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MORPHOLOGICAL CHARACTERISTICS OF PARODONTAL TISSUES IN CHILDREN WITH TYPE 1 DIABETES MELLITUS (HISTOLOGICAL STUDY DURING SURGICAL TREATMENT OF HYPERTROPHIC GINGIVITIS)

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Background. Type 1 diabetes mellitus (T1DM) is a chronic autoimmune disease associated with persistent hyperglycemia, microangiopathy, and impaired tissue regeneration. Parodontal tissues in children with T1DM are particularly susceptible to inflammatory and dystrophic changes due to vascular and metabolic disorders. Histological examination of gingival tissues obtained during surgical treatment of hypertrophic gingivitis provides important information about the morphological alterations associated with diabetes.

Aim. To evaluate morphological changes in parodontal tissues in children with type 1 diabetes mellitus based on histological examination of gingival biopsies obtained during surgical treatment of hypertrophic gingivitis.

Materials and Methods. The study included gingival biopsy specimens obtained during gingivectomy in 24 children aged 8–16 years. The main group consisted of 12 children with T1DM, and the control group included 12 systemically healthy children with hypertrophic gingivitis.

Biopsy specimens of marginal gingival tissue (0.2–0.5 cm) were fixed in 10% buffered formalin, embedded in paraffin, and sectioned at 5 µm thickness. Histological sections were stained with hematoxylin and eosin and examined using light microscopy. Morphological evaluation included epithelial structure, inflammatory infiltration, connective tissue organization, and microvascular changes.

Results. Histological examination revealed significant morphological alterations in parodontal tissues of children with T1DM compared to the control group.

The gingival epithelium showed pronounced acanthosis in 83.3% of cases, epithelial cell vacuolization in 75.0%, and focal epithelial desquamation in 58.3%. Disruption of epithelial stratification and intraepithelial inflammatory infiltration were also observed.

The underlying connective tissue demonstrated severe inflammatory infiltration consisting predominantly of lymphocytes, plasma cells, and macrophages in 100% of cases. Connective tissue edema was observed in 91.7% of specimens, along with disorganization and fragmentation of collagen fibers in 75.0%.

Significant microvascular alterations characteristic of diabetic microangiopathy were identified, including thickening of vascular walls (83.3%), narrowing of vascular lumen (75.0%), endothelial swelling, and perivascular edema (66.7%). Capillary congestion and leukostasis indicated impaired microcirculation.



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Granulation tissue formation and delayed maturation of connective tissue were observed, indicating impaired reparative processes. Morphological signs of epithelial dysplasia and regenerative disturbances were detected in 41.7% of cases.

Overall, parodontal tissues in children with T1DM demonstrated persistent inflammatory changes, vascular pathology, and impaired regenerative capacity.

Conclusion. Children with type 1 diabetes mellitus exhibit significant morphological alterations in parodontal tissues, including epithelial dystrophy, chronic inflammatory infiltration, connective tissue destruction, and diabetic microangiopathy.

These changes contribute to impaired healing and progression of parodontal pathology. Histological findings confirm the negative impact of diabetes on parodontal tissue structure and emphasize the importance of early diagnosis, prevention, and specialized parodontal care in children with T1DM.

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