

THE IMPORTANCE OF COMPREHENSIVE ASSESSMENT OF STRUCTURAL AND FUNCTIONAL CHANGES IN THE LIVER AFTER MINI-GASTRIC BYPASS SURGERY**Xayitov Ilhom Baxodirovich**

Doctor of Medical Sciences, Associate Professor,
Department of Surgical Diseases in Family Medicine,
Tashkent State Medical University, Tashkent, Uzbekistan

ilhommed79mailru@mail.ru**O'tkirov Mirziyod Mirsaidovich**

Assistant, Department of Surgical Diseases in Family Medicine,
Tashkent State Medical University, Tashkent, Uzbekistan

mirziyodtkirov@gamil.com**Abstract**

Obesity and related metabolic disorders, particularly fatty liver disease, are among the most pressing problems of modern medicine. Mini-gastric bypass surgery is considered one of the effective methods for weight reduction and has a positive impact on metabolic processes. This article provides a comprehensive analysis of structural (steatosis, fibrosis) and functional (biochemical parameters) changes in the liver after surgery.

Keywords

mini-gastric bypass, obesity, liver, steatosis, fibrosis, metabolic syndrome

Introduction. Obesity is one of the chronic diseases that is rapidly increasing worldwide and represents a serious health risk. It affects not only body weight but also has negative effects on metabolic systems, cardiovascular health, and liver function. The liver is one of the organs most affected by obesity. The most common liver disease associated with obesity is non-alcoholic fatty liver disease (NAFLD), which is characterized by fat accumulation in the liver parenchyma [1,4]. It includes the following stages: simple steatosis, steatohepatitis, fibrosis, and even cirrhosis. The relationship between NAFLD and obesity is strengthened by metabolic disturbances such as insulin resistance, impaired lipid metabolism, and increased oxidative stress, leading to hepatocyte damage [4]. Bariatric surgery is one of the most effective long-term treatments for obesity. In particular, mini-gastric bypass (MGB) reduces stomach volume and alters digestion, resulting in rapid weight loss [2,6,7]. MGB not only reduces weight but also improves metabolic parameters and contributes to liver recovery. However, data on the morphological and functional changes in the liver after MGB, as well as their rate and duration, remain limited. Postoperatively, liver steatosis significantly decreases and fibrosis may improve, although liver enzymes (ALT, AST) may temporarily increase in the early postoperative period. Therefore, postoperative monitoring and evaluation of liver function are essential.

Materials and Methods. This study was conducted using a prospective observational design. It included patients who underwent mini-gastric bypass surgery, and their preoperative and postoperative conditions were compared. The follow-up period was 12 months. Patients

diagnosed with obesity and indicated for MGB surgery were included. Inclusion criteria included a body mass index (BMI) ≥ 30 – 35 kg/m² and the presence of comorbidities such as type 2 diabetes mellitus, arterial hypertension, and others, as well as age criteria. Clinical, laboratory, and instrumental examinations were performed at the following time points: preoperatively (baseline), and at 3, 6, and 12 months postoperatively. Clinical assessment included body weight (kg), BMI, degree of weight loss, and comorbidities (diabetes, hypertension). Laboratory tests included liver enzymes (ALT, AST, GGT), glucose and insulin levels, and lipid profile (total cholesterol, triglycerides). Ultrasound examination (US) was used to assess liver size, structure, and degree of steatosis. Non-invasive assessment of liver structural changes was performed using elastography.

Results. The study results demonstrated several positive changes after mini-gastric bypass surgery, confirmed by clinical, laboratory, and instrumental findings. A significant reduction in body weight and BMI was observed postoperatively. The most rapid weight loss occurred within the first 6 months, with maximal results achieved between 6 and 12 months. Most patients showed improved general condition, increased physical activity, and better quality of life. Laboratory results indicated a decrease in liver enzymes (ALT and AST), suggesting reduced hepatic inflammation. Additionally, blood glucose levels decreased, and lipid profile parameters improved. Instrumental examinations showed a reduction in liver steatosis. Overall, surgery effectively reduced weight, improved liver function, and decreased fat accumulation in the liver. However, fibrosis-related changes varied among patients. In some cases, fibrosis remained unchanged or slightly increased, highlighting the need for individualized postoperative monitoring.

Discussion. The findings of this study confirm the multifaceted impact of mini-gastric bypass surgery on the liver. One of the most significant observations was the marked reduction in hepatic steatosis, primarily associated with weight loss and improved metabolic processes. Weight reduction leads to decreased insulin resistance, which reduces the accumulation of fatty acids in the liver and prevents lipotoxicity. Normalization of glucose and lipid metabolism also decreases fat accumulation in hepatocytes. Therefore, regression of steatosis is considered one of the main positive outcomes of the surgery [5,7]. However, in some patients, fibrosis levels remained unchanged or slightly increased. This can be explained by several factors. First, the preoperative stage of fibrosis plays a critical role—advanced fibrosis may regress slowly or not at all. Second, postoperative nutritional deficiencies may affect fibrosis progression. After MGB, some patients may develop protein-energy deficiency, as well as vitamin and micronutrient deficiencies, which can impair liver regeneration and contribute to fibrosis persistence or progression. Third, individual metabolic differences are important. Patients respond differently to surgery; those with rapid improvement in insulin resistance tend to show faster liver recovery, whereas others experience slower improvement. Thus, postoperative follow-up is essential. Regular laboratory and instrumental assessments, particularly elastography, are recommended. Adequate nutrition, sufficient protein intake, and maintaining vitamin-mineral balance are also crucial for liver protection.

