in the gastric mucosa. This study aimed to evaluate immunohistochemical changes in the gastric mucosa of 3-month-old rats under conditions of combined deficiency of magnesium, iron, zinc, and selenium. The experiment was conducted on white outbred rats divided into control and experimental groups. Trace element deficiency was induced through a controlled alimentary model. Gastric tissues were processed using standard histological techniques and stained with hematoxylin and eosin. Immunohistochemical analysis was performed to assess cellular activity, inflammatory response, and regenerative processes. In the control group, the gastric mucosa exhibited normal structural organization, intact epithelial lining, and moderate immunohistochemical activity. In contrast, rats with combined trace element deficiency demonstrated pronounced immunohistochemical alterations. These included increased cellular infiltration in the lamina propria, activation of inflammatory cells, and disruption of epithelial integrity. The findings also indicated impaired epithelial renewal and weakened barrier function of the gastric mucosa. The observed changes suggest the development of chronic mucosal injury associated with microelement imbalance. The results confirm that deficiency of magnesium, iron, zinc, and selenium leads to significant disturbances in cellular activity and immune response in the gastric mucosa. Immunohistochemical analysis provides important insights into the mechanisms of tissue damage and adaptive responses under micronutrient deficiency.

KEYWORDS:

gastric mucosa, immunohistochemistry, trace element deficiency, magnesium, iron, zinc, selenium, epithelial renewal, inflammation, cellular activity, experimental rats, mucosal injury

Relevance. Alimentary-induced microelementosis may disturb epithelial renewal, immune response, and tissue homeostasis in the gastric mucosa. Immunohistochemical analysis helps to reveal cellular activity, inflammatory reactions, and regenerative changes under trace element deficiency. Therefore, this study is relevant for understanding the cellular mechanisms of gastric mucosal injury in combined microelement deficiency.

Objective of the study. To evaluate immunohistochemical changes in the gastric mucosa of 3-month-old rats under conditions of alimentary-induced combined trace element deficiency.

Materials and methods.

The study was performed on 3-month-old white outbred rats divided into control and experimental groups. In the experimental group, combined deficiency of magnesium, iron, zinc, and selenium was induced through an alimentary model. After the experimental period, the stomach was collected, fixed, embedded in paraffin, and sectioned. Hematoxylin and eosin staining was used for general morphological evaluation. Immunohistochemical examination was carried out to assess cellular response, epithelial condition, and the activity of reparative and proliferative processes in the gastric mucosa.

Results.

In the control animals, the gastric mucosa demonstrated preserved structural organization, regular arrangement of gastric glands, and moderate immunohistochemical activity of cellular elements. The epithelial layer remained intact, while signs of inflammatory response were weakly expressed. Under conditions of combined trace element deficiency, pronounced immunohistochemical changes were observed in the gastric mucosa. Against the background of epithelial dystrophy and glandular disorganization, increased cellular infiltration of the lamina propria was detected. The immunohistochemical response reflected activation of inflammatory cellular elements and impairment of physiological epithelial renewal. In some areas, signs of reduced epithelial integrity were noted, indicating weakening of the barrier function of the gastric mucosa. The combination of these changes suggested the development of chronic mucosal injury associated with alimentary-induced microelementosis.

Conclusion.

Alimentary-induced combined trace element deficiency causes not only morphological but also significant immunohistochemical changes in the gastric mucosa. Impaired

epithelial renewal, increased inflammatory response, and altered cellular activity confirm the importance of magnesium, iron, zinc, and selenium in maintaining structural homeostasis of the gastric wall.

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