

MORPHOLOGICAL AND MORPHOMETRIC CHANGES OF THE EPIDIDYMIS IN EXPERIMENTAL ULCERATIVE COLITIS: A LITERATURE REVIEW

Khamdamov Qodir Fozil og'li

Bukhara State Medical Institute named after Abu Ali ibn Sino,
Bukhara, Uzbekistan.

Abduqodirkhamdamov8340@gmail.com,

<https://orcid.org/0009-0004-6402-1377>

Abstrakt. *In this literature review, modern data on morphological and functional changes occurring in the male reproductive system, specifically in the epididymis, under experimental ulcerative colitis were analyzed. Ulcerative colitis may not be limited to the large intestine alone but can also affect the male reproductive system through systemic inflammation, oxidative stress, altered immune response, and gut microbiota dysbiosis. In DSS-induced colitis, damage to testicular tissue, decreased sperm quality, and a reduction in epididymal sperm count have been identified. Recent studies demonstrate the relationship between gut microbiota–immune system–reproductive system, particularly the mechanisms of Th17/IL-17A-mediated epididymo-orchitis development. At the same time, specific morphometric changes in the epithelial and stromal components of the epididymis have not been sufficiently studied.*

Keywords: *ulcerative colitis, epididymis, oxidative stress, intestinal inflammation, spermatozoa.*

MAIN PART

Ulcerative colitis is a disease characterized by chronic and recurrent inflammation of the colonic mucosa, and its impact is not limited to the intestine alone. In modern studies, the effect of inflammatory bowel diseases on the male reproductive system is being studied with particular attention. In this context, disease activity, systemic inflammation, oxidative stress,

nutritional disorders, medications, and surgical interventions have been identified as factors affecting male reproductive health [1–4].

One of the most widely used methods for modeling experimental ulcerative colitis is dextran sulfate sodium (DSS). In a study conducted by Parmar and co-authors, under DSS-induced ulcerative colitis, increased inflammation, oxidative stress, and DNA damage in the testes were identified, as well as a decrease in the number of epididymal spermatozoa [1]. These results indicate that the chronic inflammatory process in the intestine may also exert a functional effect on the distal parts of the male reproductive system, including the epididymis.

These data indicate the necessity of studying the epididymis under ulcerative colitis not only as an anatomical structure that transports spermatozoa, but also as a reproductive organ that responds to systemic inflammation and oxidative stress. However, the majority of existing studies have focused on testicular parenchyma, spermatogenesis, hormonal status, and sperm parameters, while the microscopic structure and morphometric parameters of the epididymis have been relatively poorly studied [1–4].

One of the important mechanisms of reproductive disorders associated with ulcerative colitis is systemic inflammation. Proinflammatory mediators and reactive oxygen species produced during the chronic inflammatory process in the intestine can affect other organs through the bloodstream. In experimental studies, increased oxidative stress, weakening of the antioxidant defense system, and activation of apoptotic processes have been recorded against the background of ulcerative colitis [1, 3]. Farombi and co-authors showed that in a DSS-induced chronic ulcerative colitis model, the use of 6-gingerol reduced oxidative stress and inflammation parameters and improved sperm characteristics and testicular histostructure [3].

Immunological mechanisms also play an important role in the effect of ulcerative colitis on the reproductive system. In a study published in 2025 by

Zeng and co-authors, in an experimental model of colitis, it was shown that disruption of the gut microbiota and activation of Th17 cells are associated with inflammation in reproductive tissues. The researchers recorded leukocyte infiltration and the development of epididymo-orchitis in reproductive tissues and showed that IL-17A is an important mediator in this process [4]. This information serves as an important basis for reconsidering the role of the epididymis in reproductive damage associated with inflammatory bowel diseases.

Thus, the available literature indicates that ulcerative colitis can affect the male reproductive system through systemic inflammation, oxidative stress, immune mechanisms, and changes in the gut microbiota. Morphological changes in testicular tissue, decreased sperm quality, and in some cases histopathological damage to the epididymis have been confirmed through experimental models. However, data specifically on the epithelial structure of the epididymis, the diameter of epididymal tubules, epithelial height, stromal components, and morphometric parameters of blood vessels are scarce.

CONCLUSION

The analysis of the literature shows that in experimental ulcerative colitis, the epididymis is one of the important links of the reproductive system that responds to systemic inflammation and oxidative stress. In the available data, a decrease in the number of epididymal spermatozoa, changes in the organo-somatic parameters of the epididymis, and histopathological damage have been recorded. In recent studies, the involvement of the gut microbiota and Th17/IL-17A immune mechanisms in the development of colitis-associated epididymo-orchitis has been shown.

At the same time, studies that comprehensively assess the specific morphometric parameters of the epididymis are insufficient. Therefore, in an experimental ulcerative colitis model, the quantitative assessment of epididymal tubule diameter, epithelial height, stromal component ratio, blood

vessel condition, and inflammatory infiltration is a promising scientific direction. Assessing the effect of corrective agents on these parameters using morphological, morphometric, and immunohistochemical methods may serve to clarify the mechanisms of the effect of ulcerative colitis on the male reproductive system..

ADABIYOTLAR RO'YXATI

1. Parmar A.R., Trivedi P.P., Jena G.B. Dextran sulfate sodium-induced ulcerative colitis leads to testicular toxicity in mice: role of inflammation, oxidative stress and DNA damage // *Reproductive Toxicology*. – 2014. – Vol. 49. – P. 171–184. – DOI: 10.1016/j.reprotox.2014.08.004.
2. Adedara I.A., Ajayi B.O., Awogbindin I.O., Farombi E.O. Interactive effects of ethanol on ulcerative colitis and its associated testicular dysfunction in pubertal BALB/c mice // *Alcohol*. – 2017. – Vol. 64. – P. 65–75.
3. Farombi E.O., Adedara I.A., Ajayi B.O. et al. 6-Gingerol improves testicular function in mice model of chronic ulcerative colitis // *Human & Experimental Toxicology*. – 2018. – Vol. 37, №4. – P. 358–372.
4. Zeng Q., Liu J.C. et al. Gut microbiota-driven pathogenic Th17 cells mediated autoimmune epididymo-orchitis in a mouse model of colitis // *iScience*. – 2025. – Vol. 28, №5. – Article 112508.
5. Xiao Y. et al. Cyanidin-3-O-Glucoside Supplement Improves Sperm Quality and Spermatogenesis in a Mice Model of Ulcerative Colitis // *Nutrients*. – 2022. – Vol. 14, №5. – Article 984.