Conclusion. Overall, this study highlights the importance of comprehensive assessment of liver changes after mini-gastric bypass surgery. Further large-scale, long-term, and multicenter studies are needed to better understand these processes.

References

1. Głuszyńska, P., Lemancewicz, D., Dziecioł, J. B., & Hady, H. R. (2021). Non-alcoholic fatty liver disease (NAFLD) and bariatric/metabolic surgery as its treatment option: A review. *Journal of Clinical Medicine*, 10(24), 5721. <https://doi.org/10.3390/jcm10245721>
2. Zhou, H., Luo, P., Li, P., Wang, G., Yi, X., Fu, Z., ... et al. (2022). Bariatric surgery improves nonalcoholic fatty liver disease: Systematic review and meta-analysis. *Obesity Surgery*, 32(6), 1872–1883. <https://pubmed.ncbi.nlm.nih.gov/35386040/>
3. Fakhry, T. K., Mhaskar, R., Schwitalla, T., Muradova, E., Gonzalvo, J. P., & Murr, M. M. (2019). Bariatric surgery improves nonalcoholic fatty liver disease: A contemporary systematic review and meta-analysis. *Surgery for Obesity and Related Diseases*, 15(3), 502–511. <https://pubmed.ncbi.nlm.nih.gov/30683512/>
4. Cazzo, E., Pareja, J. C., & Chaim, E. A. (2017). Nonalcoholic fatty liver disease and bariatric surgery: A comprehensive review. *Sao Paulo Medical Journal*, 135(3), 277–295. <https://pubmed.ncbi.nlm.nih.gov/28562737/>
5. Shagzatova, B. K., & Rakhimova, S. K. (2024). Study of NAFLD dynamics using FibroScan in the context of bariatric surgery. *Central Asian Journal of Medicine*, 2, 5–12. <https://journals.tma.uz/index.php/cajm/article/view/824>
6. Xayitov, I. B., O'tkirov, M. M., O'rinboyev, J. E., Ro'ziyev, S. A., & Sayidburkhonov, S. S. (2024). Bariatric surgery outcomes and morphofunctional liver changes (review). *International Scientific Research Conference*. <https://interoncof.com/index.php/belarus/article/view/15284>
7. Wei, L., Li, M., Zeng, N., ... et al. (2021). Bariatric surgery for non-alcoholic fatty liver disease in individuals with obesity (Base-NAFLD): Protocol of a prospective multicenter observational follow-up study. *BMC Surgery*, 21, 298. <https://pmc.ncbi.nlm.nih.gov/articles/PMC8223375/>
8. Urinboyev, J., O'tkirov, M., Kurbanov, G., Toshnazarova, N., Baratov, N., & Utegenov, Y. (2025). ВЕДЕНИЕ ПАЦИЕНТОВ ПОСЛЕ БАРИАТРИЧЕСКИХ ОПЕРАЦИЙ. Modern education and development, 37(3), 58-65.
9. Utegenov, Y., Urinboyev, J., O'tkirov, M., Kurbanov, G., Toshnazarova, N., & Baratov, N. (2025). МЕХАНИК (ОБСТРУКТИВ) САРИҚЛИК: ТУШУНЧАСИ, ТАСНИФИ, ЭТИОЛОГИЯСИ, ПАТОГЕНЕЗИ, КЛИНИКАСИ ВА DIFFERENTIAL DIAGНОСТИКА. Modern education and development, 37(3), 75-82.
10. Toshnazarova, N., Baratov, N., Utegenov, Y., Urinboyev, J., & Utkirov, M. (2025, October). EARLY DETECTION OF ACUTE PANCREATITIS AND OPTIMIZATION OF ITS MANAGEMENT: CURRENT EVIDENCE AND PRACTICAL RECOMMENDATIONS. In *International Conference on Medicine & Agriculture* (Vol. 1, No. 1, pp. 84-89).
11. Kurbanov, G., Urinboyev, J., O'tkirov, M., Toshnazarova, N., Baratov, N., & Utegenov, Y. (2025). DIAGNOSIS, TREATMENT AND PREVENTION OF CROHN'S DISEASE, PEUTZ-JEGHERS SYNDROME AND ULCERATIVE COLITIS: A COMPREHENSIVE CLINICAL REVIEW. Modern education and development, 37(3), 66-74.
12. Баратов, Н., Утегенов, Ю., Курбанов, Г., Ўткиров, М., Ўринбоев, Ж., & Тошназарова, Н. (2025, October). СОВРЕМЕННЫЕ ТЕНДЕНЦИИ ЛЕЧЕНИЯ ОСЛОЖНЕНИЙ У ПАЦИЕНТОВ С ЯЗВЕННОЙ БОЛЕЗНЬЮ ЖЕЛУДКА И ДВЕНАДЦАТИПЕРСТНОЙ КИШКИ. In *International Conference on Medicine & Agriculture* (Vol. 1, No. 1, pp. 25-29).
13. Baratov, N., Urinboyev, J., O'tkirov, M., Kurbanov, G., Toshnazarova, N., & Utegenov, Y. (2025). LIVER DISEASES: BACTERIAL AND AMOEBIC ABSCESSSES AND JAUNDICE IN LIVER CIRRHOSIS. Modern education and development, 37(3), 83-91.